

Technology

How Craig McCaw Built A 4G Network on the Cheap

► The mobile pioneer's Clearwire controls airwaves worth \$20 billion or more

► "You can never be too rich, too thin, or have too much spectrum"



Craig McCaw's quest to dominate the emerging era of fourth generation, or 4G, wireless networks began in a Maryland basement office back in 2003. There, McCaw's representatives met with Rudy Geist, a lawyer with only one client, a Spanish-language broadcaster that happened to be the nation's largest licensee of the 2.5-gigahertz frequency of radio spectrum.

That band had been given away to schools and nonprofits since the 1960s. In theory, it was to be used for educational TV. In practice, the spectrum mostly languished. McCaw signed a master lease with the Spanish broadcaster, giving a Kirkland (Wash.) company he founded that year called **Clearwire** a foothold in about 20 markets.

Clearwire would end up with more than 1,000 such leases, for which it will pay about \$5 billion over the next three decades. When the Federal Communications Commission in 2005 relaxed regulations on the 2.5-GHz band to encourage wireless broadband, its value exploded. McCaw was then in a position to compete against Sprint and other companies for control of a national portfolio. In 2008 Sprint, which also had 2.5-GHz holdings—and was still struggling with its 2005 Nextel merger—folded its spectrum into Clearwire in exchange for a stake in the company.

"That spectrum basically went from swampland to oceanfront property," says Brad Bowman, a community activist in Delray Beach, Fla., who advocates for municipalities to create their own 4G networks rather than rely on commercial carriers.

Today, Clearwire says the airwaves it controls are worth \$20 billion or more. Now we're about to find out whether McCaw, the mobile-phone pioneer who made a killing selling McCaw Cellular



"For a guy who isn't an electrical engineer, he's got an intuitive sense of where the spectrum will be valuable"

lar Communications to **AT&T** for \$11.5 billion in 1994 and later helped build Nextel, will rock the world of mobile communications once more. "Craig has the ability to bend the horizon," says Bob Ratcliffe, a former senior vice-president at McCaw Cellular. "For a guy who isn't an electrical engineer, he's got an intuitive sense of where the spectrum will be valuable." (McCaw declined to be interviewed for this story.)

Last year McCaw, who serves as Clearwire's chairman, hired former **Vodafone** executive Bill Morrow to help him create a superfast wireless network that will serve all manner of devices—from smartphones to tablet computers to gadgets not yet invented—at speeds that rival some of the broadband connections now offered by cable and phone companies. Clearwire advertises 4G wireless as four times faster than 3G.

It's safe to say Morrow hasn't had a boss quite like the 60-year-old McCaw before. Morrow sometimes finds himself summoned over to McCaw's office, where the billionaire holds forth with "philosopher-type views" on how to use the public's airwaves to "disrupt" entrenched telecommunications giants. "Next thing you know, I'm getting two or three books sent over as gifts to me," says Morrow.

Yet Morrow wasn't signed on to be McCaw's literary pal. The two executives are trying to out-hustle far bigger rivals **Verizon Wireless** and **AT&T**, the two biggest carriers in the U.S., in a mobile data market that, by some projections, will reach \$93 billion in revenue by 2013. Both AT&T and Verizon are planning to roll out 4G services over the next several years using a competing technology that could turn Clearwire's wireless broadband standard, called WiMAX, into the next Betamax. "I think we're in

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Goldman
wrestles with
the SEC
page 42 ►

a better position,” says AT&T spokesman Mark Siegel, calling Clearwire’s technology “unproven for true mobility.”

While not a household name, Clearwire has two key advantages: McCaw’s massive accumulation of relatively cheap broadband spectrum, which dwarfs the airwaves of AT&T or Verizon Wireless, and a one-year head start. Clearwire already offers 4G service under the Clear brand in 32 U.S. cities and plans to add up to 50 more by the end of 2010.

To reach that number, the company is in the midst of a high-speed build-out. Last year the company put up 5,000 cell sites at a cost of \$130,000 to \$150,000 each. “That broke the record,” says Morrow, 50. “This year we’re doubling that in terms of the number of sites we’re constructing.” In 2010, Clearwire will spend up to \$3.2 billion, the bulk of that on capital expenditures.

Consider what’s involved in putting up a single tower: leasing or buying real estate; winning community support and zoning permits, sometimes over fierce opposition; and paying as many as 25 workers to erect structures up to 400 feet high. The process takes from nine months to three years, says Dave Cloud, co-owner of **NuHites Construction Services** in Arkansas, which has installed equipment for Clearwire. “The task and the resources to do this build-out are enormous,” says technology consultant Chetan Sharma. He figures Clearwire is putting up a tower an hour—including weekends.

For Clearwire, much is riding on whether its strategy of buying up some 85 percent of the 2.5-GHz spectrum

Cell Towers by the Numbers

20

Minimum number
of workers it takes to
build one tower

80 to 400

feet

Range of height

9 3

months to years

How long it takes to build
one tower, including
permits, construction, etc.

10,000

Number of towers Clearwire
plans to build this year

\$130,000

Approximate cost to build
one Clearwire tower

DATA: CLEARWIRE, NUHITES CONSTRUCTION SERVICES

band will pay off. Some big tech players are clearly willing to bet sizable money on McCaw. Two years ago, Clearwire received \$3.2 billion in investments from **Comcast, Intel, Time Warner Cable, Google, and Bright House Networks**. Last year, Clearwire raised an additional \$1.5 billion from a group led by **Sprint Nextel**, prompting one Wall Street analyst to call the McCaw company “too strategic to fail.” Sprint is now the majority shareholder of Clearwire and offers high-speed mobile Web service under the brand Sprint 4G. Sprint is releasing the first 4G smartphone in the U.S. on June 4.

The \$5 billion Clearwire will pay its license holders for its spectrum over the next three decades is a bargain compared to what its rivals are paying. (Clearwire’s \$20 billion valuation of its spectrum may prove to be conservative; J.H. Snider, former research director at the New America Foundation’s Wireless Future Program, puts the number closer to \$50 billion.) AT&T and Verizon

bought their spectrum that can be used for 4G at government auction in 2008, paying a combined \$16 billion.

AT&T and Verizon may have paid more, but those companies contend that their lower frequency, 700 megahertz, lets radio signals travel farther on less power and do a better job of penetrating buildings and other objects. “Clearwire will have to build two, three, maybe even four times the number of cell sites to get the same coverage,” says Nicki Palmer, Verizon Wireless’ vice-president for networks. Morrow disputes that assessment. In cities, where the bulk of customers are, he says, “you build the same amount of sites within a city whether you’re on 700 MHz or 2.5 GHz.”

Even more pressing than the questions about coverage is the possibility that at its current rate of spending, Clearwire will burn through its cash in 2011, according to Steve Clement, an analyst at Pacific Crest Securities. Clearwire may need \$3.8 billion more to reach its goal of building a network that covers 270 million people, Clement says.

Then there’s Clearwire’s bet on WiMAX. Analysts increasingly see the technology backed by AT&T and Verizon Wireless, called LTE, for “long term evolution,” as the industry standard. That could limit the number of cool new devices Clearwire and its reseller partners can offer customers and could ultimately force Morrow to convert the network to LTE at a cost of hundreds of millions of dollars. “It looks almost certain that Clearwire will move to LTE within a matter of 24 to 36 months,” says Sharma, the technology consultant.

Although Clearwire has never been profitable, it has about 1 million subscribers, double what it had a year ago. It added 283,000 net new subscribers in the first quarter, compared with 133,000 new customers in the previous quarter. “They’re announcing nice growth in subscribers, but that growth is off of a very small base,” said Jeff Belk, a San Diego-based telecom consultant and former Qualcomm executive. By comparison, Verizon Wireless alone has 93 million customers, all of whom the company will try to convert to its 4G service.

However the 4G race shakes out, Clearwire can count on its “oceanfront” spectrum holdings to remain valuable

Quoted

“What have you done that’s so great? Do you create anything, or just criticize others’ work and belittle their motivations?”

— Apple’s Steve Jobs in an e-mail exchange with blogger Ryan Tate of Gawker Media



even if the company's retail efforts fizzle. For example, consumer electronics companies have recently been expressing interest in including Clearwire's service with Internet-enabled devices like computer tablets, Morrow says.

"A lot of spectrum is extremely valuable when you think about the exponential growth of mobile broadband data needs," says Sriram Viswanathan, an Intel vice-president and general manager of its WiMAX program. "Anyone that has more spectrum is going to be in a much better position." Or, as Belk puts it: "You can never be too rich, too thin, or have too much spectrum."

—Gadi Dechter and Olga Kharif, with additional reporting by Peter Robison

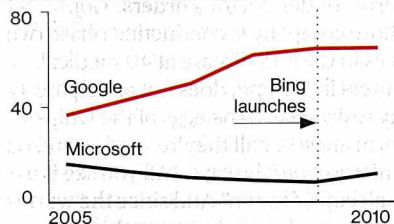
The bottom line Even if Clearwire's retail business sours, it will be able to resell 4G services to other carriers and device manufacturers.

The Internet

Bing Seeks, and Finds, A Foothold in Search

► Microsoft's big challenge is to woo online advertisers

► Share of Internet Searches



DATA: COMSCORE

If Microsoft's goal was to hear Bing used as a verb, there are signs of success. In April about 12 percent of all Web searches were performed using Microsoft's year-old search engine. While that doesn't exactly make Bing a Google killer, it seems to be holding its own. Searches on Bing are up 4 percent since its launch a year ago, according to comScore. Meanwhile, Google's share is flat at 64 percent. "I do hear people saying 'I Binged it,'" says Danny Sullivan, who runs the search-analysis Web site Search Engine Land.

Microsoft has been trying to build its presence in search since 2004 (its

last pre-Bing effort was called Live Search). Despite huge investments, Microsoft's share of all Net searches fell eight percentage points between 2004 and 2009. Most of the roughly \$6 billion in losses racked up by Microsoft's online business division since 2006 are related to search, estimates Matt Rosoff, an analyst with market research firm **Directions Marketing Group**.

For Bing to be successful, the bump-up in searches will have to translate into more business from advertisers. For years, many companies that wanted their ads to appear alongside search results have sought a strong alternative to Google to get better prices. **Range Online Media**, a search-marketing firm, says most of its clients spend 5 to 9 percent of their budgets with Bing, up from the 2 to 5 percent they spent on Microsoft's search products two years ago. Curt Hecht, head of **Publicis Groupe's** digital ad technology unit, says some clients who had been taking a "wait-and-see" approach to Bing are now asking whether they are "underinvested" in Microsoft's search engine.

Bing moved away from Google's minimalist formula of a plain white page with a search box that produces a list of 10 blue links. Instead, Bing's home page showcases a daily high-resolution photo. There's the usual column of results in the middle, and a list of relevant categories on the left. If you Bing Lady Gaga, for example, these categories include "Lyrics" and "Albums." This month, Google unveiled a redesigned search page with a similar layout. "It certainly seems that they've been spurred by something over the past year," says Mike Nichols, Bing's general manager. (Google spokesman Gabriel Stricker: "We have many competitors, and we take them all seriously.")

Bing may never come close to passing Google as the top search engine, but it may not have to. A 2009 deal with **Yahoo!** makes Bing the search technology that Yahoo will use on its Web sites, though it won't use the Bing name. If Yahoo and Microsoft hold their current shares, Bing will power nearly 30 percent of all searches. "At that size, advertisers can't ignore them," says Rosoff.

The Bing team is pushing for a bigger slice of a market that Google doesn't yet control: mobile devices. While Google is the default search engine on Apple's iPhone and other

Will we grow our way out of the deficit? Or tax our way out of it?

"The tax system today is not up to raising the revenues we need in the future."

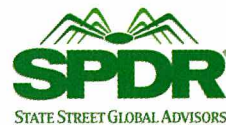
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