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WiFi, 3G, and Ten Million Landlords

{Because this month's column covers specific technical issues, the online version includes an extended glossary and links to sources for many of the assertions. I encourage you to look at http://www.mironov.com/archives/wifi_3g/ .}

In the US, WiFi usage has skyrocketed, while 3G adoption limps slowly along. We might expect WiFi to completely supplant 3G, but there are some interesting problems to solve before that happens.

First, some background: WiFi is a hot set of market-driven, fast-moving standards for short-range wireless networking. You may know WiFi as the gear that lets your laptop roam throughout your house, or something labeled 802.11b (and .11a and .11g). Dozens of vendors have rushed dirt-cheap products to market, driving spontaneous adoption in homes, small offices and some enterprises. Gartner forecasts more than 26 million new WiFi nodes will ship this year, and appear in more than half of all new office laptops. The general business press has been kept busy with the human-interest side of the story: coffee shop access and warchalking.

WiFi is a classic Internet technology: cheap, addictive, somewhat chaotic, and built on a rapid cascade of increasingly good standards. Intel's announcement of WiFi support in its upcoming chip will drive even cheaper gear and faster adoption.

In contrast, US 3G networks have taken a very slow trip to market. 3G technology adds data services on top of the major cellular providers' existing voice network. It is wide-area wireless coverage for all kinds of devices (handhelds, PCs, phones) using licensed radio spectrum, competing with voice calls for the carriers' bandwidth and attention. The major US carriers have split on technical standards (Sprint and Verizon are on CDMA 1XRT; AT&T, Cingular and T-Mobile are on GSM/GPRS), locking customers into carrier-specific hardware.

Surprising no one except the carriers themselves, 3G suffers from all of the classic big-carrier ills: slow roll-out, high prices, incompatible hardware, slow data rates, incomplete coverage, carrier-style customer dis-service, and slower-than-planned market adoption. My cell carrier will let me sip data for $10 per month, but wants $100 monthly for heavy traffic. For those who remember ISDN, 3G is its younger cousin.

Today, the American 3G market is a combination of trendy consumers sending short messages (IM, SMS, light email) and corporate customers who urgently need broad data mobility (such as package delivery services).

Therefore, we should expect WiFi to eradicate 3G, leaving only write-offs on the carriers' financial statements. For the home and small business, I heartily agree. (Come heavily armed if you want to take away my home office WiFi.) There is some obvious work to make this happen, though, plus more subtle issues for businesspeople who travel. Let's consider the simple items first.

Three Easy Pieces

To mimic earlier mass-market technology adoption patterns, we will need:

- Dirt-cheap cards and Access Points. This month, WiFi cards are under $60. As support moves onto Intel and AMD chipsets, look for WiFi support below $35. By December, business laptops without wireless networking will be in the discount rack.
- Really easy to install and configure. Don't hold your breath here for 2003… perhaps early in 2004. Windows XP can detect wireless Access Points, but it won't be truly friendly or compatible until the second or third release. (Remember Windows 1.0 and 2.0?) Meanwhile, free Microsoft client software will squash all innovative competitors, since they need revenue to survive.
- Decent WiFi data security based on stable standards. This doesn't matter for home or hot spot use, but enterprise network managers are fearful of weak WiFi security. Since this is big topic, February's column is a walk through the acronym forest (WEP, WPA, 802.11i) and a critique of attempts to use VPNs where they were never intended.

Given good execution, everything is in place for consumers to WiFi their houses, and for companies to wireless-enable their employees at their main offices. Trade magazines are filled with optimistic forecasts and product announcements, so it must be true.

Then What's the Problem?

Businesses still face the "roaming" problem. When business users leave their campuses, they visit customers and suppliers. In person. In other people's office buildings, across the table from their partners. Once they've become addicted to always-on connections, corporate road warriors are increasingly nervous working without a net. In contrast, they spend as little time as possible in airport lounges and hotels and coffee shops, because that's not where useful work happens. Wayport and STSN are addressing the marginal edges of a business traveler's day.

Here's where the physics of WiFi becomes important. At its best, WiFi users must be within 300 feet of a wireless access point. Most office buildings are wider than 300 feet, which means that external service providers can not deliver WiFi in the places that most business users want it: in someone else's office. Cometa's plan to deliver ubiquitous wholesale WiFi may bump into both ownership and physical limitations.

Tyranny of Ten Million Landlords

Each business, then, becomes the sole supplier of WiFi within its walls. Every local network administrator can control whether visitors have local WiFi access privileges. Imagine ten million businesses, each with its own unique policies for "who's allowed to surf" and "what's the secret handshake". Today, there's no incentive or agreed solution to manage WiFi visitor privileges.

In order for WiFi to become a resource in other peoples' offices, we need a few more things:

- A motivator for corporations to grant each other access. This might start bilaterally, with a few big companies giving limited public access to key partners.
- A solid technical solution that gives visitors a quick route to the public Internet, yet solidly protects the network owner from unauthorized users. I'm still looking for a simple, workable solution.
- A massive clearinghouse for authorizations and payments. Today, iPass does for dial-up what Visa does for credit cards: linking thousands of customers to hundreds of providers. If we scale this up another 1000-fold, the numbers get interesting.
- Huge numbers of access points. Spaced every 100 yards, the continental US is about 56,000 access points wide and 28,000 high.

(I'm toying with approaches to the first two items. Drop me a line to compare your white board solutions with mine.)

On the other hand, wide area networking is… well… wide area. 3G easily passes through walls and over corporate campuses. If your cell phone works inside, then 3G should too. Corporate roamers can plug in their (overpriced) 3G cards almost anywhere, and (over)pay for 3G data services in most conference rooms. It looks like business travelers will be supporting both solutions until WiFi ranges get much longer or carriers deliver a truly competitive service.

WiFi will dominate home networking this year, and in-your-own-office connections next year. Creating shared access for outsiders on corporate WiFi networks and in transit seems much harder.

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