



Municipal Wireless Gets New Emphasis

Rethinking the Infrastructure Cloud

Greg Goth

The vaunted concept of cloud computing has come to mean different things for different layers of the application stack. For enterprise customers, the “cloud” has come to refer to the dedicated infrastructure of applications and data residing in a combination of outsourced or otherwise remote hosts. This definition has obscured consideration of the cloud as a ubiquitous, last-mile network available to any user, anywhere, but numerous factors – including vastly more capacious wireless technologies and increased national attention on broadband network strategies – are contributing to a new emphasis on this cloud as well.

As much as consideration of fundamental network capacities has changed, however, the overall discussion about who leads and who follows in implementing new resources seems to be following an old outline. Asian nations with a history of investing heavily in broadband are still global leaders; so, too, are European and Scandinavian nations who pioneered wireless networks.

3G is Falling Short

Esme Vos, founder of the global networking information Web site MuniWireless.com, is emphatically more optimistic about public investment in network infrastructure than she used to be, though she has words of warning for US-based technologists.

“Asia has free Wi-Fi everywhere, in airports and cafes,” Vos says.

“They build infrastructure, they don’t dillydally around waiting for stimulus funds. When you’re writing articles about infrastructure, the rest of the world is marching along very quickly. The US has a serious problem, but I don’t think people in the US realize it that much until they go abroad.”

Vos isn’t sanguine about the latest end-user enticement from incumbent carriers, the MiFi personal access point. About the size of a deck of playing cards, the MiFi utilizes 3G networks to provide up to five users simultaneous Wi-Fi access. Vos believes the long-term result of introducing these mini access points will be to demonstrate the 3G infrastructure’s shortcomings.

“If they sell a lot of these MiFis and people are using [them] to provide connectivity to their colleagues, wireless carriers will realize they need to add capacity to the network,” she says. “People get upset when they sign up for 3G service, try to access their iPhone apps, and find it’s really slow or the network is down. The carriers will have to think very carefully about how they do this.”

Vos’s observations received recent reinforcement from the 2009 Global Broadband Quality Study, released on 1 October by Oxford University’s Said Business School and the University of Oviedo in Madrid (Cisco Systems sponsored the study; see www.sbs.ox.ac.uk/news/media/Press+Releases/Cisco+BQS+2009.htm).

The study included data on the

quality of mobile broadband services for the first time. On average, its authors found that “mobile devices connecting to Wi-Fi services meet the broadband quality threshold required for today’s mobile Internet applications. The average BQS [broadband quality score] of 3G and 3G+ technologies does not currently meet the threshold due to low upload throughput.”

The study also concluded that to adequately meet emerging applications’ technical requirements, network architects and planners will have to figure for increased capacity factors of three to four times current benchmarks. For example, although current applications such as social networking and low-definition video streaming sites require download speeds of 3.75 Mbps and upload speeds of 1 Mbps to achieve the study’s quality benchmark, the study’s authors believe emerging applications such as visual teleconferencing, high-definition video transfer, and consumer telepresence will require download capacity of 11.25 Mbps and upload capacity of 5 Mbps.

European-based studies aren’t alone in calling for faster upload capacity. In the US, the Minnesota Ultra-High Speed Broadband Task Force recently released its recommendations for that state’s broadband infrastructure with explicit mention of bringing more upstream capacity to network users.

“The task force heard from a

variety of experts who believe certain applications require symmetrical speeds (that is, equal upload and download speed) in order to work properly,” the task force found. “Examples cited include telemedicine, telework, and distance education. The task force found that many consumers asking for symmetrical service are in fact in need of faster upload speeds. When that application upload need is met, whether the download speed is symmetrical or faster, consumers or businesses have a solution to their problem.”

Improved Technology and Business Models

Wireless networks alone won't likely be able to meet those thresholds for some time, but that hasn't halted the ongoing construction of alternative municipally backed networks in numerous cities. Although many early examples of municipal Wi-Fi networks failed due to overoptimistic usage estimates and equipment that proved underpowered for its intended purpose, second-generation municipal wireless networks demonstrate a new sustainable business model and are concurrently taking advantage of the newest Wi-Fi standard, 802.11n, which features greatly amplified throughput and range compared to its predecessor b and g standards.

“The 802.11n standard is a game changer,” Vos says. “It changes the economics of setting up a very large Wi-Fi network. I've heard from a couple manufacturers of equipment. Originally, they targeted the enterprise market; they didn't want to touch muni networks. And they found some of their customers have set up outdoor networks.”

One vendor that discovered outdoor network possibilities accidentally is Sunnyvale, California-based Ruckus Wireless. David Callisch, Ruckus's vice president of marketing, says the company's access

points delivered robust performance in outdoor deployments, though they were designed for indoor networks.

Callisch estimates deploying an outdoor wireless network with 802.11n access points is nearly five times less expensive than using WiMax or equipment intended to use licensed spectrum.

However, one municipal network just announced an expansion of its wireless footprint using 802.11g equipment that exceeds current 3G speeds. The network – Albany, New York's Albany Freenet – is a partnership between the city and local ISP Tech Valley Communications; it offers users of its free service download speeds of 1.5 Mbps and upload speeds of 1 Mbps. Users of Freenet's premium wireless network service get symmetric data rates of 3 Mbps. Jeff Mirel, Tech Valley's director of wireless, says the increased data rates are due to a combination of wireless access points and an extensive network of fiber-optic cables enabling much larger rates of backhaul.

The expansion of Albany's wireless network also demonstrates the current philosophy of using a public-private partnership investment and anchor-tenant model to ensure municipal network providers sustainable revenue. Mirel says the city uses the network for public safety applications as an anchor tenant and also participates in securing public-sector economic development funds. The recent expansion, for example, was possible through a US\$625,000 grant from New York state; the funds will let Tech Valley double the number of access points in the city. The funding will also enable the city, through partnerships with more than 20 community-based organizations, to offer digital literacy and job skills assessment classes for city residents at no charge, as well as subsidized Wi-Fi-enabled hardware.

The return on investment for municipal Wi-Fi goes beyond produc-

News in Brief

The oft-bemoaned **US Department of Commerce's** control over **ICANN** officially ended with the expiration of the two parties' Joint Project Agreement on 30 September. ICANN management will now transition to an international multistakeholder model. As Internet Society President **Lynn St. Amour** noted in response to a *Wall Street Journal* article, the move will “help ICANN emphasize and enhance transparency, stakeholder participation, evidence-based decision-making processes and accountability that will, in the long run, provide a healthier Internet for us all.”

More on ISOC's view of the new oversight framework is at <http://isoc.org/wp/newsletter/?p=1287>.

ICANN's official announcement of the change is at www.icann.org/en/announcements/announcement-30sep09-en.htm.

In a 21 September speech at the **Brookings Institute**, **Julius Genachowski**, chair of the **US Federal Communications Commission**, said that the FCC would up its efforts to safeguard Internet neutrality. Chief among those efforts would be to make the commission's **2005 Broadband Policy Statement** into a set of actual rules. It also plans to extend those rules to cover wireless Internet access, as well as to include a nondiscrimination principle and require network management transparency.

The speech is available online at <http://openinternet.gov/read-speech.html>.

Operation Phish Phry, a multinational investigation in the **US** and **Egypt** that commenced in 2007, uncovered a **large-scale phishing scam** and led to the October arrest of 33 out of 53 defendants identified in several US cities; local authorities identified an additional 47 defen-

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dants in Egypt. According to the FBI, the defendants were operating an elaborate scheme to collect personal information from thousands of bank account holders and thereby **defraud American banks**.

More information is available at <http://losangeles.fbi.gov/pressrel/2009/lal00709.htm>.

Nineteen **chief technology officers** from major international organizations have called on the **ITU** to lead “an overhaul” of **global ICT standards**. In a 6 October meeting in Geneva, the CTOs met with ITU’s senior management and agreed on recommendations and actions to “streamline and clarify the standardization landscape,” according to **Malcolm Johnson**, ITU’s director of the telecommunication standardization bureau. The focus of the meeting was to find ways to better address the industry’s needs and reaffirm the role of standards as a universal language to ensure interoperability and drive growth in products and services.

More information is available at www.itu.int/ITU-T/tsb-director/cto.

To help **businesses in Africa** bypass the need for PCs and proprietary software, **IBM** and **Canonical** have introduced a cloud- and premise-based Linux software package for netbooks and other **thin-client devices**. The effort, which is part of IBM’s **Smart Work Initiative**, will let organizations use the low-cost software for laptops and other mobile devices to improve their processes regardless of communications infrastructure. The solution includes open-standards-based email, word processing, spreadsheets, unified communications, and social networking.

More information is available at www-03.ibm.com/press/us/en/pressrelease/28457.wss.

tivity applications such as administrative, police and emergency medical communications, and file transfers. Groningen, in the Netherlands, is constructing a wireless network intended to encompass the entire city, with the municipality of Groningen, Hanze University Groningen, the University of Groningen, and University Medical Center Groningen serving as anchor tenants. A study conducted for the city estimated that Wi-Fi networking could save €200,000 annually in directing the switching and dimming of public lighting; Wi-Fi-enabled communications devices on city trash bins could also save significant sums over cellular devices using SMS applications to inform city sanitation engineers when the bins are full (see www.smartcities.info/abstract-study-%E2%80%98wireless-services-groningen-municipality%E2%80%99).

Strategic Plans Emerging

In the US, the role of public broadband investment is likely to receive more attention as the Federal Communications Commission prepares to release its National Broadband Plan by 17 February 2010 (see http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-293719A1.pdf). The strategy will place additional scrutiny on the \$7.2 billion set aside to improve the nation’s broadband infrastructure.

“The stimulus isn’t enough to solve most of America’s broadband issues,” Vos says, “but the communities that get the money and manage to put a network up will be looked at by others who didn’t who will ask ‘Why can’t we get the same thing?’”

It might be in places like Albany, with a strong public-private partnership and a diverse menu of offerings and revenue streams, that they’ll find an answer.

Mirel says Tech Valley and the city began building the network in late 2005 and early 2006, which he termed the “nuclear winter” for municipal networks, following the

collapse of several that were built with no guaranteed revenue model.

Ironically, the company’s original focus as a fiber-based business and government sector ISP might give it an advantage as mobile devices and unified communications capabilities become more important for those users.

“All the major cell carriers are going from having an anti-Wi-Fi attitude out of fear of competition to pro-Wi-Fi so they can offload all that smart-phone traffic on their networks now,” Mirel says. “Because of our fiber backhaul, I think we’re one of the few residential plays in our market that does offer an affordable symmetric connection over the wireless.”


Thus far, he says, the region’s large incumbent ISPs haven’t tried to launch competing networks in the municipal network’s footprint.

“We’re seeing more competition in the small business market instead of the wireless specifically,” he says.

However, he believes that the onslaught of data traffic from mobile devices for both recreational and enterprise purposes will lead to more hybrid fiber and Wi-Fi offerings from more carriers.

“You have to have big pipes to attract the leading enterprises in the new economy,” he says, “and Wi-Fi provides a great adjunct to those because it gives us the ability to offer that additional mobile service, provide different applications on the municipal front, and a robust solution for the residential market before the construction of fiber-to-the-premises networks, which will be the ultimate end to this evolution.” □

Greg Goth is a freelance technology writer based in Connecticut.

 Selected CS articles and columns are also available for free at <http://ComputingNow.computer.org>.