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Success Depends on Public Investment and Civic Engagement
FIVE GUIDEPOSTS FOR THE FUTURE OF MUNICIPAL WIRELESS

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As the saying goes: Reports of the death of municipal wireless are greatly exaggerated. Most mainstream media simply got it wrong. Most municipal wireless networks across the United States didn't take a tumble over the past year. Rather, in high-profile cities where deals fell apart – including Philadelphia, Chicago, San Francisco and Houston – what failed were exclusive commercial franchise forays. Local governments were not going to finance, own or operate their respective networks. These weren't municipal networks at all.

The business model that faltered in 2007 was the "private corporate franchise" model based on the deal that Philadelphia and EarthLink agreed to in 2006. It was, in fact, the free market that failed last year – not governments in their traditional role as the builders and maintainers of critical infrastructure. In municipalities that committed public resources, engaged their citizens and didn't fall for the lure of a "free lunch," wireless networks are up and operating quite successfully. These emerging and unsung success stories include scores of locations including St. Cloud (Florida), Minneapolis (Minnesota), Cleveland (Ohio), and Corpus Christi (Texas).

How we define a municipal network has repercussions for every aspect of next-generation network-building, and it will reverberate through 2009 and beyond. Jon Peha, the FCC's new chief technology adviser and former associate director of the Center for Wireless and Broadband Networking at Carnegie Mellon University, addresses the problem of defining municipal involvement in his work. "Unfortunately some define municipal networks as a network that serves a city, and some define it as the city government's network, and people argue about exactly what the latter means," Peha said. "I often write about models for a 'wireless metropolitan-area network' (WiMAN), because it is a broader term that carries no ambiguous baggage."

Craig Settles, a wireless consultant and the president of Successful.com, defines municipal networks, at a minimum, as ones with "local government involvement, whether it's a government manager driving the project as is the case in Greene County, N.C., or the economic development office is working with community organizers and local businesses to drive the project - similar to what's happening in Seattle."

"Networks cannot continue to be characterized as municipal when the municipality neither owns nor has principal or ultimate responsibility and authority over that network," said Michael Maranda, president of the Association for Community Networking. "Just because a network may cover the bulk of a muni territory, and just because a city initiates public processes around the idea of such a venture to make some assets available in furtherance of such an effort - we can't call it muni."

Esme Vos, founder of MuniWireless.com, lays out a variety of ways municipalities can be involved: as an "'anchor tenant' subscriber [to network services], leasing out or donating city-owned property on which wireless nodes can be mounted, or leasing out or donating backhaul (e.g., fiber access); as an investor or guarantor of a loan; [and] as the owner of the network (e.g., Corpus Christi, Texas, and Burbank, Calif.)." At its heart, there's a battle brewing between "free-marketeers," who favor the government taking a hands-off approach to broadband networking, and those in favor of government involvement to help direct efforts at the national, state and local levels.

When the NSFNET was privatized beginning in 1995, expanding Internet connectivity to the general public, a huge boom ensued whereby numerous corporations built broadband infrastructure. Unfortunately when the free-market technological bubble burst in 2000, governments at all levels refused to get involved in broad-

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band networking. Today, after more than a half-decade of market failure, as a growing number of other countries continue to pull ahead of the United States - deploying far better and more accessible broadband infrastructure - municipalities have an opportunity to turn things around. Joshua King, senior network administrator for the Acorn Active Media Foundation's Chambana.net community web hosting project, puts it this way: “A 'municipal' network is a network whose ownership and operation is under the control of a city and is run for the common good of the citizens of that city rather than for profit.”

Like many, King is not against public-private partnerships, but he supports the notion that the core intent of these networks must be the public good and not corporate profits. “This does not mean that the network cannot be utilized by local businesses to turn a profit, nor does it mean that third-party companies can't be contracted to deploy or maintain a network,” King said. “But that the network itself provides services in a neutral fashion to all citizens within the network's coverage area (and the city has some obligation to expand that coverage area to all citizens).”

Locally Grown Networks, Not Just ‘Muni’ Networks

If we take King's assertion to the next logical step, we would envision broadband networks owned collaboratively by the community, municipality, businesses, etc. In Europe, a growing list of metropolitan and rural areas is doing exactly this. Wolfgang Nagele, a core developer with the FunkFeuer.at network in Austria, writes: “The main difference for a municipal network as we try to achieve it in Vienna is the fact that it's citizen-owned. So there is no classical company-customer relation. This changes the understanding of the users into being a vital part of it. In most networks I know of, this also relies on a strong social connect between its members. This in turn strengthens the municipal community.”

Given its widespread misuse, the term “municipal wireless network” has become remarkably problematic. Anthony Townsend, research director at the Institute for the Future rarely uses the term. “I feel it really limits the discussion to those efforts with significant government sponsorship or oversight. To me, it's an artifact of the need for vendors to define a market,” he said. “I prefer the term 'community wireless networks' which also embraces the rich grassroots of neighborhood-level ISPs that have emerged by exploiting the flexibility and low cost of unlicensed wireless broadband.”

Glenn Strachan oversaw the Macedonia Connects project to build a wireless network bringing broadband to the entire country. Today he is an independent consultant and senior adviser to Wireless Broadband in Developing Countries. Strachan defines the scope of municipal networks broadly: “A muni wireless network can encompass a small number of users or extend as far as an entire country.” Yet even while he was building municipal wireless networks, the nomenclature remained unknown until after his return stateside. “At USAID [United States Agency for International Development], we spoke about connectivity projects ranging from a single school, to a collection of colleges, and finally, in Macedonia, not only to 460 schools but the entire populations surrounding those individual schools.”

Dharma Dailey, a principal at the wireless consultancy, The Ethos Group, said, “'municipal network' seems to be a catch-all for everything from a local government engaging in negotiations with an incumbent over service to a soup-to-nuts build-out at taxpayers' expense.” The problem, according to Daily, is that “This lack of consistency really muddies our understanding of how local broadband is really rolling out. I would reserve the use of a muni network to three instances: muni intranet - that serves municipal operations such as meter readers, building inspectors, fire and police; muni ownership of infrastructure; and/or muni decision-making power.”

Dailey said municipalities are often overly focused on bottom-line accounting rather than the best interests of local residents. “Why should we predetermine what the right tool is for a network before we have defined *who* the network is for, *where* it is, and *why* it's needed? Many of my colleagues want to cling to the term 'wireless' because it seems at the moment to represent something new, something that is in opposition to all of the problems that we have with legacy networks controlled by incumbents. But by emphasizing the technology, I think we fall into the same trap that created the legacy mess. We need to jettison the techno-centric, vendor-driven model of buying and selling networks.”

Open Platforms Versus Closed Commercial Franchises

Corporations such as EarthLink, AT&T and MetroFi had staked a claim over “municipal wireless,” but their business model is predicated on cities granting a de facto private franchise to these companies. Many of these corporations blame the failures of multiple networking initiatives on municipalities, claiming that the

problem with their model was the onerous and greedy requirements of the cities. This is, unfortunately, how much of the media have reported it. But there's a far deeper conflict that can be boiled down to a simple phrase: liberation versus lock-in.

What cities should demand is an open platform to support public use and new applications. When *The Economist* reported in January 2008 that open networks are necessary to support next-generation networking and the global competitiveness of the United States, it opened up debate about the wisdom of our sole reliance on free-market solutions for broadband networking. What private corporations have implemented are often closed systems using proprietary hardware, software and services. Such systems *may seem* good on paper, but as history is teaching us, their many points of failure makes them unreliable in practice.

In Philadelphia, the vision of a nonprofit-owned, open-access system gave way to an EarthLink-centric network, which struggled to become operational and attract subscribers. The original hardware underperformed and EarthLink has all but abandoned this line of its business. Sadly the city also hitched its digital inclusion cart to EarthLink's franchise, tying its free hardware, and training programs and discounted subscriptions to the inadequate EarthLink network infrastructure and subscription-based service model. After Earthlink's pullback, a locally-controlled investor group acquired the network earlier this year, implementing a new model that at least so far has opened the still-unfinished network for free WiFi access for all.

Ramon Roca founded Guifi.net, a regional wireless network with more than 4,000 wireless nodes covering much of the Catalan region of Spain. Roca sees the traditional municipal wireless model as often leading to failure for similar reasons as experts in the United States have stated. "Like in many other countries, we [have seen] many of those initiatives fail for many reasons: hype, overestimating the technology capabilities, etc.," Roca said. "In Spain [there] have been significant, multimillion [euro] failures, as an example, here in Catalonia, 'Flash10' (15,000,000), Zamora Wireless (about 500,000, sponsored by Intel) ... Barcelona Sensefils."

What differentiates Guifi.net, which won Spain's 2007 National Telecommunications Award, from many other Spanish wireless endeavors is that it has found a way to coexist with private companies and municipalities. "The municipal projects don't have to be linked to a single contractor operator and should be able to connect to any other network in the neighborhood, and therefore, be 'open' in the sense of 'open network,'" Roca said. "The only solution for doing so is by considering the network as something open and neutral, out of the assets of anyone. A model where everyone [has] ownership of the physical infrastructure, but not the whole network itself." Roca points out that this ownership model, while seemingly a radical notion is "not very much distinct from the original Internet idea itself." For him, the real question is whether Guifi.net is "a singular exception - or can this mutation also occur and be replicated elsewhere?"

Five Guideposts for More Robust Municipal Networking

As municipalities rethink their broadband strategies in 2008, they should be looking to implement five best practices to support liberation and avoid lock-in:

Build hybrid infrastructures. Infrastructures that support multiple, redundant delivery options are more robust than single-medium solutions. That means integrating fiber and incorporating other wireless systems whenever possible (Wi-Fi, WiMAX, 802.11n, EVDO, and other technologies). Similarly, municipalities can create enormous synergies by interconnecting public-safety and public-access networks without compromising either goal. Single-use networks are far less efficient than hybridized and interconnected solutions, and are often more expensive. Hybridized, redundant networking requires new thinking about how to create reliability. Unfortunately too many decision-makers approach municipal networking with yesteryear's thinking.

Utilize open technology. The smart choice for municipalities is to require open standards that support interoperability and an easily upgradeable modular design. Too many wireless broadband networks in this country use proprietary technologies that are far more expensive and far less dynamic than other systems available today. Open technology alternatives like WiFiDog (Ile Sans Fil), Austin Wireless (LessNetworks), CUWiNware (CUWiN Foundation), and OpenWRT/OLSR (FreiFunk and FunkFeuer in Berlin and Vienna) may not have the public relations or marketing budgets of proprietary solutions, but that should not excuse municipalities from seriously considering them. The success of the Internet itself is predicated on an open architecture with open protocols, and municipalities would be wise to support these principles in the wireless realm.

Prioritize competition. One of the main failings of so-called "municipal" wireless networks has been the over-reliance on single-provider solutions. Wireless networking is a critical tool for municipalities struggling with the cable/telco duopoly. Open-access networks allow a city to support multiple market entrants, which enhances leverage *far more* than simply introducing a third competitor. Whether focusing on fiber optics (e.g., the UTOPIA project in Utah), or the wireless realm (e.g., Open Air Boston), municipalities should support an open platform that can serve as a level playing field for many competing service providers. For example, a city or county can facilitate a variety of both community-driven (nonprofit) and commercial market entrants by simply building out, or subsidizing, a fiber optic network along at least major streets that is made available on a wholesale, open-access basis to any network operator.

Think holistically. Municipalities must initiate dynamic, evolving digital inclusion initiatives rather than silver-bullet, one-off solutions. What might sound today like an ideal solution for the digital divide may tomorrow become the source of new divisiveness in speed, reliability or access. Solutions must promote ongoing public engagement and ensure long-term benefits to local constituencies. As examples, one can read through the Minneapolis Community Benefits Agreement and the Chicago Digital Access Alliance's Ten Principles for Digital Excellence, both of which were drafted by local community members to meet local community needs.

Embrace change as the new status quo. When it comes to high-speed Internet access, municipalities should embrace the constructive disruption coming from new technologies, applications and telecommunications policies. Due diligence for municipalities does not mean a one-time review of available technologies and community needs, but rather constant research and feedback. In coming years, we will see the advent of white space devices, open platform spectrum, and distributed device-as-infrastructure networking. Pro-municipal broadband legislation in Congress and the Broadband Census Act, and the growth of initiatives like the CAIDA COMMONS Project, which is creating an alternative, cooperative Internet backbone, will continue to impact the national telecommunications debate and carry with them the potential for transforming the broadband playing field. Municipalities need adaptable infrastructure and continued vigilance to keep pace with rapidly changing conditions and technologies.

Municipal networking proponents are not opposed to private investment in city-scale wireless networks. But they do believe that municipalities have to take more responsibility and control over the broadband networks they're involved with. Regardless of who pays for the physical infrastructure, municipal networks will continue to struggle unless they provide reliable, open platforms for innovation that support diversity at the hardware, software and service-provision levels. Municipalities should choose liberation over lock-in as they continue to address growing Internet needs in 2009 and beyond.

Further Resources:

Acorn Active Media: www.acornactivemedia.com

Austin Wireless: www.austinwirelesscity.org

COMMONS Project: caida.org/projects/commons

CUWiN Foundation: www.cuwin.net

Ethos Group: www.ethoswireless.com

Free Networks Assoc.: www.freenetworks.org

FreiFunk: www.freifunk.net

FunkFeuer: www.funkfeuer.net

Guifi: www.guifi.net

Open Source Wireless Coalition: www.oswc.net

Open-Mesh Hardware: www.open-mesh.com

Wireless Summit: www.wirelesssummit.org