Municipal Wi-Fi: Big Wave or Wipeout?

Deployment of wireless services to cities and towns has become a topic of considerable controversy. At the center of the debate is the decision by municipalities to offer low-cost service to citizens who would normally be excluded from the Internet. This "digital divide" justification often pits large cities against incumbent telecommunications providers. Legislation at the national and state levels has been somewhat favorable to the providers so far, but this bias might be shifting as more large providers join, rather than oppose, municipal wireless projects.

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In March 2006, a story in the business section of *The Washington Post* described a plan in which the DC government hopes to close the digital divide when it seeks bids for a new wireless network that would cover much of the District.[1] The city is reportedly looking for a company that will use a portion of the revenue it derives from paying customers to provide free Internet access to low-income residents — possibly even free computers. The winning bidder will land an exclusive eight-year contract and will be able to attach wireless equipment to city-owned street lights and buildings.

City managers in the nation's capital might not realize it, but the establishment of municipal wireless networks has become a very stormy public policy issue over the past few years. The subject has produced major legislative proposals and enactments at the state and federal level in the US as well as overseas. Because

wireless broadband is a small fraction of total broadband service, and most government telecommunications connectivity is through land lines and combinations of cable and asymmetric digital subscriber lines (ADSL), what is it about municipal wireless activity that causes difficulty? This article describes some contemporary cases, explores the perspectives of municipalities, providers, and legislators, and examines some examples that could synchronize the various stakeholders' positions. We focus here mostly on US cases, but a more global perspective appears elsewhere.[2]

Municipal Wireless

MuniWi-Fi is a catch-all term for municipal wireless. It applies to several technologies that provide wireless access via any combination of true Wi-Fi (IEEE 802.11a, b, or g protocols at speeds of up to 54 Mbps with limited distances) as well

Table 1. Broadband access by technology type.						
	1999	**2000**	**2001**	**2002**	**2003**	**2004**
Asymmetric digital subscriber line (ASDL)	16.3%	30.8%	32.9%	31.9%	34.3%	37.2%
Coaxial cable	78.2%	63.7%	64.1%	65.3%	63.2%	60.3%
Other wire line	2.6%	3.4%	1.3%	1.2%	1.1%	1.2%
Fiber or power line	0.1%	0.0%	0.0%	0.1%	0.1%	0.1%
Satellite or wireless	2.8%	2.0%	1.8%	1.5%	1.3%	1.2%
Total number of lines	1,792,219	5,170,371	11,005,396	17,356,912	25,976,850	35,266,281

as proprietary wireless protocols in licensed or unlicensed frequencies. It also applies to the use of emerging WiMAX protocols, which cover directional distances of up to 30 miles and omni-directional distances of 2 to 5 square miles at speeds of up to 100 Mbps.

Perhaps the best-known case of a large US city entering the municipal wireless business is Philadelphia's decision in 2003 to establish a Wi-Fi mesh covering a 130-square-mile area. The vision was similar to that cited in the DC case — provide low-cost broadband to an underserved community — but it caused a firestorm of controversy and swift legislation that resulted in the prohibition of any additional MuniWi-Fi initiatives in Pennsylvania (www.freepress.net/communityinternet/=PA). Many other government entities have implemented or are investigating local Wi-Fi services, including San Francisco, rural Oregon and Washington, New Orleans, Los Angeles, and New York City (http://wifibeat.com/entry/1234000897042055/).

Providers Weigh In

At first glance, it might seem like MuniWi-Fi wouldn't be a matter of dispute from a provider's perspective: as Table 1 shows, wireless is a small segment of total broadband activity (www.freepress.net/docs/broadband_report.pdf). Moreover, it's unlikely that we'll see a dramatic market share increase in the near term from MuniWi-Fi applications alone, even if special applications such as wireless-based jury rooms, wireless meter-reading, patient telemetry, and so on are added to mainstream Internet applications. Longer-term prospects are better, with a possible US$1.2 billion market for MuniWi-Fi services by 2010.[3] However, there's more at stake here than the threat that some providers could lose a bid to provide a city or town's wireless Internet service. As the DC and Philadelphia cases suggest, broader issues are involved.

First, there's the possibility of discrimination. Would the fact that one provider won a city contract have any effect on an unsuccessful bidder's local rights? Would decision-makers favor an existing cable TV franchise? The act of deploying a Wi-Fi mesh could imply special treatment to the winning provider and penalties to the loser, even if the initial stakes are small. Another concern is the protections that give rivals access to essential facilities such as phone, cable, broadband delivery, and so on. If no rules about vertical divestiture exist, for example, providers might be disadvantaged in bidding on possible service integration opportunities. City governments aren't normally concerned about antitrust or regulatory sanctions, so protections might not be provided. Finally, what about the role of thousands of smaller wireless ISPs (WISPs)? Would city governments offer a local WISP the opportunity to bid? If so, would all the providers, large and small, receive fair treatment?

Pricing of Telecommunications Services

A frequent case made for MuniWi-Fi is the service it offers to disadvantaged populations — the so-called digital divide justification. The Internet is a stepping stone to improved earning power, and access is viewed as a right that should be available to all citizens, regardless of their current income. Municipalities can offer broadband access at very low prices (or in some cases, at no cost) to areas not well served by current regional providers and also offer locations for drop-in sites, where people without home computers can get broadband access as well as good training. The DC plan works on a private–public partnership model similar to Philadelphia's. Earthlink, the contractor for Philadelphia's planned MuniWi-Fi deployment, will eventually put radio transponders on 4,000 of the city's street lights, and the projected offering price for broadband will be US$10 per month for low-income subscribers and $20 for everyone else — significantly lower than current DSL or cable service nationwide (www.phila.gov/wireless/faqs.html).

Putting aside for a moment the concerns of providers being treated fairly in MuniWi-Fi cases, let's briefly examine the current cost of broadband service in the US. Where available, Verizon's introductory DSL price is $14.95 per month for 748-Kbps download speeds and $25.83 per month for 3-Mbps download speeds. According to a recent report, actual DSL prices are increasing due to line and other fees.[4] Roughly 60 percent of US broadband users are cable customers, and they pay between $35 and $40 per month for 2- to 4-Mbps download speeds (www.tiaonline.org/business/media/press_releases/2006/PR06-22.cfm).

Most of the poorest areas aren't high-priority sectors for providers because the potential returns are relatively low or negative, especially after including the expenses involved with developing the needed infrastructure. So with the twin challenges of low availability of broadband service to many poor areas and a relatively high unit price, it would seem that many municipalities do, in fact, need a tailored service aimed at empowering those who can't currently benefit from broadband.

Measuring MuniWi-Fi Successes and Failures

How well is MuniWi-Fi working in the locations in which it's been implemented? The answers vary widely, depending on planning, oversight, and review — cities that leverage multiple Wi-Fi needs (both consumer and government Wi-Fi demands) are in a better position than those that only have one or the other. Moreover, cities that enter well-planned risk-sharing models with the private sector appear better situated as well (www.intel.com/business/bss/industry/government/digital-community-best-practices.pdf). In Corpus Christi, Texas (population 300,000), a $7 million Wi-Fi mesh network will cost approximately $23 per person (www.intel.com/business/bss/industry/government/digital-community-best-practices.pdf). The City of Westminster, London (population 181,000) has a US$8.77 million Wi-Fi network that costs approximately US$48 per person (www.intel.com/business/bss/industry/government/wireless_city.pdf). Scottsburg, Indiana (population 6,000) is deploying a $385,000 Wi-Fi network that will cost approximately $64 per person (www.intel.com/business/bss/industry/government/digital-community-best-practices.pdf). Philadelphia has projected its Wi-Fi network costs to be roughly $60,000 per square mile, which works out to $7 to $10 million to cover 135 square miles, at a cost of approximately $6.50 to $10 per person (www.phila.gov/wireless/faqs.html).

What these examples have in common is a confluence of factors that seem to favor the municipalities instead of large incumbent providers: low barriers to entry in the Wi-Fi access market for qualifying WISPs, relative ease of obtaining equipment, an unlicensed and free Wi-Fi spectrum, and relative availability of technical know-how. Before Wi-Fi, municipalities sought to deploy their own wired fiber or cable networks, but the cost of running wire lines to all their constituents was expensive. Wi-Fi and WiMAX make the unit costs of deployment much lower because communities don't need to lay cable and can avoid the economic burden and headaches involved with digging up streets or interrupting city services.

Yet some people criticize municipal network efforts, both wired and wireless, as being inefficient. In a May 2005 report, cnetnews.com staff writer Jim Hu outlined examples of what he considers to be the failures of municipal fiber broadband deployments.[5] One is Marietta, Georgia, which built a community fiber network for roughly $35 million only to have to sell it for $11 million to a private ISP. Sonia Arrison of the Pacific Research Institute points to municipal broadband "failures" like Tacoma, Washington, a city that had a $23 million dollar deficit in 2001–2002.[6]

But there is evidence that such comments are misleading. A 2005 review of a dozen cases of municipal broadband deployments found the criticism short-sighted, inappropriate, and biased:[7]

Deploying municipal broadband enables communities to take a long-term perspective. This strategy promotes greater penetration of the high-speed Internet access to those who need it most, a sizeable improvement on the short-term profit maximization mentality of the private sector incumbents. Municipal broadband increases competition, lowers prices, and drives demand for future deployments in both the public and private sectors.

It further noted that MuniWi-Fi's detractors didn't allow adequate time spans when judging returns on investment or report the increased price and speed competition in these communities. The Arrison article, for example, stated that Tacoma, Washington, was said to have added $700 in debt per subscriber due to its broadband network; the 2005 review, however, states that the network is actually showing positive cash flow and prices for broadband and cable TV 20 to

25 percent lower than areas in which the municipal network isn't available.

Value Added: Other Uses for MuniWi-Fi

Additional forces beyond fixing the digital divide are driving municipalities to implement Wi-Fi. MuniWireless.com publishes a list of communities exploring various wireless applications, including a wireless jury room in Macomb County, Missouri; emergency services that use video and patient telemetry in Tucson, Arizona; reports of incidents or faults on the Paris metro; telephony via Skype in certain cities; and streaming live concert performances in Amsterdam (http://muniwireless. com/topics/applications).

Another report lists additional Wi-Fi applications, such as automated utility reading in Corpus Christi, Texas; wireless traffic-signal management in Cheyenne, Wyoming; low-cost replacements of T1 lines in Lewis and Clark County, Montana; enhancements to police-force productivity in Pirai, Brazil; and improved residential security in Westminster, UK (www.intel.com/business/bss/industry/government/ digital-community-best-practices.pdf).

Legislation

The proliferation of MuniWi-Fi cases inevitably leads to appeals to state and national legislatures. From the municipalities' perspective, the issue is fair treatment of citizens and availability of broadband to the poor and underprivileged. The providers' concern is fairness to businesses that have invested extensively in infrastructure. Let's briefly review MuniWi-Fi as it's being enacted by the US Congress and state legislatures.

National Legislation

The current legislative climate surrounding MuniWi-Fi reflects growing interest in the technology at both the national and state levels. Two major federal initiatives propose to severely limit municipal broadband and Wi-Fi, whereas one is very supportive of it. In 2005, Senator John Ensign (R.-Nev.) introduced the Broadband Investment and Consumer Choice Act; this bill, among other things, eliminates requirements for private providers to cover an entire area rather than just "choice customers" and preempts local governments from offering competing broadband services to citizens – existing municipal projects can stay but without expansion (http://thomas.loc.gov/cgi -bin/query/z?c109:S.1504:). Congressman Pete

Sessions (R.-Tex.) introduced the Preserving Innovation in Telecom Act of 2005, which goes even further, banning any state, local government, or affiliated entity from offering any telecommunications service if a private entity offers a similar service in the same jurisdiction (http://thomas. loc.gov/cgi-bin/query/z?c109:H.R.2726:).

In contrast, the Community Broadband Act of 2005 is a pro-municipal bill introduced by Senators Frank Lautenberg (D.-NJ) and John McCain (R.-Az.); it prohibits statutes and regulations banning public providers from offering advanced telecommunications services and forbids public entities from discriminating in favor of themselves (http://thomas. loc.gov/cgi-bin/query/z?c109:S.1294:).

So far, none of these legislative initiatives has progressed very far. Ensign's bill, which reworks the existing Telecommunications Act, could see some legislative activity this year, but there's no guarantee. The Sessions and Lautenberg/McCain proposals probably won't be acted on this year. Senator McCain in particular emphasized the international importance of moving this situation forward:[8]

Many of the countries outpacing the United States in the deployment of high-speed Internet services, including Canada, Japan, and South Korea, have successfully combined municipal systems with privately deployed networks to wire their countries.

State Legislation

Fifteen states already have laws restricting municipal broadband (five states made the list in 2005) and nine more have bills pending (www.freepress.net/communityinternet/=states). As mentioned earlier, Pennsylvania passed a law in 2004 that restricted the rights of communities to offer broadband services. The situation drew increased fire when Philadelphia's efforts to deploy the most ambitious municipal wireless network in the US to date came up against this legislation, which large providers had strongly lobbied. The two sides, however, reached a compromise, and the Pennsylvania State Senate is reexamining the law with open hearings aimed at soliciting community opinion on wireless networks (www.freepress.net/ communityinternet/=PA). The compromise as it stands allows Philadelphia to deploy a 135-square-mile Wi-Fi mesh network downtown, but restricts future efforts statewide.[9] A new bill introduced in the Pennsylvania State House in February 2006

Municipal Wi-Fi Quick Reference List

Several links are helpful for reviewing some of the key MuniWi-Fi issues from the perspective of municipalities, providers, and state and national legislatures. The legislative map is of particular interest because it shows the increasingly rapid increase of attention to MuniWi-Fi issues at US statehouses:

- Wireless Philadelphia: www.wirelessphiladelphia.net/?target=howto use&ipaddress=.
- FreePess.net interactive map: www.freepress.net/community internet/=states.
- Federal legislation: Broadband Investment and Consumer Choice Act (http://thomas.loc.gov/cgi-bin/query/z?c109:S.1504:); Preserving Innovation in Telecom Act of 2005 (http://thomas.loc.gov/cgi-bin/query/z?c109:H.R.2726:); and Community Broadband Act of 2005 (http://thomas.loc.gov/cgi-bin/query/z?c109:S.1294:).
- MuniWireless, an up-to-date blog of municipal wireless projects and events: http://muniwireless.com.
- Washington, DC, Wi-Fi plans: www.washingtonpost.com/wp-dyn/content/article/2006/03/08/AR2006030802362_pf.html.

would reverse some of the legal restrictions under the earlier law.

The disagreement between New Orleans incumbent provider BellSouth and the Louisiana state government is also of interest. New Orleans, in the aftermath of Hurricane Katrina, proposed a Wi-Fi network free to all users to attract businesses and residents and to protect emergency service communications, but BellSouth tried to invoke a recent Louisiana law that requires a referendum for citizens to approve any municipal broadband services (www.freepress.net/communityinternet/=LA). BellSouth was also accused of withdrawing a donation of a police headquarters building as a result of the proposal.[10] So far, New Orleans is moving forward and has established some Wi-Fi services, citing the ongoing dire economic conditions in the region and the obvious need for better emergency telecommunications services in the event of another crisis as justification.

A good resource for state-by-state updates on Wi-Fi projects and legislative initiatives is FreePress.net (www.freepress.net/communityinternet/=states). The "Municipal Wi-Fi Quick Reference List" sidebar provides other links as well.

For the protagonists in this battle, the stakes are high. Municipalities want the flexibility to plan for future benefits and services for their citizens,

without being forced into business alliances that seem inimical to long-term planning, and providers want to maximize their profits and be protected against what they perceive as unlawful and discriminatory practices. In the near term, it appears that federal and state legislatures will be the locus of this debate, with initiatives sponsored by providers and municipalities settling the agenda on a case-by-case basis.

A recent *Wall Street Journal* article might be a good indicator of the long-term trajectory for both municipalities and providers.[3] It found that many of the large companies, such as AT&T, Cox Communications, and Time Warner, bid on and implement MuniWi-Fi projects selectively. If the market for these services rises to the billion-dollar level in a few years, as some speculate, there's a definite opportunity for profit, even for major providers. But the future isn't clear. Legislatures seem to be impeding MuniWi-Fi deployment more than helping it, and large providers are lobbying state houses vigorously. As Craig Settles says in his new book, *Fighting the Good Fight for Municipal Wireless*,[11]

It's inevitable that municipal wireless will become prevalent in cities large and small … . I don't care how much you dislike it as a telco incumbent. You just can't get away from this wave.

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