Broadband Wireless and European Cities at the Public-Access Crossroads

Based on Proceedings from W2i Digital Cities Workshops at the Global Forum in Venice, Italy, December 5-6, 2007

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Abstract

In the 21st century, local authorities increasingly view broadband as a "utility" like water and electricity that must be made widely and affordably available to their constituents. The efforts of urban local authorities to bring free or low-cost broadband has sparked a decision-making process inside the European Commission, where the Director-General of Competition has begun ruling on whether the expenditure of public monies for such initiatives constitutes unfair use of "state aid." Consequently, several initiatives have been shelved or are in limbo, begging larger questions about the competitiveness of European communities in the global economy. Based on a series of Digital Cities Workshops hosted by W2i at the Global Forum in Venice, Italy, on November 5-6, 2007, this paper summarizes contemporary discussion around the role of cities and regions in promoting broadband services.

Credits

Founded in 2002, the **Wireless Internet Institute, LLC,** is an independent forum bringing together stakeholders around the world to accelerate the adoption of wireless Internet in support of better managed and safer cities. The W2i Digital Cities Convention is a thought-leadership conference exploring the planning and deployment of broadband-wireless infrastructure, applications and services at the metropolitan scale, and a professional development seminar for local-government IT professionals.

Items International is an international consulting firm based in Paris, dedicated to delivering Information & Communication Technology (ICT) strategies. It organizes annually the Global Forum conference. This event is dedicated to business and policy issues that affect the successful evolution of the Information Society worldwide. As a high profile international think tank bringing together government, business and civil society, the Global Forum acts as a catalyst of innovation.

Sponsored by **IBM**.

◢ Introduction

Broadband is viewed as an essential resource in the information society and is a priority of the European Community and its member states. To bridge the digital divide, member states have set goals of broadband access for all citizens. For example, in December 2006, Italy launched its Committee on Broadband Diffusion to coordinate different government bodies and the involvement of regions, local authorities, and operators to provide network services, inviting the support of operators and avoiding adversarial relationships.

Local authorities in numerous European cities have also wanted to make broadband readily available to their constituents, sparking a decision-making process inside the European Commission around when it is permissible for them to do so. Typically, a municipality must make a clear case for market failure, or risk a judgment by the EC that its expenditure of public monies to deploy broadband for public access is unfair use of "state aid." While the EC's ultimate stance on the matter remains unclear, today many cities view this posture as heavy-handed.

Caught between a call to bring a 21st-century "utility"—broadband—to citizens and concerns about abrogating EC rules, some cities have begun investigating alternatives and new business models. This paper summarizes a discussion around the role of cities and regions in promoting broadband services, and is based on the proceedings from a series of Digital Cities Workshops hosted by W2i at the Global Forum in Venice, Italy, on November 5-6, 2007.

◢ Europe's Rural Broadband Success Stories

Central to the discussion around broadband-wireless service provision in Europe and North America has been the identification of sustainable business models. While attention has focused on public-private partnerships between large cities and service providers, in Europe, some of the best models of public-private collaboration are emerging in rural areas rolling out fiber networks or WiMAX-type backbones to bridge the digital divide.

The European Commission appears to have little issue with approving public monies for fiber networks when there is little or no broadband service and when the new networks are opened up to multiple service providers to drive down prices.[1] EC Treaty state aid rules (Article 87(3)(c)) allow subsidies for the development of certain economic activities or of certain economic areas provided there is no overall negative effect on competition.

The mountainous Piedmont Region in Italy's northwest is one such example. In 2002, a consortium of 54 members embarked on a five-year plan to bring total digital inclusion to 1,200 municipalities facing a long-term digital divide in the region, including more than 600 villages with populations below 1,000.

CSI Piemonte forged an agreement with Telecom Italia to reach more territory than it could have without an MOU. "We are guaranteeing technological neutrality and open access, and the network is open to local and national operators," said Margherita Italiano of CSI Piemonte, which is responsible for the technical implementation of the WI-PIE program.

The infrastructure is owned by the regional government, and service is delivered by some 16 service providers at the last mile. The project's cost will total €100 million between 2002 and 2007, including about €20 million in European Structural Funds.
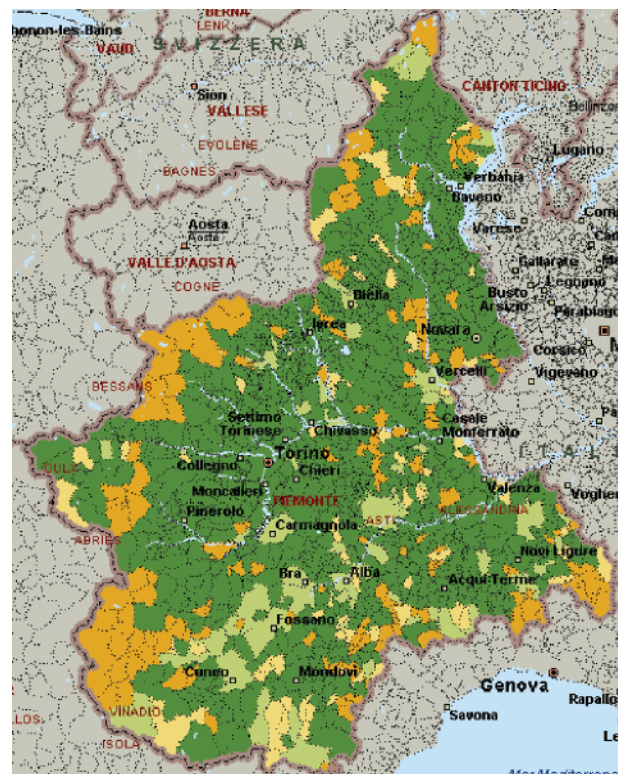
Italy's Piedmont Region: Expected ADSL coverage by the end of 2008.

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[1]The EC has approved rural fiber projects in France (southeast of Toulouse), Wales, and Ireland.

Spain's Basque Country is small—about 7,300 square kilometers with 2.1 million inhabitants in three territories and including 250 municipalities. In 2002 and 2003, the Basque government grew increasingly concerned about the lack of broadband penetration in rural areas of the region. Access was limited largely to those municipalities with the largest populations and thickest industrial fabric. In May 2004, the Basque government created a public corporation, ITELAZPI, and charged it with providing carrier services for radio, TV, and broadband to all populations in 100 target municipalities, even if they were isolated or dispersed over the territory. In October 2004, ITELAZPI called a public contest to select a telecommunication operator as its partner, and EUSKALTEL, the incumbent telecom, was selected at the end of 2004, to deploy a WiMAX network on the back of existing radio and TV infrastructure assets. The Basque government committed to make the necessary investments in network equipment and future upgrades, while EUSKALTEL would operate it. Now deployed, the network remains in public hands, allowing public authorities to make requirements about its use. The agreement also provides a guarantee for the future the region's rural areas.

European Cities at the Public-Access Crossroads

Rural broadband projects around Europe are emerging as models of creative public-private collaboration, to cure market failures and bridge the digital divide. Just as in the United States, however, public-sector intervention by European cities has been more complex. The use of public monies is at issue.

For example, Margherita Italiano of CSI Piemonte said her organization is thinking about deploying a free Wi-Fi access model for the City of Turino, but at the moment activity there is limited to e-Government services and access in the public libraries. "The network is for business," she said. "CSI is a public company and not an operator and cannot overlap with market actions."

Under state-aid rules in the EC Treaty, the EC Director-General for Competition can halt the use of public funds for projects it deems compete unfairly with commercial Internet service. DG-Competition's Wireless Prague decision in May 2007 was the first to deal directly with state aid for free municipal Wi-Fi. To receive the EC's go-ahead, the City agreed to limit use of its network to government operations and a "walled garden." The EC ruled that Prague's municipal-wireless project did not involve state aid because no special advantage would be conferred on any private- or public-sector operator of the network.

At the time of the decision, EU Competition Commissioner Neelie Kroes said: "Investment in broadband networks is primarily a matter for private companies. State subsidies for such networks are only acceptable if they address a well-defined market failure or cohesion problem. I am glad that the city council of Prague modified its plans so that the project can go ahead without distorting competition."

Critics of DG-Competition's ruling have countered that the network will provide little benefit to a public seeking low-cost broadband Internet access. "Prague's offer of free public services had to be so reduced that building the network now seems almost pointless—and getting that far took 11 months of negotiation," said Robert Horvitz of the Open Spectrum Foundation.

Daniele Auffray, Vice Mayor of Paris, argues for a lobby of cities who think that Internet is a public service. "The problem of wireless needs to be like water or electricity, an essential thing," she said at the Global Forum in Venice. "It is not only our experience but the experience of many cities. Public service does not mean that the city does it ourselves. We have to invent a public and private partnership, but where the interests of citizens are well understood."

Jaroslav Solc, IT development director for Prague, has said: "Simply, the opponent is not [the] EC but some operators with lack of understanding for cooperation with cities on muni wireless infrastructure and potential for new services."

The need for creative partnership between local government and the private sector is real. A W2i/Yankee Group survey of more than 180 local-government IT professionals and leading members of the broadband-wireless industry at the W2i Digital Cities Convention in London[2] revealed

> Public-sector intervention by European cities has been more complex. The use of public monies is at issue

[2] Olympia Convention Centre, September 25-26, 2006.

In April 2007, the Cloud Networks and the City of London Corporation launched broadband-wireless access across the famous "Square Mile" financial district in central London. The network currently comprises 127 nodes and will evolve to offer 95% coverage across areas owned by the City of London Corp. Under development for a year, the network is mounted onto existing street furniture including lamp posts and street signs. The network allows anyone with WiFi-enabled devices including laptops, PDAs, media players and smart phones to connect to the Internet wirelessly.

several perceived barriers to implementation that can stall projects and keep them from getting off the ground. Some 55% of local-government representatives feel that lack of both technical know-how and funding are the primary roadblocks for deployment, while 56% of the private-sector attendees believe that lack of political consensus and regulatory hurdles are the key barriers.

"Consequently, the survey results strongly suggest that emerging service providers and local authorities can break through these perceptions with teamwork approaches to network planning, including public-private agreements, dual funding mechanisms and facilitative policy changes at the local level," said Berge Ayvazian, Chief Strategy Officer, Yankee Group.

In Venice, Giuseppe Paruolo, Bologna's Deputy Mayor for Health, Communication and ICT, pointed with dismay at the situation in his city: "On one side, we have the EC saying it's a free market to develop by its own means, and on the other side we have the private sector asking for money to develop this for our citizens!"

From Bologna to San Francisco, Cities Experiment

The City of Bologna is one of several emerging test cases in local-governments' search for sustainable solutions to offering "broadband as a utility." The City of Bologna has a metro-area population of one million and more than 100,000 students at university. In June 2006, Bologna deployed a free downtown pilot network, Bologna Iperbole Wireless, which it wants to expand across the entire city center.[3]

"We have not yet implemented our idea," Deputy Mayor Paruolo said. "The problem of the business model is a controversial one because the European Commission clearly states that using the citizens' money to implement an open wireless network is a way to put state money in the frame of the free market."

Bologna is now trying to identify a business model that could eventually provide public access as a windfall benefit. "If you want to use wireless as the means for interconnecting the video and information systems, you can then use the spare bandwidth of the network to provide services to the citizens," Paruolo said. "Perhaps in this way, we can reach the target to have a quite large initial base on which we could try to also put chartered services and open this network to other providers."

Paruolo said Bologna would put a requirement for applications in its next call for tenders. It would then work on the sustainability model starting from a larger installed base.

Bologna: Existing (blue) versus desired (green) Wi-Fi mesh footprint.

A representative from Segrate, Italy, said he faces a situation similar to Bologna; providing service in public areas is okay, but doing so in homes goes against the General Competition Law in Italy. "We cannot use this experience to bridge a digital divide we face in our town," said Andrei Moroni, Project Manager, ICT Innovation, for Segrate. "There is an area that is not provided a broadband connection

[3] The network is sponsored by Telecom Italia and an incumbent provider to the city, which provide the backhaul connection. The technological infrastructure is supplied by HI-TEL Italia S.p.A (www.hitel.it). Internet broadband connection is guaranteed by Acantho S.p.A (www.acantho.com). The pilot phase was realized with the support of Laboratori Guglielmo Marconi S.p.A. (www.labs.it).

> The ancient Italian seaside city of Molfetta had been suffering from chronic traffic congestion. Officials determined to use the latest video surveillance technology to monitor and regulate traffic, but soon discovered that installing a new fiber network capable of handling the broadband requirements for transferring video would cost millions and take years. After consulting with Alvarion, the city decided that the BreezeNET® DS.11, operating in the 2.4 GHz band would be to the best solution for establishing a wireless broadband network. The single modulation data encoding and small form-factor made it ideal because it minimized electromagnetic pollution and made little visual impact, while providing excellent performance. Now, 16 traffic cameras deliver live video to police headquarters over Alvarion's network at up to 11 mbps. Police are able to study traffic patterns, observe violations and dispatch police units to trouble areas.

by anyone. The market is not able to cover this point, but we are not allowed to do it by the law."

Chris Vein, CIO for the City and County of San Francisco, commented on the market failure in his and other U.S. municipalities. "There are parts of the city where you cannot get DSL," he said. "They are effectively redlined. And you are not going to get AT&T to build out in those places. So you're left with a problem as a city."

Vein added that cities step in and do things all the time when problems are not being solved by the private sector. "As far as the San Francisco project goes, we still believe in free and affordable ubiquitous Wi-Fi service for all citizens." In August 2007, EarthLink backed out of its plan to deploy a network across the 49-square-mile city.

Vein also mentioned FON, a Wi-Fi business model where consumers agree to share their connectivity with others. "I think telecom providers are going to have a little trouble with this model because basically they are taking DSL and letting multiple people use it to access the Internet," he said. Vein also mentioned Meraki Networks, which uses an inexpensive mesh networking client/repeater model and is already deploying in San Francisco.

◤ Jumpstarting Networks with Government Operations

While public access is now deemphasized as a primary driver of citywide wireless—for various economic, regulatory, and technical reasons—revenue-generating applications and government efficiency improvements delivered to multiple user groups may open the way for some cities and counties to jumpstart networks. Bologna has begun to explore whether the network can be expanded in support of a government operation such as video surveillance, with the extra bandwidth used to provide public-access.

In 2007, W2i began observing a reemphasis on public safety, emergency response, video surveillance, machine-to-machine applications, and intelligent transportation as primary drivers of networks—over public access, digital inclusion and economic development. The shift means an greater focus on the value proposition and purpose of deploying broadband wireless for local communities, tying projects back to a tangible return on investment. These operational efficiencies may include:

- Government-to-citizen communications (e.g., neighborhood portals)

> Stockholm's successful road-user charging solution was designed, implemented and operated by IBM. The project's aim was to reduce traffic by 10-15%, increase average speed on streets and roads, reduce emissions, and improve the city's environment.
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> While politically controversial, the system is regarded as a technical success and achieved significant impacts in traffic reduction in Stockholm's city center, including a 25% reduction in traffic volume, removing 100,000 peak-hour vehicles; an increase of 40,000 mass transit users per day; a speeding up in bus schedules and reduction in queue times. Emissions decreased by 14% in-city, and 2.5% in-county.
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> The congestion charge is a national tax, and the monies are used in the Stockholm region for investments in the public transport system and infrastructure connected with the trial.
>
> The electronic road pricing solution implemented by IBM in Singapore similarly reduced traffic—by approximately 30%—with charges varying by location, type of vehicle and time of day. Other cities showing interest in this solution include Dubai, Paris, Seoul, Shanghai, and New York.

Funded with £1.1 million of public money, UK's Norfolk Open Link provides outdoor Wi-Fi coverage using mesh access points mounted predominantly on streetlights around the city, with a coverage area up to 30 square kilometers. Public-sector workers will be able to access the system at speeds up to 1Mbps and organizations including health, education, and emergency services will be considering a range of projects to help evaluate the network. The project is not allowed to compete with commercial broadband providers; the speed at which the general public may connect is rate limited to 256Kbps. Open Link will be extended to twenty rural locations in the district of South Norfolk.

- Telecommunications-cost avoidance (e.g., automated meter reading)
- Revenue-generating applications (e.g., congestion charging, parking meters)
- Field workforce productivity (e.g. field inspectors, public works crews)

"W2i estimates that local governments in Europe could yield in excess of 15 billion euros annually through government workforce productivity improvements and reduction of recurring telecommunication costs with these infrastructures," said Daniel Aghion, W2i Executive Director.

For example, the City of Minneapolis (pop. 388,000) analyzed potential cost savings from shifting more than 200 workflows over to a citywide broadband-wireless network, allowing it to commit $1.2-million (over 10 years) in anchor tenancy to its private-sector service provider. Riverside, California (pop. 305,000) is committing more than $1 million in anchor tenancy over five years by leveraging its citywide Wi-Fi network in similar fashion.

"The more that governments can do to use the wireless services, the more revenue they will provide the installer of the wireless capability and the faster infrastructure can be built out," said Todd Ramsay, General Manager, IBM Global Government Industry. "That's the equation you want—not so much public funding and installation of networks but public usage so that the private suppliers will be incented to put that capability out there."

Along the way, government can serve as both a user and a facilitator to bring the wireless business model to fruition. For example, congestion charging in the center city not only provides a revenue stream back to the city, it can further enable security cameras in high-crime areas and for monitoring illegal parking. Anchor tenancy agreements can ensure sustainability through purchasing of capacity in a joint public-private partnership.

As facilitators, government can bring various parties together to use the network. Whether it's Facebook, YouTube, and games for young people, or grandparents downloading pictures of the kids, "once you get it going, local residents will buy it to connect because they find the cost is such that it is very convenient," Ramsay said. "Sometimes you don't know that they want it until they start using it."

◤ Conclusion

For the time being, a pervasive apprehension about what cities can and cannot attempt is likely to continue in Europe. In January 2008, the Dublin city council decided to shelve its project to offer free citywide Wi-Fi, at a cost of 27 million euros, because it would run counter to EC state-aid rules.

These rules may do more to hinder the efforts of cities to react to the knowledge-based global economy and to cope with market failure while simultaneously protecting incumbents. The worst outcome is a stifling of European communities' competitiveness—even as some countries meeting in November 2007 at the World Radiocommunication Conference (WRC) in Geneva spoke of national broadband speed in Gigabits-per-second.

How do we turn the corner? Clearly, movement toward more flexible EC rules will be needed. The European Commission's position as a whole is not entirely clear. Is the department responsible for regulating competition simply at odds with the department facilitating infrastructure? Shouldn't local governments be free to organize demand and determine which user groups, businesses and institutions want to get on board? Learning from the City of Prague, Bologna is pursuing applications and building a business model that could support public access down the road. Perhaps a next step is greater clarification—and improved communication—from the EC about how cities can construct models that meet regulatory approval.◍