

by Dianah Neff

Local Wireless Networks— A Prerequisite for The Future

For centuries, local governments have been the early adopters of new technology, and it was by investing in these new technologies that they became the great creative engines of commerce, culture, and society. It was railroads in the 19th century and roadways in the 20th century. For the 21st century, it will surely be the Internet and the electronic connectivity that the Internet delivers.

In only the past decade, these new technologies have changed our daily lives from how we communicate, to how and where we work, to how business is done, to how we deliver local services, to how we are educated, and to how we play. We are truly in the beginning of a new age. Just as in past centuries, the communities that will prosper in this new age will be those that embrace and invest in new technologies.

Many businesses and organizations have begun to exploit wireless technology. Already there are wireless hotspots providing Internet access at hotels, coffee houses, bookstores, and public places. At the commercially provided hotspots, users must have an account or pay a daily user fee. Several other hotspots provide free access, including ones provided by localities or business districts.

While wireless access continues to grow, today's patchwork of individual hotspots does not provide uniform coverage across a community. This lack of

comprehensive and universal wireless access greatly limits the benefits of this new technology. It is here that a local government can play the traditional role of government in providing the framework and initial investment, if needed, to fully exploit this opportunity.

Communities can capitalize on this potential opportunity by carefully considering the state of technology within their borders, deciding whether and how to intervene and, if justified, leading an effort to create an infrastructure that will provide high-speed, broadband connectivity to all points within the city/county.

Many local governments have begun to deploy wireless networks. Although localities vary dramatically in many respects, the primary drivers for local wireless networks are uniform. Typical project objectives are often based on these three concepts:

- **Economic development.** Communities of all kinds perceive broadband service to be critical to their economic vitality. Sonny Perdue, the governor of Georgia, calls broadband the “new dial tone” and sees it as an economic necessity. Greater connectivity is expected to encourage businesses to relocate; provide a sound telecommunications environment for existing businesses; help local businesses (especially small enterprises) compete regionally, nationally, and globally; and provide a foundation for the young “creative class” to stay after graduation and start up their businesses.
- **Social improvement.** The leading driver underlying social improvement is digital inclusion—the principle of ensuring that residents of all socioeconomic backgrounds can compete in the digital economy, use online information resources for job searches and continuing education, participate in electronic democracy, and partake of integrated health care education and monitoring initiatives.
- **Government efficiency.** Govern-

ments are large telecommunications users and benefit from lower-cost telecommunications services, including certain mobile services and wireless T-1 alternatives. Philadelphia estimates that it can save \$1 million annually on these two types of reduced service costs. Corpus Christi justified its wireless network ROI on replacement of their manual water meter reading system.

Local wireless projects usually blend two primary uses:

Government use. Because of funding restrictions or security concerns, some localities may deploy wireless networks for government use only. Most

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local governments agree to, or at least promise to consider, anchor tenancy in order to entice service providers to deploy networks in their cities or counties. They may extend the use of the network to schools, libraries, or other locally owned agencies with common assets. Water utility meters and parking meters are typical examples of the latter. Some local wireless networks have been deployed for public safety use only, as in Oklahoma City.

Residential and business use. Most local wireless projects being planned today target services to local governments as well as to residents, visitors, and small businesses. Combining local, business, and residential service

creates a larger customer base, which makes it advantageous for service providers to come to a community to build and run the networks at no cost to the community.

FOUNDATIONS FOR LOCAL WIRELESS NETWORKS

Local wireless projects tend to start with elected leaders considering and approving an initiative to investigate such a network. Before issuing a request for proposal (RFP) to deploy a network, officials wishing to launch a wireless network often commission a feasibility study or business plan to assess if they should intervene and the likelihood of deploying a sustainable network. A typical feasibility study or business plan includes:

- Statement of goals, objectives, and policies for the network.
- Analysis of the city’s expectations for the network, including focus group feedback from key stakeholder groups.
- Overview of current and future broadband technologies.
- Assessment of existing broadband offerings (for example, 3G cellular, DSL, cable Internet).
- Estimates of subscriber demand for residential, business, and government users of the proposed network.
- Inventory of assets suitable for use in a local wireless network.
- Service requirements and reference architecture assumptions.
- Demographic analysis of the community’s population.
- Topographic and morphological (land use) analysis of the community’s geography.
- Business model assumptions and analysis.
- Regulatory enablers and constraints analysis.

The feasibility study, once approved by the locality, provides the basis for an RFP to be issued to potential vendors and operators. The RFP will make use of the study data to provide information to prospective bidders. Here are examples of what a

prospective operator might look for in the data.

- **An understanding of the applications that will be used over the network.** If, for example, there is demand for applications such as wireless VoIP or camera surveillance, a network will require more capacity injection and fewer mesh hops, a type of Wi-Fi radio access device that is self routing and self healing, versus a basic Wi-Fi radio. Most systems being built today use mesh Wi-Fi radios because of their better performance.
- **A description of the municipality's intention to use the network,** including any potential commitments as an anchor tenant on the network. While such commitments may come with strict performance measures, they can substantially reduce risk for the potential operator.
- **A comprehensive inventory of local government assets.** Assets that can be used by the network include access to communications towers, building rooftops, streetlights, utility poles, water towers, and optical fiber infrastructure. If a private utility company owns the poles, exploratory discussions on projected costs and constraints regarding pole use are critical, at a minimum.
- **A study of terrain, topology, architecture, foliage, and other characteristics.** Hills, tall buildings, trees, and weather conditions in a region will affect connectivity. Anaheim, California, for example, has relatively few skyscrapers and hills, while San Francisco poses a far more significant challenge to network planners.

WIRELESS BUSINESS MODELS AND PRIVATE SECTOR PARTNERSHIP OPPORTUNITIES

Once local officials conduct a feasibility study and specify the primary objectives for their local network, it becomes necessary to select a business model that complements these objectives and ensures the network

will become sustainable. Every wireless network relies on a relationship with companies in the private sector, if only to purchase hardware for the network.

Managing the network's infrastructure, performing network maintenance, creating e-government applications, marketing the network, managing billing, and providing customer support, however, are tasks difficult for some communities to perform without some external assistance. Therefore, most enter into an ongoing public/private partnership to support their networks, if not to build them as well.

Several key terms must be agreed upon in order to form a public/private partnership that serves mutual interests. Variables to be negotiated may include:

- Ownership of the network.
- Funding for the network.
- A revenue-sharing agreement between the local government and the provider.
- An agreement for the local government to act as an anchor tenant for the network.
- An agreement to offer a discounted rate for municipal use of the network.
- An agreement to sell wholesale access to other Internet service providers in order to foster a competitive marketplace.
- An agreement under which the local government grants access to

certain of its assets, including utility poles and rooftops.

- An agreement to offer subsidized rates for low-income subscribers.
- The length of the agreement.

An agreement that balances the needs of both parties is necessary for positive long-term partnership and for the network to thrive.

To optimize negotiations, the city or county must be attentive to stakeholder needs. How successful will the network become if it does not meet the needs of the community? Stakeholders include government officials and agencies; residents; large, medium, and small-sized businesses; K-12 schools; colleges and universities; tourists; business travelers; foundations and nonprofits; utilities; and hospitals and health care agencies. Town hall meetings, surveys, focus groups, and other tactics will help network planners identify the most relevant stakeholder issues.

Because each local government is subject to different constraints and local officials require a network that is uniquely tailored to the needs of the community, no formula can automatically determine the correct business model or contract terms for a given locality. Figure 1, however, provides a summary of five business models that could potentially support a local wireless network. Variations on these business models are virtually guaranteed because the local wireless landscape is still in an embryonic stage.

PM Look to ICMA

ICMA's New Hot Spot

Communities around the world are researching, analyzing, and, in many cases, implementing wireless services to meet local government needs, to facilitate economic development, and to bridge the digital divide. Recognizing this important trend and the strong interest demonstrated by local government managers, ICMA is embarking on a new local wireless initiative that will feature articles in *PM* magazine, case studies and executive briefs, partnerships with private sector providers, and special programming at ICMA's 2007 Annual Conference in Pittsburgh, Pennsylvania, October 7-10.

For more information on ICMA's local wireless initiative, contact Tad McGalliard at 202/962-3563; e-mail, tmcgalliard@icma.org.

FIVE LOCAL WIRELESS BUSINESS MODELS

Private consortium. A private telecommunications company (or companies) funds the design, deployment, and operation of a communitywide wireless network and charges fees to subscribers for its use. The private company would typically own the network. In exchange, the city or county may provide access to light poles and other community assets (potentially for a fee) and may agree to act as an anchor tenant. The community may also negotiate with the private company to regulate rates for economically disadvantaged subscribers and require the private company to resell wholesale access to the network to foster competition among service providers.

In this model, the private telecommunications company would bear most of the risk associated with building and operating the network. A guarantee from the city or county to act as an anchor tenant, however, would significantly reduce this risk and, at the same time, provide an opportunity for the community to lower its internal telecommunications expenses and empower its mobile workforce.

Cooperative wholesale. A local government funds the design, deployment, and operation of a communitywide wireless network, but it outsources these tasks to a private company (or companies). The locality may use the network to provide its own telecommunications needs, such as access to the Internet and mobile phone service, which are leased from private sector companies. The locality also has the option of leasing access to the network on a wholesale basis to retail wireless Internet service providers (WISPs). WISPs can, in turn, resell Internet access to the general public and return a fee to the local government.

This model enables the locality to outsource the logistics of managing the network and ensure a competitive marketplace while it still benefits from the financial gains of a competi-

Figure 1. Types of Local Wireless Business Models

Business model	Example
Private consortium	Philadelphia, Pennsylvania
Cooperative wholesale	St. Cloud, Florida
Public utility	Toronto, Ontario, Canada
Nonprofit	Boston, Massachusetts
Grassroots public community	San Francisco, California (FON) New York, New York (NYCwireless)

Source: Informa/Civium.

tive network. In this scenario, the locality bears most of the risk and must raise the capital to build, maintain, and upgrade the network. This model is used most frequently when a community lacks the demographics and high profile necessary to entice the private sector to invest the capital to build the network.

Public utility. A public utility company, whether city owned, privately owned, or cooperatively owned, funds the design, deployment, and management of the wireless network and charges fees to subscribers for its use. The utility may outsource the design and deployment of the network but leverage its existing resources for subscriber acquisition, customer care, technical support, marketing, and billing.

Cities and towns that own their own utilities may find this business model a logical path. The utility then bears the financial risk and complexities inherent in managing a wireless network. Some municipal wireless utilities have entered into a partnership with a private sector company to manage the network because of the complexities.

Nonprofit. A nonprofit organization is created to own the wireless network and has the responsibility to fund the network. Funds can be raised through foundation grants; private donations; and, in some cases, loans from a city, county, or financial institution. The nonprofit outsources the design, deployment, and management of the

network to private companies. It then charges fees to subscribers or may contract with retail WISPs to provide Internet access to subscribers.

The nonprofit may have a social charter to reduce the digital divide and may engage in related activities such as the coordination of training resources or programs to provide inexpensive or no-cost personal computers to those in need.

Grassroots public community. A coalition of volunteers from the community funds the design, deployment, and operation of a wireless network. It is likely that such a network would provide free access and that the network's buildout may be organic and opportunistic rather than organized and ubiquitous.

The risk to the local government associated with this business model is low, and it has little at stake in it, either financially or politically. This type of initiative may increase the number and create greater awareness of free Wi-Fi hot spots within a community. Without means to generate revenue from the network, however, it is unlikely the grassroots model will provide uniform coverage across the entire community.

WHERE LOCAL NETWORKS HAVE BEEN AND WHERE THEY ARE GOING

The local wireless movement first gained traction in 2002 with those impressed by the power of low-cost, Wi-Fi technology, and the appeal remains the same today:

- Wi-Fi can be set up by just about anyone on a small scale.
- Wi-Fi requires no licensing, unlike most commercial wireless technologies.
- Wi-Fi equipment, at home and at the hot-spot level, is very low cost.
- Wi-Fi client radios are built into new computers or are an inexpensive and simple add-on for existing systems.

Today, the local wireless industry has moved beyond initial grassroots efforts. There is a sense in many projects that Wi-Fi provides a chance for local governments and public interest groups to assert a measure of independence from incumbent operators. Local wireless network projects give localities the chance to specify network policies—such as open access and network neutrality—that have previously been at the sole discretion of national government or left up to the operators themselves. The vision

and leadership expressed by early proponents of local wireless networks, like the city of Philadelphia in 2004, have inspired more communities and local groups to claim some control over broadband policy.

Today, more than 140 cities and counties in the United States (compared with 12 municipalities in 2004) are pursuing wireless networks while another 200 are studying the issues or are in the feasibility phase. These entities include some of the largest in the country, such as Chicago, Houston, and Philadelphia, along with many medium- and small-sized cities. The majority of these networks are still under construction.

The year 2007 will be an inflection point, with local governments on target to deploy wireless networks within the next 12 months. Thereafter, the industry is poised to continue its explosive growth. Recent announcements regarding new local wireless projects reflect a trend toward regional projects that encompass more

than a single local government.

The proposed networks in Silicon Valley, California; Pierce County, Washington; Suffolk and Nassau Counties on Long Island, New York; and Colorado wireless communities are among the latest examples. It is believed that regional projects such as these will entice traditional telecom providers into this space, which in turn will fuel the industry's expansion.

Local governments will continue to base their decisions to engage in local wireless networks on their goals for economic development, social improvements, and government efficiency. **PM**

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A photograph of a man and a young boy running on a beach. The man is in the foreground, shirtless, wearing orange patterned shorts, and is smiling broadly. The boy is running alongside him, also shirtless and smiling. The background shows the ocean and a rocky shoreline.

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