

Santa Monica City Net: How to Grow a Network

The telecommunications master plan that the city of Santa Monica began in 1996 laid the groundwork for an award-winning fiber network that supports the city's business community today.

By Masha Zager ■ *Broadband Communities*

An old joke asks, "How do you eat an elephant?" The answer, of course, is "One bite at a time."

Many daunting projects become feasible once they are broken into bite-size pieces. The trick is to make sure that each step along the way produces tangible benefits and that those benefits are applied to the next step in the process.

This is how the city of Santa Monica, Calif., built City Net, its 10 Gbps fiber optic network. Bite by bite, over more than a decade, Santa Monica developed an asset that now provides cost savings and revenue for the city and other public agencies, offers cost savings and competitive advantages to local businesses, and serves as a powerful economic development tool.

STEP 1: PLANNING

City Net had its origins in the Telecommunications Act of 1996, which held out the promise of telecom competition. Jory Wolf, who was then Santa Monica's information systems manager and is now the CIO, looked forward to the prospect of reducing the city's data access costs. After the act became law, he began a series of discussions with Internet service providers about offering competitive broadband services.

When these companies proved unable to offer affordable data services, the city quickly set up a task force to address the use of public assets for telecommunications, the coordination of city telecom systems and universal access to broadband. The plan was unusually



Jory Wolf, Santa Monica's chief information officer

ambitious, encompassing video, data, voice, cable, wireless and other services, including two-way video communications. The needs of public-safety agencies, of such municipal facilities as parks and libraries, and of the Unified Santa Monica-Malibu School District and Santa Monica College were all taken into consideration.

With help from a consultant and a community advisory group, Santa Monica's City Telecommunications Working Group assessed existing infrastructure and needs, evaluated possible solutions

and prepared financial models for several different approaches. In 1998, it issued a telecommunications master plan, which called for an institutional fiber network.

STEP 2: LEASING AN INSTITUTIONAL NETWORK

When Santa Monica next renewed the franchise of the local cable TV operator, it also agreed to lease from that operator an institutional fiber network that connected 43 city buildings, along with school and college facilities. The city funded the \$530,000 in construction costs and shared the operations and maintenance costs with the school district and college.

The leased institutional network went live in 2002 and immediately yielded operational cost savings. By operating the network instead of purchasing bandwidth, the city, school district and college reduced their combined telecom costs to \$700,000 from \$1.1 million. Within a few years, the annual savings grew to \$500,000.

STEP 3: BUILDING AN INSTITUTIONAL NETWORK

The city used these savings to build its own 10 Gbps municipal fiber optic network, using Metro Ethernet equipment from MRV. The network made pos-

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sible a variety of new, high-bandwidth municipal applications, including traffic surveillance, traffic signal synchronization, real-time parking advisories, real-time mass transit signs and security cameras.

In addition, the city upgraded its own Internet connection to 1 Gbps and installed a 10 Gbps connection to an offsite data center.

Although the original leased network was reserved for municipal use, the city-owned network had no such restrictions. The city was now free to lease excess fiber to private organizations.

By this time, the residential sector was reasonably well served by the incumbent cable operator, and, as a result of the city's encouragement, Verizon was also building out its FiOS network in Santa Monica. (Today, FiOS service is available to about two-thirds of residences.)

However, the city's business community still had no affordable ultra-high-speed access. Bandwidth of 100 Mbps cost about \$3,500 per month, and the city was concerned about making business broadband more affordable. Wolf says, "We wanted to create the concept of a 'tech coast,' so we had to do something to address the cost of broadband."

With 100 Mbps service priced at \$3,500 per month, Santa Monica decided it had to help businesses find more affordable broadband.

STEP 4: LEASING DARK FIBER TO BUSINESSES

In 2006, the city began leasing its excess dark fiber to local businesses. Because the monthly fees were low, businesses that needed the dark fiber were willing to fund the cost of building fiber from the backbone to their buildings, thus extending the network at no cost to the city.

The city was able to attract a dozen customers to its dark-fiber offering through word of mouth alone. These customers – mainly businesses with 2,000 or more employees – needed point-to-point connections between multiple offices in Santa Monica. To connect outside the city, they partnered with third-party providers to get them to the nearest Internet point of presence.

However, the dark-fiber offering was less attractive to smaller and mid-sized businesses. At the end of 2008, the city

surveyed more than 3,000 businesses located within 200 feet of the backbone to find out whether they could also benefit from access to city fiber. The responses indicated that Santa Monica's businesses were not well served by private telecom companies. The great majority of survey respondents either could not afford or did not have access to the amount of bandwidth they required. Of the few that had adequate bandwidth, most were unhappy with the quality of service they received.

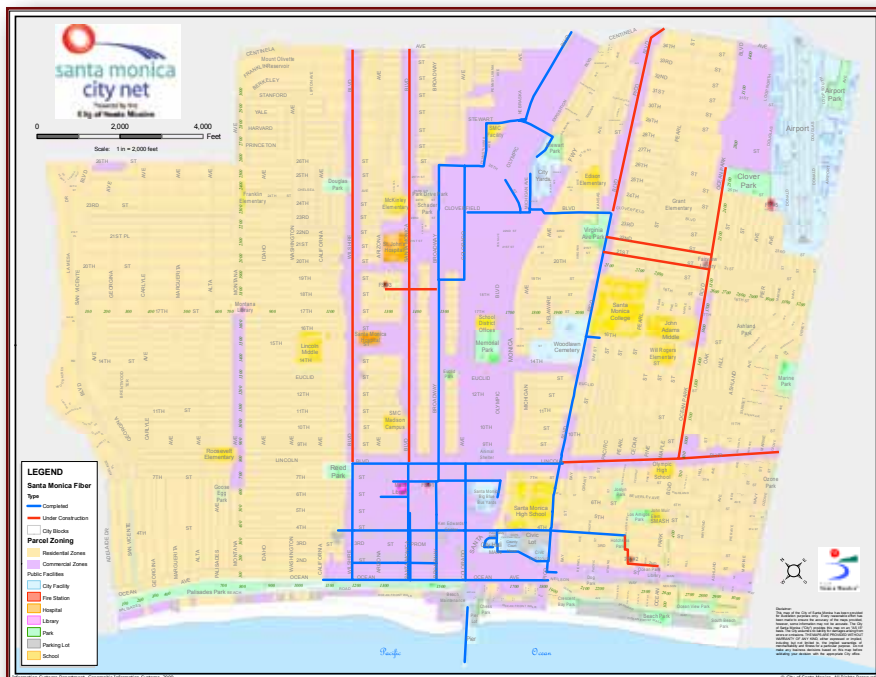
Despite their unmet needs, these businesses did not avail themselves of the city's dark fiber offer both because 10 Gbps service was more than they needed and because connecting to the local Internet point of presence on their own was expensive. Most of them were looking for ready-made Internet connectivity at speeds between 100 Mbps to 1 Gbps, and they requested that the city provide such service.

STEP 5: PROVIDING INTERNET BANDWIDTH

In 2009, the city decided to make an additional investment to accommodate these businesses. "We looked at lit services to provide an affordable way to multiplex broadband into the community, hook up with ISPs and get wholesale rates," Wolf explains.

To be able to provide Internet access to businesses, the city leased a fiber connection from City Net to One Wilshire, a major colocation center in Los Angeles in which about 270 Internet providers interconnect their networks. Obtaining Internet access at a major carrier hotel such as One Wilshire is much less expensive than connecting at a local point of presence.

However, leasing the 15-mile line to Los Angeles proved to be a challenge. Service providers were initially reluctant to provide transport, knowing that the city planned to make services available



Santa Monica started building City Net in the downtown area and is expanding into other commercial areas.

Today, the 100 Mbps business connection that once cost \$3,500 per month is available in Santa Monica for about \$500 per month.

to local businesses – they believed they would effectively cannibalize their own commercial offerings in Santa Monica. After extensive negotiations, one company agreed to provide transport.

STEP 6: MARKETING INTERNET SERVICES

With all these pieces in place, the city was able to begin offering Internet access to local businesses. Rather than continuing to rely only on word of mouth, it began advertising on the sides of buses, getting the word out through the Chamber of Commerce, talking with real estate brokerage companies and property management companies, and even using social networking sites such as Twitter and Facebook.

To make broadband more affordable, the city decided to keep its offerings simple – 100 Mbps, 1 Gbps or 10 Gbps, with standardized contract terms – and it dispensed with service-level agreements, counting on the inherent reliability of fiber to provide sufficient uptime. At first, the city advised customers to secure separate, secondary paths, but City Net now has enough redundant connections of its own that this is no longer necessary. (In the last several years, a number of other fiber network operators have also begun to sell business services

without service-level agreements, on the grounds that a well-designed and well-run fiber network provides enough reliability for most businesses.)

Today, most large commercial parks and multitenant commercial buildings in Santa Monica are connected to the network. Thanks to low Internet connection costs and simple contracts, business customers of City Net typically obtain 10 times the broadband speed for about the same price they once paid for non-fiber services. The 100 Mbps connection that once cost \$3,500 per month now costs about \$500 per month. A measure of City Net's success is that it has had 100 percent customer retention.

Though the city provides Internet access directly, it also makes the network available to third-party providers on an open-access basis. "The incumbents have chosen not to use our assets," Wolf says, explaining that larger providers are often reluctant to operate over networks where they cannot control the user experience and that their marketing and support organizations are not geared to using other companies' networks.

However, other ISPs have shown interest in the network now that it is becoming successful. Currently, two ISPs offer services generally over the network,

and other ISPs serve the Santa Monica offices of businesses that they deal with in other locations. Wolf says, "We have the opportunity to handle the business any way they prefer. ... We're not an obstacle; we're an enabler. We don't see ourselves as competitors, but as filling a void."

City Net's revenue from current business customers totals about \$300,000 per year, enough to fund network operations and maintenance and to support an extensive system of free Wi-Fi hot spots throughout the city. Wi-Fi is now available at parks, beaches, libraries, public buildings and other open-space areas. On any given day, about 2,000 of Santa Monica's 87,000 residents use the 27 Wi-Fi hot spots.

The city also has \$190,000 of its capital funds remaining, which it uses as a revolving capital improvement project account. This account funds construction for network expansion, which is repaid by customers as the network is extended to their premises.

An indirect benefit of City Net is that it has forced competing networks to lower their prices. Wolf's office estimates that nonparticipating providers have lowered their bandwidth prices by 20 percent or more, making bandwidth generally more affordable throughout the city. "If that's all we had accomplished, we'd feel that we'd done what we intended," Wolf says.

STEP 7: EXPANDING THE NETWORK

City Net's footprint today is still only about 60 percent of its planned total. Wolf says, "We're continually expanding, running fiber all through the downtown area, and lighting up the major transit corridors and commercial corridors – every commercial corridor will have fiber. We'll have Phase 5 completed in about 10 months."

Not only do businesses pay for the fiber network to be extended and connected to their premises – which is unusual enough in the United States – but they also return these network additions to the city. Typically, a business can recoup the up-front fee in the form of lower monthly telecom costs within two to three years.

Potential business customers aren't

SANTA MONICA RESIDENTS USE SMARTPHONES TO REPORT PROBLEMS

Help for potholes that need filling, trees that need maintenance, and graffiti that need removing is only an iPhone tap away in Santa Monica.

iPhone users simply download the GORquest applet from the iPhone App Store, select an issue, take a picture and tap "Submit." The applet finds the user's location and sends the issue to the staff member who can fix it.

The iPhone's GPS and camera features make it simple for residents to alert city officials about many issues around the clock. Residents know their photos, locations and requests go to the right people, and they receive status updates on their requests. This saves the city time and money and improves service at the same time.

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the only entities that request City Net connections; property managers and brokers also pay to connect their buildings to the network because these connections help them market their properties. Once a commercial building is on the network, whoever paid for the connection – whether tenant or owner – can negotiate with other potential customers in the building to share the access.

Wolf explains, “I believe strongly that businesses want to know what it’s going to cost them. This way they know, and they understand the differentiation between total and ongoing bandwidth costs. ... It makes it more cost-effective to continue to expand to other customers.”

The downside of requiring customers to pay for their own connections is that some potential customers cannot afford the up-front fee. The network would certainly grow more quickly if the city paid for the connections. In addition, some residential neighborhoods that do not have fiber access would like to connect to City Net – but again, most residents cannot pay for their own connections. Santa Monica applied for a broadband stimulus grant to enable it to pay for network expansions but did not receive it, so the policy of expanding the network based on demand will remain for the foreseeable future.

ECONOMIC DEVELOPMENT

Making broadband access affordable is beginning to pay off in terms of economic development, as the city had hoped. As an upscale beach city, Santa Monica is an inherently desirable location, but high rents deter some businesses from operating there. By offsetting the high rents, low broadband costs make it possible for more businesses to locate in the city.

In addition, existing businesses have found ways to compete more effectively. For example, the Fairmont Hotel Santa Monica, a historic luxury hotel on the ocean, now offers 100 Mbps broadband to guests and has repositioned itself as a tech-friendly hotel suitable for technology conventions and media production. Directors of films that are shooting in Los Angeles can stay at the Fairmont, receive daily footage via the Internet at the end of each day, review the footage and then forward approved sequences to studios and postproduction companies – a far more efficient procedure than the standard method of copying dailies to hard drives and sending the hard drives by courier to studios and by leased private jet to postproduction facilities.

A similar service is provided by Sohonet, an international private network operator that offers connectivity to film producers on an as-needed, project basis. Sohonet uses dark fiber on Santa Monica City Net to connect postproduction facilities in Santa Monica with studios and film locations worldwide.

The UCLA Santa Monica Medical Center has implemented a telemedicine initiative that involved hiring 180 software developers in Santa Monica. The medical center not only connects its main site to its data facility and satellite clinics, but also works with U.S. military services to offer telemedicine and virtual surgical procedures to troops stationed abroad. The medical center has also become 100-percent paperless for employee records, billing information and medical imaging, and it provides high-speed access to patients and their families in hospital rooms.

HOW MANY SANTA MONICAS?

Santa Monica’s City Net has received recognition in the local and national press and garnered prestigious awards from the Public Technology Institute and Harvard’s Kennedy School of Government. Its success inspired the nearby cities of Burbank and Long Beach to launch similar projects, and the three cities are now considering developing a regional network to enable high-speed data exchange throughout the West Los Angeles region. The regional network would be used first by the city governments for collaborative IT projects and public-safety communications. Later, it would be made available to businesses to facilitate regional communications among their offices and with their customers and suppliers.

Santa Monica has also consulted with other cities that are interested in learning from its experiences. Wolf believes the model is replicable in many other cities but not everywhere. Santa Monica’s business model is most likely to succeed in cities whose municipal buildings are located reasonably close to one another and that are within about 50 miles of global data centers with access to competitive broadband options.

In places where the model works, Wolf says, city governments should study it as an economic development strategy. “Businesses are community stakeholders,” he points out. With a system such as City Net, “the community wins, residents win and businesses win.” ♦

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