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Municipal Broadband Snapshot Report™

After the Shakeout: Getting it right the second time around

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Table of Contents

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Introduction

In my January 2007 Snapshot Report, I predicted that by the middle of 2007 certain municipal network business models would prove to be unviable, and likewise viable business models would become apparent (www.successful.com/Snapshot-1-07.pdf). The report also states that you would see this take place mostly in smaller cities and counties.

Well, June saw the beginning of the end of the "free wireless for all," a model that should have died a-borning 18 months sooner. The real bummer of such a late demise is that a lot of time and resources were wasted that could have advanced muni broadband much further along. That, plus you now have many city officials giving up on these networks entirely when what's really needed is to re-engage the evaluation and planning process.

So much of what went wrong with the network projects that are now the object of widespread media scorn can be traced to a failure of process. Little or incomplete needs analysis, deciding on technology direction (most frequently WiFi) before fully exploring technology options, and a paucity of creative thinking on how to fund these projects. These collectively resulted in many cities falling for the 21st century version of Herbert Hoover's "chicken in every pot" promise.

What's the way out? The answer lies with those municipalities I interviewed or alluded to in January that are pursuing muni broadband using the right analysis processes and achieving success. There have been challenges and stumbles along the way even for them, but in the end they are reaching the goals they established, and delivering notable benefits for their government operations and constituents.

This October report throws the spotlight on municipalities you probably haven't read too much about in all the news proclaiming the doom of municipal networks, except maybe Corpus Christi. These cities and counties offer valuable lessons, albeit without the same sizzle of the great free-for-all of 2006. Nonetheless, these are lessons to be modified and adapted to meet the uniqueness of your municipality, not cookie cutters to be blindly copied and executed by rote.

I. Separating hype from reality – again

An interesting game if you have 10 minutes with nothing better to do is to pull up all of the September articles about muni wireless, and count the number of times the words "death," "dying" or "near death" appear. Take note that those serving up the eye-catching headlines of muni wireless' demise are the same headline writers who proclaimed the values and virtues of "free wireless" with the fervor of college freshmen at their first frat party.

I'm reminded of a story my grandmother used to tell me about a spry old gent who used to take a daily stroll through town. She'd sometimes see him stepping lively down the street and ask how was he doing. He'd look up, smile and without breaking stride always say "I ain't dead yet."

People, muni broadband ain't dead! Nor dying, and not likely to do so. It's only a flawed business model that has died, and a welcome death it is. Don't fall for the headlines. They're just reverse hype. Last year, the hype machine overpowered a valuable technology and gave it super human powers, some of these it could never achieve. Now that rational thought is being driven to the fore by brutal financial reality, let's get off this kick of writing muni wireless' obituary and start writing some noteworthy business plans.

Burning needs still remain

If we look at the needs in 2005 that drove municipal broadband - wired and wireless – many remain today. A recent NASCIO report highlighted that 27% of the current municipal workforce is eligible to retire in the next 5 years. Local governments need to be more efficient and able to do more with the same human or material resources, and highspeed wireless is great for achieving this.

Internet and data network access that's affordable and fast enough to meet the highspeed needs of government, commercial and not-for-profit entities are sorely lacking, and incumbents in many places are not filling the bill. In some cases they won't, in others they're technologically incapable of doing so.

I'd like to think that one day the telcos and cable companies will see the light and become a positive and more creative part of the necessary solutions. I just spoke at a digital cities conference in France where a senior executive from British Telecom spoke words that stunned me in their candor, and heartened me with their prescription for action sorely missing over the past months.

Jon Lane, BT's Director of its UK Wireless Cities programme said at Cannes - "We do not believe that in metro areas 3G will give city governments or other major city stakeholders the speed and bandwidth necessary to support the type of WiFi, CCTV and mobile worker

applications they need, and which will deliver them real sustainable business benefits.

"This can only happen when municipalities and service providers develop open public/private partnerships based on a shared vision and commitment to evangelize the real benefits which muni wireless can bring to a city. Building these robust sustainable partnerships requires commitment, time and a long-term view. But as we have demonstrated in the UK with cities such as Westminster, Birmingham, Liverpool and Newcastle, these partnerships can work and are the only viable way."

You cannot have true partnerships when vendors or service providers are forced to carry the full financial burden. For these to be fruitful partnerships you must have the careful planning and out-of-the-box thinking that don't always capture headlines, but often produce strong bottomline results: more responsive government, enhanced economic development, increased productivity and constituencies better served through diverse technology options.

Luckily, in spite of all of the negative news, there are municipal broadband success stories. As you go back to the drawing board to map out Municipal Wireless 2.0, take a long hard look at the real stories beyond the news blurbs, the conference presentations and other governments' RFPs. Identifying partnerships, as well as executing other elements for muni network success, require that you be a stellar student of the processes used by successful cities.

II. Report participants – a cross section of success

For this month's roundtable discussion I wanted to bring together cities that pursued a variety of technologies, applications and financial options. Too many cities jumped on the muni wireless bandwagon without fully understanding constituents' needs, doing effective technology due diligence and exploring the range of funding options for these projects.

As you read participants' comments, consider how effectively you've conducted needs analysis, technology due diligence and business model analysis, or how well you intend to do these things if you are just starting to pursue a muni network project.

Casey Beard, Director of Emergency Management - Morrow County, OR

At 700 square miles, this is the largest deployed and successful municipal network in the country, and one most people probably don't know exists. The driving force behind this network was for rapid emergency response and public evacuation in case one of several potential significant crises occurs. This hybrid WiFi/WiMAX network manages a myriad of monitoring and emergency response resources.

Mayor Glen Caldwell – Williamstown, KY

Williamstown not only owns its utility company, but they also owned and operated a cable network for 20 years. Four years ago they replaced this with a fiber network, and two years ago built out a citywide wireless network with the help of Connect Kentucky, an initiative started by that state's governor. Both networks have been expanded to cover the rest of the county's 27,000 residents, and network services are sold to any individual or organization that wants them.

Misty Chase, Director of Beyond Tobacco - Greene County, NC

If necessity is the mother of invention, then Greene County was destined to create a winning muni wireless project. A rural county totally dependent on the tobacco industry that had abandoned the area, a few years ago they were above average for all national indicators that defined economic crisis. Three years after the network was deployed, Greene County has turned everything around, and is a model for using muni networks to spur economic development at all levels.

James Hettrick, former CIO – Loma Linda, CA

Loma Linda was one of the cities moving aggressively into the muni broadband space before it became chic. However, they focused extensively on fiber in the beginning and targeted this network to government, education and commercial organizations, including developers of multi-unit residential and commercial buildings.

Charles Hewitt, CIO Providence, RI

Though Providence's network is 2.4 GHz wireless, it's not WiFi. Their technology due diligence led them to the conclusion that, in order to meet the public safety need they had identified, another approach would deliver better results. Then Providence pursued a Dept. of Justice grant rather than Homeland Security. These moves reflect what should be the thinking of more cities – the best solutions are those determined by the needs of a specific municipality rather than following what's popular.

Mark Myers, Director of Business Development - Government/Education - Cisco

Cisco Systems, sponsor of this report, is a major vendor in the municipal broadband space. Their infrastructure technology is being used in several major muni network projects, including Dublin, OH, Madison, WI and the Italian city of Brescia.

Leonard Scott, Business Unit Manager of Municipal Information Services – Corpus Christi, TX

Corpus Christi represents one of the more rational approaches to muni wireless projects. They built their network to successfully address city government needs, then sold it to EarthLink to enhance and sell services to consumer and commercial customers. One primary app (automating utility meter management) justified their investment in the network, and other departments quickly saw opportunities for additional applications.

Lynn Willenbring, CIO – Minneapolis, MN

This network project is a shining star for muni wireless, it's value being proven like few others. The network was only 25% complete when one of Minneapolis' key bridges collapsed. The network played a leading role in the crisis response, traffic management and public communication efforts during and after the disaster (www.successful.com/addendum-5-07.doc). It puts to rest the silly notion that muni wireless is not a reliable technology for crisis communication and public safety.

Jory Wolf, CIO – Santa Monica

As we move forward, I will be forever skeptical of the claim "we can't do muni broadband because we have no money." Santa Monica didn't have a budget for their network, but Jory Wolf managed to find enough money within the city's budget to launch the initial network. Equally important, he's been able to use creativity to fund the continued operation and expansion of the network.

III. Question responses

The questions you ask are as important as the answers you're trying to find. Many folks miss great opportunities or get tripped up by avoidable pitfalls because they don't ask the right questions. I asked report participants the following:

1. What successes are you having with the network?

2. How did you manage expectations for what this project was to achieve?

3. What steps did you take to do needs analysis of the local government or constituents?

4. What were the primary findings of your needs analysis?

5. What were main steps in doing tech due diligence?

6. How was the network buildout financed?

7. How do you expect the network to sustain itself financially in upcoming years?

8. What organizations has the city (county) partnered with for applications, content, services or general support?

Consider posing the same questions to steering committees and project teams to make sure their planning is, or will be, sound.

1. What successes are you having with the network?

Hettrick (Loma Linda): We have a good partnerships with the University of Loma Linda which is using city's fiber and data center to revamp their computing operations, set up a new call center and create highspeed links between many of the university's buildings. Loma Linda is also making access to its network available to residential and commercial buildings as they're being built. So far 60% of new building projects are incorporating the City's fiber.

Wolf (Santa Monica): We came to a point where we didn't have funding for enhancing the telecom technologies such as our legacy PBX and slow connection circuits. So we pooled money we were already paying for voice and data services and used this capital to build a fiber network and implement new technology such as better switches that allowed for additional savings.

By switching fiber for the old systems we realized a $500,000 savings in data circuits and $250,000 savings in voice circuits, all of which stayed in our fund. These ongoing savings fund other innovations, such as hotzones for free wireless access, redundant call managers that allow us to balance our voice traffic and also provide fault tolerance. Savings also enabled us to provide our police with EVDO for video streaming in their vehicles, and 200 terabyte-data storage devices to store three years of data from video cameras.

Network reliability went from 85% to 99.9% uptime. Our staff has more availability to provide improved customer service so we can manage what's running on the network as well as the network itself. We never had the time needed for a well-managed network before because the old technology required so much attention.

We have excess bandwidth, so we can provide large number of sites with free wireless access, while the staff has unlimited speed at their desktops and immediate access to the database. We're selling dark fiber to corporations. You reach a critical mass in which the service sells on its own. When one company buys, another one buys. The network is growing all over the city using private companies' money. We generate more revenue to expand the network for our use and when all is done we own it. Our fund is self-sustaining and I have $2.5 million in available capital.

We're doing projects we would never have thought of before. We're connecting all of traffic signals and the traffic cameras, and putting parking structure signs onto network to tell people if there are available spaces. Eventually the public with WiFi devices will be able to see what the cameras see, and the City's Web site and traffic radio station will get this information.

Willenbring (Minneapolis): We will not be using the network for our institutional purposes until it is completely built out at the end of this year. The expectations were far exceeded, however, in our ability to use it for the bridge collapse recovery efforts.

Scott (Corpus Christi): Aside from our expected $1.6 million in savings through our AMI application, the traffic signal control system is cutting costs and saving time. 25% of traffic lights that were not universally managed because of the expense are now monitored, workers remotely fix problems and staff monitor traffic patterns to better resolve constituents' calls. There are significant intangible benefits as well. The Health e-Cities application so far is reaching its goal of producing better health outcomes for people.

Expectations have always outpaced our ability to take advantage of the network. We continue to log potential uses for it. The real monster here is managing change. Many employees embrace change well and enjoy using the system to make their jobs easier and more efficient. Others would enjoy our banishment from the face of the earth. We are moving forward at an acceptable pace and gaining momentum.

Myers (Cisco): Right now the market clearly is in transition period. In many ways there was a period during the last 18 months of over exuberance as a few companies came in offering to build networks for free. Now municipalities are becoming more focused on value and what can the network do to help change the way they do business.

Houston Metro, the Chicago Transit Authority and the City of Niagara are three examples of successful networks up and running. In Houston and

Chicago, both projects focused on public safety on busses. Houston is combining several technologies to improve security, reduce cost and create a collaborative environment to better serve the public, and also tying in telemetry to reduce costs such as maintenance expenses. Niagara is using their network for smart parking meters.

In our view, what leads to success is cities looking to leverage their existing investments in technology by using the network as the platform. Mobility, in general, is an enabler, and muni wireless extends those existing investments to drive applications that target productivity, improving quality of life, cost avoidance and revenue generation potential.

Caldwell (Williamstown): The government is using various Internet services, all of the City's operations and buildings are linked and mobile workers are using it, such as police officers with mobile data terminals. We're now moving to maximize the network and eliminate phone lines. County departments are moving their office networks onto ours and we anticipate some of their mobile workers will use the network as well.

A lot of home business users are subscribing because this is the first time they've had connectivity to any services unless they went with satellite. A majority of these businesses came about because of the service, up from the two or three before. People can complete tasks in an hour that used to take four. Certain northern areas of the county had options, mainly along the I 75 corridor, but not far into the rural areas.

From comments we're hearing, expectations are exceeded. People really like the idea of a local organization providing Internet services. If someone calls in with problem, we can respond within an hour or two. Before, folks had to wait two or three days to get repair services. Also, there have been no outages.

Hewitt (Providence): After about one full year of operation, the users (police officers in the field) regard the network as an essential part of the infrastructure, like a cell phone and a voice radio. The network has met or exceeded expectations. Even though there isn't a financial savings from many aspects of this application, justifying the investment is similar to justifying telephones. We're talking about basic infrastructure, what platform do you stand on when you deliver services. The justification people understand best is that a tremendous amount of work is done in the field. If the necessary resources are not in the field, forcing officers to return to the office to use them, then officers aren't delivering fully on the mission.

In the future, other departments can use the same network. We're getting ready to put Building Inspections on the network next because our analysis shows that we can save about 2 1/2 hours per inspector per day by them being able to complete paperwork in the field.

Beard (Morrow County): We have had tremendous success with our network. It's allowed us to meet federal safety mandates in order to

begin destruction of chemical weapons at the Umatilla Chemical Depot. We provide better day-to-day community policing at a reduced cost. We've enhanced the delivery of Public Works services with the same amount of resources in place before the network, and are delivering a higher level of public health services with the same number of employees.

The school district has improved security and enhanced learning opportunities. The network itself and the access it provides fosters private sector economic activity, improves the community's quality of life and has drawn positive national and international attention to our county. In the final analysis, the project has exceeded our expectations on many levels.

Chase (Greene County): One major area of success is with our youth. The different programs that we're able to have because of the network have led to high school SAT composite scores increasing 41 points, and proficiency scores increasing from 53% to 78.4%. Over 70% of our students now apply to college compared to less than 30% before we got the network.

We had been losing businesses because we had only a small area in the county with broadband, so businesses moved to where they could get the service. More than a dozen new businesses have been attracted here, in large part, because of the network. Of the new businesses, a couple are commercial retail, a couple are technology companies. These businesses don't do traditional commerce, but a lot of electronic commerce.

The Assistant County Manager observed that the network is giving us a better trained workforce. When the tobacco industry left, a lot of our people became jobless who had worked at the same place for 20 years and didn't have a high school diploma. The training programs accessed through the network go a long way toward educating adults without computer skills and diplomas so they can actively participate in the digital economy.

The network is expanding and we have a waiting list for families that want to be connected. We are on track and continually making progress.

2. How did you manage expectations for what this project was to achieve?

Willenbring (Minneapolis): Very carefully! It was important that our cost savings estimates were extremely conservative, so as not to oversell the capabilities. Also, in the early phases we met with individual City departments to discuss how their business might best leverage a wireless mesh.

Hewitt (Providence): I hosted a couple of meetings several months before the RFP was published to brief the Public Safety and City Administration leadership teams, explaining why the project was

necessary and what it would deliver in terms of applications and performance. I requested and received approval to proceed. Then, during the course of the build-out, we provided frequent updates to the leadership team regarding progress.

Also, about mid-way into the build-out, we briefed the entire police command staff on how the transition to the new mobile applications would happen. The message was that when the network went into operation, the users would see the same applications and level of service that they were currently seeing at their desks. We noted that the network would cover over 95% of the city outdoors. We said that advanced applications, like video surveillance, ought to be feasible, but remained to be proven later.

As for providing services for the general population, everyone knows we're not interested in getting into the public access business. We see significant benefits for having a public wireless network with the right financial model, but we publicly support getting a private entity to build and run the network. The City would definitely cooperate in the project.

Caldwell (Williamstown): We had several public meetings, though these were mostly attended by library, healthcare and county and city school systems. Connect Kentucky provided a lot of information. We showed the public the expected coverage areas were. Currently we're informing people where we are now with services and where we expect to go to in future. We've awarded a contract for six new standalone towers that the City will own and extend range of wireless network, so people are reassured that they'll be taken care of soon.

Beard (Morrow County): We were clear with stakeholders and the general public that the network was designed to accomplish specific functional tasks in clearly defined geographic areas. We didn't promise 'free' WiFi to everyone. End users were included in the requirements definition and equipment selection process so they knew what they were getting. Those involved with the deployment continually explained the system's strengths and limitations.

Myers (Cisco): Cities pushed many of these network projects from the outside and worked in – looking at universal public access before looking at their universe of public workers. Elected officials initiated projects proposing that someone else build a network without specifically identified users, expecting that users would eventually show up. That's the 'old' model. You should first ask whose expectations are we talking about, what are those expectations, and what are the specific values that they will bring to the community?

We feel the value has to be seen by the municipality itself, more so than the citizens. By showing how the network can impact public works or public safety, for example, you demonstrate value to the departments and also to the community at large. This creates simple ways to explain why you're doing something. Social inclusion and economic development are important, but how you get there is critical and making sure that the

network is financially sustainable is the first step. Target sustainable and measurable value and you have secured funding.

At the same time, it's wrong for us as a vendor community to paint a picture that every city is the same and try to position the same solution. We must begin with the existing invested infrastructure such as the technology that is in place now within each city and promote expansion from there. Leverage the investments already made and utilize technology as the enabler.

Wolf (Santa Monica): Everyone had low expectations, not because my staff couldn't deliver, but because people just couldn't see all of the possibilities. Some of the ideas we put out there were kind of wild, so people were skeptical. On the other hand, I wasn't asking anyone for money, so there's been no risk. It's been my risk. I said we'd go slow, start with a pilot project. I didn't promise the moon, and in fact, the revenue projections I gave were half of what I personally expected.

In the end, what we delivered was way beyond what people expected. People knew we'd have a better network and save money for data and then voice. It took two years to do. But then, for example, while I had promised $20,000 in savings for something, we actually saved $45,000. All of a sudden things started to mushroom. Council would come to us and say it wants 150 video cameras, can we do it? Well, sure, because the fiber's right there, already in place. It's better to under-promise and over-deliver.

Chase (Greene County): The biggest thing is that we have this very detailed plan. That way you get everyone reading on the same page. Everyone knew where you want to go. When you're that specific, it's hard for someone to waiver off. This, by the way, is why we won the TOPs [Technical and Occupational Program] grant. The plan backed up the vision that led us through that funding tunnel.

This roadmap includes goals in areas such as enhancing education, improving technology infrastructure and economic growth. We did a big community project kick off event that brought in the politicians and major people of the area. Collecting feedback is ongoing. For example, an article in the local paper talks about what's up with the project and includes ways to send us questions. By encouraging feedback we set and manage expectations at the same time.

You can't ignore elected officials in this education effort. Not too long ago new County Commissioners were elected, and when they were running they got involved learning about what we're doing so after the election they would be up to snuff with everything.

Scott (Corpus Christi): This was very difficult as the only thing most City employees had as a reference for performance measurement was copper 10/100 connections. We've had to provide a lot of education regarding the technology and its advantages and shortcomings.

Hettrick (Loma Linda): We held meetings with department heads every week, and presented informal or formal reports regularly to Council meeting. We set up the Loma Linda Connected Community Advisory Board that consisted of CIOs in town who helped with the planning and provided feedback. They submitted reports to Council as well. Vendors of any type of technology who the city had contracted with to provide services met regularly to discuss what projects they were working on and how this could be integrated with the City's technology applications.

3. What steps did you take to do needs analysis of the local government or constituents?

Wolf (Santa Monica): We didn't have to do much analysis because it was pretty clear we were paying a lot for a little and needed to find a better way. We were getting choked in the neck and in the pocketbook by incumbents and out-of-date technology, services were poor and they weren't investing in services in the city. Just one example, we were leasing T1 lines at $700/month for 128K throughput for most of them, and one at 512K. With this we couldn't implement storage area networks or download patches necessary for keeping systems up and running. The staff felt we needed to manage our own resources.

Chase (Greene County): Our focus on wireless started when we were addressing a bigger problem. Greene County is a rural and depressed community that depended heavily on tobacco. When that industry left, we acknowledged that we had not prepared for economic growth beyond tobacco, and so there was limited infrastructure to draw other types of businesses. A group that included the Mayor and Health Department looked at a strategic plan for moving the county forward. We concluded that technology was going to be our four-lane highway.

We created an advisory committee to help establish goals and expectations for a technology solution. The group included county commissioners and representatives from the Board of Education, the Cooperative Extension, the Department of Social Services, the Health Department, the Chamber of Commerce and philanthropic organizations. They met with their respective organizations to develop strategic plans for their parts of the initiative and brought this input back for discussion.

Willenbring (Minneapolis): Multiple community meetings were held, particularly around the issue of public vs. private ownership. As for the functional needs, they were based upon the bandwidth and mobility needs we could immediately identify for the City's institutional use. We want sufficient capability on day-one of the network, so the assessment was not based on any pie-in-the-sky future applications.

Hettrick (Loma Linda): Several of us started by reviewing what current services the incumbent was providing, then looked at what we could do that they weren't as far as capabilities and services. Before the Advisory Board was formed, we conducted a series of interviews with

various people in the community. This included individuals with a wide spectrum of talent such as people who were professional grant application writers and experts in education.

Hewitt (Providence): We ensured tight communication with Public Safety's leadership and Public Safety's IT staff, listened to their concerns, and relied on them to validate the needs that my team identified. We engaged a local consultant who is trusted and agnostic, an expert in data communications technology, well-connected with other experts, already familiar at a reasonably deep level with the City's voice and data communications networks and capable of preparing an RFP. We established a small network of external sources - both vendor and non-vendor - to assure as complete an understanding as possible of the needs and risks.

Beard (Morrow County): Our team performed a thorough analysis of needs based on Chemical Stockpile Emergency Preparedness Program (CSEPP) criteria. We performed a needs assessment utilizing the Governor's Executive Review Panel emergency response performance measures. We hired a contractor to review the internal needs assessments we developed. We also conducted an assessment of our available technology.

Scott (Corpus Christi): We held several "Cloud Chasing" meetings with groups of folks with common interests to provide education and solicit input.

Myers (Cisco): Municipalities have to consider where mobility can have the biggest impact on local government employees. We're seeing success when the network is positioned as the platform. The network extends applications or business processes for municipal employees and employees drive that value for local governments. This way, government officials can clearly articulate those potential benefits. If you look at what people have at their desktops and how that makes them productive, extending it to the field is a primary need that makes sense.

Caldwell (Williamstown): We didn't do much besides the activities Connect Kentucky conducted at meetings, which were pretty effective. There was a census study with demographic and statistical data as well as historic usage data on people who were subscribing to existing system issue. We relied on all of this to map out how people were using the technology.

4. What were the primary findings of your needs assessment?

Scott (Corpus Christi): Folks enjoyed the idea of the freedom to connect wirelessly from anywhere and their thoughts about what was needed generally flowed freely. Most of the software that municipalities currently run has a Web-based element. When you start looking at wireless, you realize this is what you need to extend to the field. We felt that, if ideas to meet this need could convert directly to dollars, we could fund the entire project.

Willenbring (Minneapolis): Essentially, we needed up to 3Mbps border to border to support our emergency responders as well as our inspections staff.

Caldwell (Williamstown): One of the main results was determining that we needed to account for people who have computers but don't know how to get best results from them. Not surprising, this is often tied to age, so people 45 and over are more reluctant to use the network. We figured that younger people would be the primary ones to use the network, at least in the beginning. But we also felt that the southern part of county was the area that would use it the most and by all demographics because they had the least amount of connectivity to begin with. This has proven to be true.

Hewitt (Providence): We determined that a commercial cellular network, Verizon EVDO for example, would not satisfy our requirements. We also believed WiFi technology probably would not work, certainly not very well or affordably. Everyone felt the hard part would be getting access to mounting sites and getting the resources to do the work.

Backhaul would be a significant problem, even with mesh network technology, since it is expensive and technically challenging to deploy correctly. An experienced contractor and a trusted brand were essential for acceptance by stakeholders and success.

Beard (Morrow County): We found that the emergency response communications and management systems in place were not adequate to meet the needs identified, and that the only available technology to meet the requirements given the available time and money was a WiFi based data transmission system.

Chase (Greene County): Our needs assessment concluded that we needed to expand high speed Internet access and this access needed to be affordable. We also determined that we needed a partner because the county doesn't have an IT department or any way to provide customer service and support, plus we needed a creative way to provide technology training to a large percentage of first-time computer users.

Hettrick (Loma Linda): The University, particularly its medical center, is the leading employer for the county as well as Loma Linda, so their needs were a primary concern. Doctors wanted the ability to work from home for both data entry and access of records, x-rays lab results and so forth. Many students also wanted to be able to work from home. The center needs to interface with various types of people and resources in the surrounding cities. The VA hospital had similar needs, plus they wanted to put patients with non-serious medical issues and chronic conditions in apartments so they can do remote monitoring of patients. This frees hospital resources for the more critically ill.

On the government side, people were very interested in video surveillance, SCADA and park irrigation control applications, AMI and traffic management systems placed on fiber to make point-to-point

wireless a more interactive feature. They also wanted the network to interface with the university and have transparent secure LAN services. Looking at the alternatives, we felt we were able to build faster, cheaper and more community focused networks for certain types of services than incumbents could deliver to meet these needs. Incumbents just bring everything out to the Internet. With us, all of our data would move only within the local network.

5. What were main steps in doing your technology due diligence?

Caldwell (Williamstown): We located where we could place towers or use existing vertical structures to mount the network radios. We chose frequencies based on topography, and the benefits and weakness of the different frequency ranges relative to topography. Most homes in the county are built on ridge tops plus we have lots of trees with thick foliage, so given this, we were smart and waited for spring to do testing. We also did spectrum analysis and an assessment of area coverage for whatever technology that was already in place.

Myers (Cisco): One thing you should get from your needs analysis is an understanding of the core technology that already exists within the community. For example, where does fiber exist to provide backhaul for the wireless network? Where do you have partners or organizations in place that can help you with this? Community includes the government, education, businesses, medical facilities and the neighborhoods.

Look at how you can leverage this infrastructure and extend it with new functionality. Then assess what the best applications and services are to role out on the infrastructure. You also have to determine what are the primary corridors - where do you need to have the service available first and where are you going to build it from there. Universal coverage is an ultimate goal, but appropriate access is an immediate and prudent need.

Hettrick (Loma Linda): We reviewed the power, wireless and fiber technologies already in place throughout the city. Then we compared and contrasted capabilities using Pro-Con charts for each of the main vendors of various technologies: the mesh guys, the active gear and PON [passive optical network] vendors, the fiber service providers, the main players in power world. Sometimes in this process certain technologies get eliminated quickly, which is ok because it's better to be thorough and look at many options.

Beard (Morrow County): The team conducted an internal assessment of potential available technologies. Next, we convened a technical expert review panel. Then we hired an independent contractor to review the assessment.

Chase (Greene County): Our technology due diligence may be different than in many other places. We went to a number of the telecom providers to explain what we needed, but because of us being so rural, there was no interest because they did not think they could

build a network that would work. So in a way, our decision was made easy. From what we learned from other local governments, municipal WiFi was the simplest option logistically. We just needed to buy the WiFi infrastructure so we could maintain control of the network, but find a company to design, build, test and operate the physical network.

Because of what we have done, other vendors have now expanded offerings in our area with services that are not the same as what the county is doing. This is great because it enhances constituents' options.

Scott (Corpus Christi): First we had to find out what our needs were, and then find out what technology was in the marketplace. After this, it was time do the in-depth planning on how we could make the most from our investment.

Wolf (Santa Monica): We were already a Cisco shop with a large investment in their technology and were trained in it, so we use this for the edge and the core of the new network so we can leverage these assets. For each technology category we looked at all of the big players, and in great detail, for months at a time. The staff did a combination of RFPs and some shopping. For items under $150,000 we just have to show three bids or quotes without doing an RFP, but we prefer the RFP process because this gets us more data for decision making. Even without one we still did due diligence as if it were an RFP process.

Willenbring (Minneapolis): Our first was to contract with an expert to evaluate the technology. Second, we used the RFP process to ensure wide participation and that we received multiple options to consider. Finally, each of the two finalist vendors were required to install a one square mile pilot network for us to evaluate the promises made by the technology as well as the ability of the vendor to deliver on their promises.

Hewitt (Providence): We set out to understand the technology at a fairly deep level, including its pedigree and relationship to competing technologies. We had conversations with cities that were early adopters and had our team visit the best ones for extensive interviews and demonstrations of the technology they were using. Then we tested the products in our office to make sure our core application suite was compatible with the network.

We made an early decision not to use WiFi. The RFP was written so incumbents and anyone else could respond with whatever they had to offer as a service. We got several incumbents to reply plus Motorola who bid to actually build a network.

6. How was the network buildout financed?

Myers (Cisco): People are building out networks by focusing on how they can do more with less, and then re-directing funds from somewhere else within the budget based on this value proposition. Communities building new CAD [computer aided dispatch] systems may see the

network as an important component of the project. Since they've already earmarked money for this, targeting additional money to extend the system's value by leveraging the network and driving additional functionality makes prudent sense.

People are integrating grant strategies that also focus on the value proposition. Where can we get a grant to drive interoperability, or create new opportunities for first responders? We see the next wave of financial strategies coming here.

Chase (Greene County): We received a Technical and Occupational Program [TOPs] grant funded by the U.S. Department of Commerce that paid for the network infrastructure, which we now own. The service provider, Wavelength, leases the equipment from us plus pays us a percentage of the revenues they generate selling services. We were able to buy laptops for all of our high school students through a grant from Apple.

Willenbring (Minneapolis): The City pre-paid for services to provide some start-up capital. The rest was funded by the vendor.

Hettrick (Loma Linda): We pulled money from a combination of accounts. There was redevelopment agency money, special projects money and the utility department putting in money. The amount of every group's financial participation was based on their anticipated usage. If SCADA is going to use 20% of backhaul, then that department paid 20% of the network costs. Some cities could pursue a loan, and others could use the bond route.

Scott (Corpus Christi): We used capital improvement funds to pay for the network and later sold it to EarthLink.

Caldwell (Williamstown): We used some capital funds. The Kentucky League of Cities has bond pools and legal counsel told us we could use those as well. The bonds, which are already sold, are issued based on requests for various things from police cruisers to Internet services. Connect Kentucky provided personnel in contractual arrangement to advise us and worked with us on initial start up. There were a lot of steps where we didn't have to re-create the wheel. The wheel was already rolling so we just jumped on and used it.

Wolf (Santa Monica): Five years ago, we started a computer replacement program to refresh desktops every few years to make sure people had quality equipment, and did the same for servers and other hardware. This was working so well and was so well received that I knew I needed to do the same for the voice technologies that were growing old. I wanted to buy newer technology, not just a new version of old stuff, but we didn't have budget - just old hardware. This was a problem. Someone needed to create a master fund and a way to cycle technologies.

I asked the staff to identify infrastructure costs. They found $1.2 million in costs and so I put this in the fund. This allowed me to roll the money

over and invest in new technology with the savings generated through previous purchases.

Hewitt (Providence): Federal grants from DHS and the Justice Department (COPS program) funded about $750,000. Debt financed the remainder of the expense, about $2.25 million.

Beard (Morrow County): It was a mixed process. Private sector partners financed the system backbone. The county signed a long-term lease agreement to serve as a core tenant on the network, enabling the private sector partners to secure funding. Some of the WiFi components built for specific purposes, such as the evacuation control system, were paid for and are owned by the county, and we pay a private firm to maintain the system.

7. How do you expect the network to sustain itself financially in upcoming years?

Hewitt (Providence): The City regards the mesh network as part of its essential infrastructure. The cost of sustaining the network is entirely funded in the operating budget.

Wolf (Santa Monica): More cap from more apps.

Hettrick (Loma Linda): Because the network is built for multi-purpose use, there will always be customers because someone within the city will always need it and for some purpose within most of the application categories we're addressing. So if the City stops doing FTTH, there's still the Parks and other departments. Easily explaining all of this to public is another story, though, and can present a challenge for municipalities.

Caldwell (Williamstown): We hope to expand coverage and offer other services. One of those we might do in a year is voice over IP [VoIP]. All of the backbone is there, so it's just a case of getting the rest of the necessary technology in place. It helps having an infrastructure in place to sell utility services and support customers. Many of the operations logistics are similar, so not much has to change with our human resources. Though it's a small part of the picture, we find that people really like it that the city is selling everything from garbage collection to Internet services and everything comes on one bill.

Beard (Morrow County): We expect the emergency management portion of the system to experience less demand as the chemical weapons are destroyed, so private sector use for which we receive revenue can increase. Additionally, new local or county government users may be brought into the system using different applications, and the resulting savings in operating costs can fund some of the ongoing network costs. Finally, new technologies and system management techniques will make the system less expensive to operate.

Chase (Greene County): The county does not maintain the network. Wavelength has the leasing contract and through the terms it established, the company is responsible for maintaining it. We do have

to continue to run the applications and support the content that are part of the economic development effort and the network infrastructure will need to be replaced. There has been a boost in the local economy and part of this is reinvested. However, at some point taxpayers' dollars will have to kick in to this. But if we're getting something back from the investment then the County will continue to support the network.

Willenbring (Minneapolis): The City's commitment as the anchor tenant is a significant part of the financial sustainability. The vendor, however, has built a valid business case that indicates the anticipated residential and commercial use of the network ensures its financial viability. The viability to upgrade the hardware is a major consideration. This was a primary reason Minneapolis decided to contract for the service rather than build and own the network ourselves. As WiFi and eventually WiMax moves forward, Minneapolis did not want to be in the situation of trying to fund the replacement of approximately 2700 radios.

Scott (Corpus Christi): Our business plan and our agreements with EarthLink will provide for the maintenance and upgrade of the system. We worked hard to insure that EarthLink has an opportunity to make a respectable profit through the City's anchor tenancy that in turn enables us to supply more efficient service and information to the public. I think the best term to use to describe our relationship is 'symbiotic.'

Myers (Cisco): Using a grant to build the network is only one part of the equation. The network becomes an on-going project. If a network is based on core values and targets one of the four key areas [productivity, quality of life, cost avoidance, revenue generation], this allows the community to redirect funding and the value justifies money. If you're not going to change productivity models, why are you building the network in the first place? If the value isn't identifiable, maybe you shouldn't go forward.

This isn't new. With franchise agreements for other communication technologies, the provider is allowed to build out services. Then a city capitalizes on the buildout to bring in new services. We lost this perspective with certain companies coming in to build muni networks for free public access without a sustainable business model.

The good news about the current negative press is that it's forcing people to go back to assess the real value of these networks and how leveraging this investment will drive sustainable value for the community. If the main driver behind the network is based on truth and focuses on value, then the funding will be identified.

8. What organizations has the city (county) partnered with for applications, content, services or general support?

Willenbring (Minneapolis): Current partnerships include the vendors who provide our ShotSpotter (gunfire detection sensors) application and our public safety camera system. Both are using WiFi for communication

today. Future partnerships will include those with water meter and parking meter system vendors.

Hettrick (Loma Linda): The University Medical Center was the City's primary partner.

Myers (Cisco): We believe in ecosystem model in which there are six components. You have the system integrators who design the infrastructure plan and coordinate the various technology vendors. There are infrastructure equipment vendors that provide the enabling technology to leverage and extend the network platform. Ultimately, the value the network delivers depends on what applications run on the network, application providers are obviously part an important member of the ecosystem and help the communities create specific value that aligns with the local need.

Nonprofits are important part of this ecosystem. Mobility creates connected communities and nonprofits can pull these multiple constituents together. Certain business and educational organizations are community advocates within their respective constituencies and are also another source for anchor tenants. They can be pulled in via nonprofits.

Network integrators that put the infrastructure pieces together and put them on the poles are also a part of the ecosystem. Rounding out the list is the service provider. They are also a critical component of the ecosystem as municipalities move to citizen access. Providers carry the major part of the workload identifying and serving subscribers.

Hewitt (Providence): New World System is our vendor partner with the "Aegis" suite, a core public safety application that covers police, fire, and emergency medical services. The applications include field reporting, records management, and dispatch, and there are interfaces to several subsystems – especially mug shots. There are quite a few other applications, some involving links to other agencies and some homegrown.

Chase (Greene County): One key partner is the University of North Carolina School of Government. They have questionnaires at each of our computer training classes. These help us determine technology needs, who's attending classes, how can we assist new businesses to make them successful and so on. The evaluation person comes up and meets with residents so she stays in tune with the community.

We have many other partnerships that include County Government, Wavelength, Cooperative Extension, NCSU, the Greene County Chamber of Commerce, Duke Endowment and Calvary Memorial Methodist Church.

Wolf (Santa Monica): The technology vendors and service providers who can take my customers' data and applications to the region and the world with the services they offer. Without them all I can do is facilitate point-to-point connections within the city. I couldn't serve organizations that have offices in Paris or L.A. without these partners.

Beard (Morrow County): We have explored partnering with several agencies and organizations including port districts, law enforcement agencies, other counties, the Regional Maritime Security Coalition and the Confederated Tribes of the Umatilla Indian Reservation. We also expect to partner with Pacific Northwest Motorsports Park, the Oregon Department of Transportation, and the United States Coast Guard.

Caldwell (Williamstown): We have partnered with company in Atlanta called Z-Corum that provides outsourced 24-7 phone-based service. If there are any issues that people can't get corrected over the phone, then someone local comes out between 8:00 a.m. and 6:00 p.m.

Scott (Corpus Christi): We have worked with countless companies in this area and I would be afraid to name anyone, as I am sure I would miss someone. We continue to look for opportunities and solutions. Intel was a primary partner early on as they originally spearheaded our efforts.

VI. In the final analysis

A. Take wireless out of the driver's seat

Municipal wireless, specifically the WiFi version, became the rock star of public policy for local governments in 2006. Everyone had to have it, for muni WiFi could cure all that ails us. And we can get it at no cost to the taxpayer? [the sound of swooning politicians].

Wireless is the best solution for addressing connectivity and data access needs if you want to better manage mobile workers and assets. But in the big picture of meeting the many needs of a municipality and its various constituents for better, faster access to data, the discussion must start and remain focused on broadband in all of its forms.

This is a complex need: sometimes you need it outdoors and sometimes you need it inside. Different constituents need various types of access at different times and at various speeds. Cities and counties are not all alike and subsequently their needs are different, political factors differ, terrains are varied, and so on. To start a discussion, or RFP process, without adequate research by declaring "we gotta have WiFi" puts your project at great risk.

To create the best muni network, the discussion must start with the questions "who needs highspeed and for what purpose do they need it?" Some needs dictate wired-only solutions, others scream out for wireless. Often, municipalities need a hybrid network comprised of several of all available technologies to address government and constituent needs.

When you can clearly define the need, then take a clearheaded look at the array of technology options that can meet those needs. There are wired options such as cable and fiber optics. Wireless has many faces. There's WiFi, non-WiFi 2.4, 4.9, WiMAX.

Also carefully assess the technology resources you already have in place, particularly fiber and existing network hardware. These resources may not have a direct impact on access at the point where technology touches the end user, but they very well can play a role in moving data through the muni network infrastructure, or in lowering the cost of that infrastructure.

As some local governments now go back to the muni network drawing board, and wireless eases into its role as one-among-many viable technologies, take a careful look at how those rolling out successful networks have kept their heads about them and made better technology decisions.

B. Fundamentals still the key to success

When you look at government or commercial organizations that have deployed complex technology for a broad user base, you find that those

with the greatest success followed a basic formula. 1) Define the need of the people using the technology. 2) Conduct technology due diligence that is dictated by the needs. 3) Determine what the technology's going to cost and how it will be funded.

How many municipalities went from the "We're Going Wireless" press release to RFP in 30 days? Ok, a slight exaggeration. But it sure seemed that fast in some cities. The latest snap-to-judgment craze started as cities immediately rejected anchor tenancy the same day the news came out vendors aren't giving networks away for free anymore. Did these folks ever hear that two wrongs don't make a right decision?

Whether you're starting over or beginning fresh, do your needs analysis government department by department, constituent group by group. Focus groups, surveys, town meetings, informal chat sessions. Any and all of these are viable tools to get the job done.

Start all initial contacts with "how can broadband, in whatever form makes sense, improve your work, play, life?" That question should be followed by "what are the ways broadband will benefit you?" and "how much are you willing to pay for this benefit?"

Thorough research often uncovers a lot of unmet need. And with this typically comes a willingness to pony up money when end user see potential benefits. The more departments and entities willing to set aside money, the more likely you'll develop a strong business case. General consumers tend to be the exception. They don't want to spend a dime. Remember how Napster got to be such a huge success.

Once you have the needs properly assessed, or re-assessed, technology due diligence isn't necessarily faster, but you will be better focused and able to find the best technology solutions. I've often said that a lot of San Francisco's woes came from the fact that they didn't adequately assess needs or do sufficient due diligence before locking into a solution. Otherwise, they might have come up with one that generated broader, deeper support.

C. You need creativity developing financing strategies

There is a decided lack of creative thought when it comes to funding municipal networks. No, not the creativity that gets you doing the perp walk on the 6:00 news. Municipalities fell for the chimera of "free wireless" like teen girls at a Backstreet Boys concert because the only option they could see to finance these projects was taxpayer money.

Look at Santa Monica, Greene County and Fredericton (in my January report – www.successful.com/Snapshot-1-07.pdf). They had no money, yet each one came up with a different and creative way to pay for what they needed AND still retain ownership of the network. The cities in this report and many in my previous ones have shown great resourcefulness in financing their projects.

As you define needs, either you or the folks being interviewed should be encouraged to come up with a dozen "if-then" financial gymnastics. If the medical community can implement telemedicine applications, then can we get philanthropic grants to cover their portion of network use? If the biggest employer in town needs a bezillion gigabit pipe for data transfer, then ask if they will pay to have fiber extended to their facilities. If Public Works is planning to automate its mobile workforce, then maybe retailers will fund part of the network because they'll get better snow removal.

Local government let those with threatened interests bamboozle them with all that hot air about how governments' involvement was unfair to business. Wrong! Governments are partners with business, as well as with nonprofits and not-for-profits and everyone else who does business in their city or county. Once you accept that, then think like a business if you want to be a good – and equitable – partner with business. That means creative financial thinking.

D. Anchor tenancy is a team sport

Too much of the discussion about anchor tenancy, meaning cities commit to being a primary customer on the network, has focused on the local government. Macy's, Nordstrom's, Home Depot, none of these big players are the only anchor tenant in a mall. Generally there are at least three or four.

The same should be true for municipal networks. First, there's the financial viability of the vendor to consider. It amazes me how many folks seemed so nonchalant about whether or not the vendor made any money. Somehow, the historic reality that organizations have more profitable technology deployments when there are strong partner-style relationships with vendors was lost on some municipalities. So, take care of your partner by bringing multiple revenue streams to the party.

Second, additional key tenants take a lot of pressure off of local governments to make the network financially viable. Since municipalities need to start off with one or two applications or departments using the network, it may take a while for the full government to capitalize as paying customers on the network's value.

Another major benefit of multiple anchor tenants is that, in order to build network capacity to meet the highspeed needs of certain businesses, medical facilities and other organizations, you have to overbuild network capabilities. You can use this excess capacity for digital inclusion or general consumer needs. Fredericton and its business co-owners provide their excess capacity for free to the general public.

One great selling point to potential anchor tenants is that it enables them to reap the benefits of highspeed without carrying the full cost of network deployment and end user support. In Philly, one of the major universities felt it made a lot of sense to turn over all of its students' wireless accounts to EarthLink. When the city's network is fnished,

Drexel students will have wireless access everywhere, not just on campus, while Drexel's administration gets to offload all of the hassles of managing sign ups and service.

All in all, it makes sense to bring as many key organizations to the table as possible. As I mentioned in the previous section, we need a lot more creativity brought to bear on this issue of financing muni networks. The more entities that have an active stake, the more creativity you bring to the finance picture.

V. Conclusion

I'm constantly asked what do all of these recent developments and bad press mean for municipal broadband. My answer is that this is only the end result of municipalities coming to grips with the reality that there is a no free lunch. As we move forward, this muni network movement will be stronger and you will see better networks as a result.

As people are forced to accept that the gravy train has left the station and is not likely to return, they have to put more thought and effort into the needs analysis, technology due diligence and business modeling process. And subsequently, this attention to details should result in better planning. Maybe there will be fewer projects, but these are likely to be better projects delivering greater benefits for all constituents and stakeholders.

I believe I can safely predict that muni network projects will continue, and that we haven't seen anywhere close to the full potential of technology and business model options from which a municipality can choose. Don't close the door after looking at just one or two options. Push the envelope, employ forward thinkers, cast your net wide among all kinds of constituents when gathering feedback. These are the steps necessary for muni network success. And nothing succeeds like success.

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For 20 years Craig Settles' consulting services, books and workshops have helped organizations worldwide understand how to use technology to make money, save money and run a better organization. Since 1999 he has concentrated on developing strategies and tactics for using wireless technology. Former clients include Microsoft, Symantec, AT&T and Nextel. Mr. Settles has written several books, plus numerous articles and columns for leading publications on wireless business topics.

View Mr. Settles' PowerPoint presentations on the future of municipal wireless – www.successful.com/France.ppt and www.successful.com/France2.ppt.

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