

# Using Your Fiber: The Synergy of Public-Private Partnerships

The Intelligent Community Forum offers plenty of ideas on how municipalities can leverage broadband.

It's time for developers and property managers to climb on board.

By Steven S. Ross ■ *Editor-in-Chief*

**T**he Intelligent Community Forum at Brooklyn's Polytechnic University announced its seven top intelligent communities this month. The choices (see sidebar), as well as the ICF conferences leading up to them, highlight the myriad ways communities can leverage investment in broadband networks – and the frequency with which developers and builders act in isolation from their communities, except where zoning is concerned.

Sylvie Albert, president and CEO of Planned Approach, asked, “How can ICT [Information and Communication Technology] become an enabler for social and economic development? How do we propagate change? How does this agenda fit into a larger regional agenda?” She noted there has been a “range of reactions, from leadership to cluelessness,” and that we “need dialog, collaboration, learning from each other. Failure to innovate is death of community. And we must include a wide variety of stakeholders.”

John Jung, chairman of the Intelligent Community Forum, said that it's not enough to put new technology in place; communities also need a “culture of use” to create engagement. Intelligent

communities are trying to differentiate themselves in order to attract investment and talent. They are trying to attract and sustain a knowledge workforce. They are learning by identifying gaps, and by investing to fill those gaps. They are acting as role models for other cities.

Strong leadership is necessary, he said; these efforts create opportunities for heroes who will communicate compelling visions, marshal resources, and communicate a sense of urgency. These

***Jung: Communities need a “culture of use” to create engagement. Intelligent communities are trying to differentiate themselves in order to attract investment and talent. They are trying to attract and sustain a knowledge workforce. They are learning by identifying gaps, and by investing in themselves to fill those gaps. They are acting as role models for other cities.***

leaders and heroes can come from any sector – not just in government, but from universities and the private sector.

The issue is more than a matter of ubiquitous and convenient broadband. Fiber helps enable it, but Robert Lieber, President of New York City's Economic Development Corporation, noted that there are 800,000 technology-sector employees in the city, “three times more than in Silicon Valley.” He is particularly proud of the fact that WiFi is avail-

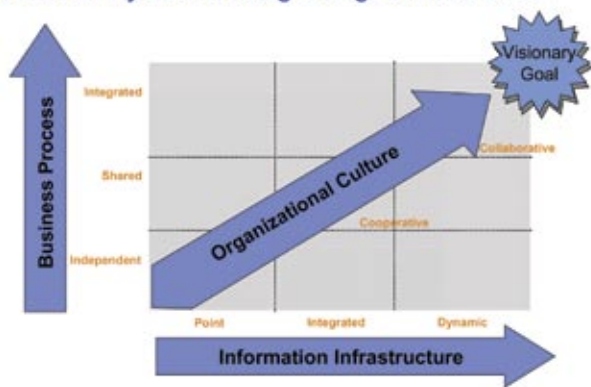
able in 10 of the city's largest parks. The city's “311” line for information had handled over 40 million calls by last spring. “Queries can be answered in over 170 separate and distinct languages,” he said. “And if we are to continue to grow we have to make sure broadband is available throughout the city.”

But Bruce Lai, chief of staff to NY City Council Member Gale Brewer (who has been a sparkplug pushing broadband issues), said the city does indeed have a “major push” to use technology to address social issues.

“It's not a silver bullet,” he said, “but it addresses specific problems for specific people. Government is not an innovator but it can bring technology to the masses. We define, organize and publicize the demand for solutions. There's no affordable fast broadband here. Nonprofits don't have good technology. Schoolchildren don't have it. We're trying to get broadband to the people so they have the tools to solve poverty – it's necessary but not sufficient.”

Brewer sponsored legislation for the city's Broadband Commission, Lai said. “We're late in the game but we're doing it the right way. The commission was appointed in March; in its first hearing,

## Organizations maximize the value of their IT investments by coordinating change in three areas



Todd Ramsey, general manager for IBM's Global Government businesses, says organizations can maximize their broadband investments by coordinating their information infrastructure with integrated business processes, enabling a collaborative organizational culture.



Robert Lieber, president of New York City's Economic Development Corporation.

it found that price is a big barrier. Middle school and high school students testified. One said that only 10 of 50 students in his class had access at home. The others wait in long lines at libraries. We want to educate the public and publicize the issue through these hearings.

"The New York Times wrote a negative article about 1-to-1 computing [where] each schoolchild gets a computer. They only talked to upper-middle-class

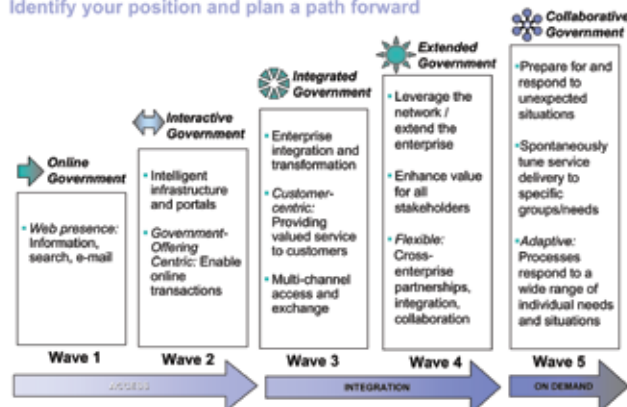
schools, not to urban areas or low-income schools. We've found that teachers are the biggest obstacles," he said, in addition to not having enough money for maintenance and tech support. "They are afraid of losing control of the classroom – they should be facilitating knowledge rather than imparting it. Also, they don't let the kids take the computers home."

### LEVERAGING BROADBAND

The New York City issue highlighted a key question at the conference, which was held in Brooklyn: How does a community get and leverage broadband? Before the business case can be made, there are five key ingredients, says Robert Bell, cofounder of ICF (see box). "Global money is mobile but communities are not," he said. "Will the broadband economy be a

## The Government Innovation Journey

Identify your position and plan a path forward



Ramsey says most governments are somewhere between Waves 2 and 3. A key question, he says, is, "What percent of government services is delivered online versus through a call center?" At 10 percent, the community is still in Wave 2. "But as soon as you integrate, you get 65 to 70 percent," he says. "Put the customer at the center of what you are doing. Miami-Dade County has 25 key services on one site; it takes just two clicks to complete business."

## Economic development is changing as the world globalizes and job growth opportunities shift



Developed and developing regions are defining new strategies for success. Innovation and technology are vital in creating new economy jobs

Ramsey says traditional economic development once revolved mainly around transportation. Today it is about intellectual capital, nurtured and enhanced by broadband communications.

blessing or a curse for your economy? It is probably more important to understand the softer issues than the technologies."

Todd Ramsey, general manager of IBM Global Government businesses, said e-government imperatives include an aging population, globalization, climate change, and public safety – for disaster relief and accidents as well as terrorism. One new technology, millimeter-wavelength 10 Gbps wireless

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## Robert Bell: The Five Habits of Highly Effective Communities

I believe there are five habits of highly effective Intelligent Communities that separate them from the rest.

### 1. LEADERSHIP

Highly effective leaders convince their people that there is more to be gained than lost from plugging into the broadband economy. For most of us, this is not an intuitive thing. If we live in an industrialized nation, we read about or experience jobs moving to lower-wage countries. We feel new wage pressure and performance demands brought about by rising competition. We feel confusion and even fear in the face of foreign cultures that seem to be invading us and changing how we live. If you live in a developing nation, connecting to the global economy brings new opportunity – but risks overturning age-old traditions that give meaning to life, and often brings young and old into conflict. In any community, the costs and benefits are not evenly distributed. There are clear losers among those lacking education, skills, energy and adaptability, and clear winners among the better educated and better connected.

Somehow, highly effective leaders bridge these differences. They help the majority of citizens understand the threats and opportunities facing the community and how each can make a difference. They find ways to channel fear and doubt into hope and aspiration. And I believe that they do these things because, as human beings, they care less about achieving political victories than about achieving real ones. Leaders interested only in the next election need not apply.

### 2. OPENNESS

The second habit of highly effective communities is that they are open rather than closed. If the majority of your citizens believe that life stops at the municipal borders – that only local issues, events and people are important – you are in trouble. Because there is a globe full of people in competition with you who think your borders don't matter.

If you visit Issy-les-Moulineaux in France, you will find a community that knows how to be open rather than closed. Its current Mayor, Andre Santini, was first elected in 1980 and he set his sights on making technology the backbone of the local economy – something they have done with outstanding success. But one story illustrates what I mean. In 1994, Mayor Santini asked city depart-



Robert Bell, cofounder of the Intelligent Community Forum.

ments to study the development of the Internet in the US, and to incorporate what they learned in their plans for the future.

Stop for a moment and think. In 1994, the Web was still not much more than a curiosity. It was in 1994 that Netscape introduced the first widely used Web browser. There were only 10,000 Web sites in the world, compared with over 80 million in 2006. Yet an open community like Issy was alert to change and prepared to learn from anyone, anywhere.

In Dundee, Scotland, being open meant paying attention to what was really going on in the local economy instead of to common wisdom. From the mid-1970s to the mid-1990s, global economic changes swept over this industrial city and left it a

hollowed-out shell in apparently terminal decline. City government worked hard to reverse the trend but nothing seemed to help. But the city also devoted scarce resources to measuring what was going on in the economy, as intensive care units monitor their patients' vital signs. And in the late 1990s, the squiggly lines on the monitor unexpectedly made an upward jog. For the first time in a generation, the city experienced net job growth, even as it continued to lose manufacturing jobs.

More research followed, and the city discovered that its university sector had emerged as a driver of economic growth. Not that the schools themselves were doing the hiring. Instead, they were seeding new clusters of young companies in fields like computer games, software, animation, film, television and life sciences. Today, the once dominant manufacturing sector provides only 10 percent of Dundee's jobs, while digital media employ over 2,300 people, life sciences another 4,000 and one of the world's biggest pharmaceutical companies has decided to base a major medical research center there.

### 3. VISION

The third habit of highly effective communities is that they see visions – really big visions. Highly effective communities set ambitious goals, knowing full well that the goals may be beyond reach. In 1991, Tallinn was the capital of a newly independent Estonia. After five decades of Soviet rule, its economy, infrastructure and government were a mess. In 1995, the government set a goal – calling it a "Tiger Leap" – to provide every school with a PC and Internet connection by 1999. This was at a time when

school buildings were falling apart and teachers earned the equivalent of 100 US dollars a month.

What a crazy thing to do. Yet the Tiger Leap sparked what I can only call an explosion. Today, every school and public building is online, but that's almost irrelevant. After 10 years of GDP growth of more than 5 percent a year, per-capita income is still only about 40 percent of the average of the European Union's 15 original members – but a wireless network covers 90 percent of the country and Internet use is well above the European average.

You would think that, in Ottawa-Gatineau, they don't need big visions. Ottawa is Canada's capital, after all, and it can safely count on having the world beat a pathway to its door. But the vision of this community is to be known not as a political capital, but as the "Innovation Capital." More than 1,800 high-tech firms already employ 11 percent of the labor force, but local government is doing everything imaginable to increase that percentage: training and supporting entrepreneurs, attracting venture capital and investing in workforce development.

Sunderland, in the north of England, had an unemployment rate of 22 percent in the 1980s as its heavy industrial economy collapsed. So local government decided to build a completely new economy based on something called "telematics," which is a European term for the union of communications and computers.

Sure. What could be more obvious? We have a community full of out-of-work shipbuilders and coal miners, and we're going into telematics. Well, they did. In the next decade, they created thousands of new jobs in the field, opened one of Europe's most successful technology parks and today are starting to call themselves the "Software City." Like Tallinn, they could have failed anywhere along the road, but by setting their sights high, they gained something to fight for.

#### 4. CREATE HEROES

The fourth on my list of habits of highly effective communities may also sound a bit strange. Highly effective communities create heroes. By "heroes," I mean highly visible winners and local champions. And those winners tend to have something in common. They achieved their victory through collaboration. They understand that their achievement is not just the result of their own efforts but is rooted in the community. They show a desire to give back.

Both Dundee and Sunderland began their work by forming much-heralded partnerships – groups of citizen leaders representing all of their important constituencies – to help identify problems and develop solutions. Today in Sunderland, they are busy creating "Community e-Champions," volunteers who are trained to carry the message and methods of digital inclusion to neighbors who would otherwise be left out.

Waterloo in Canada is one of several small cities making up Canada's Technology Triangle. With about 10 percent of the Triangle's labor force, it accounts for 45 per-

cent of job growth, and is home to globally recognized firms like Research in Motion (maker of the BlackBerry) and Sybase. This is a classic university-business tech cluster. The University of Waterloo and other institutions have created technologies that were spun out into successful companies. Local government does all it can to encourage more of this activity and ensure that Waterloo has the high-quality workers that technology companies require. That's why, every autumn, Waterloo celebrates Entrepreneur Week, North America's largest innovation festival. Waterloo business leaders like Jim Balsillie, Chairman of Research in Motion, are honored for serving on steering committees and funding local institutes.

Highly effective communities do this work consciously and continuously, because it achieves so many goals at the same time. By creating heroes, they establish role models for the behavior they want to encourage. By involving those heroes in decision making, they open up the process to broader perspectives and better ideas. And by enlisting those heroes in the resulting programs, they gain ambassadors who can "sell" the necessary changes to the community.

#### 5. NO DEPENDENCE ON ONE TECHNOLOGY

My fifth habit of highly effective communities may not be what you expect: Highly effective communities don't fall in love with technology.

I mean that highly effective communities don't expect a particular technology – like municipal WiFi or e-government – to be a magic cure for what ails them. I can't count the number of times that community leaders have asked me what kind of broadband technology they should acquire. My answer is always the same: that's the last thing you should worry about. Worry about creating a workforce able to do knowledge work. Worry about boosting the level of innovation in your local economy. Worry about creating reasons for people to use broadband. Information and communications technology changes at light speed. Whatever you or your private-sector partner ultimately invest in, you can be sure it will change many times over the next decade.

Example: The Gangnam District of Seoul, South Korea's capital. In 1995, only 1 percent of South Koreans used the Internet. Today, the nation is the world's leader in broadband Internet penetration. The civic leadership of Gangnam has invested heavily in technology over the past 20 years. The vision has been consistent, but the technology has undergone regular transformation. In the 1990s, Gangnam built a local area network and installed kiosks to give citizens access to over 60 e-government applications.

By the end of the decade, it had converted this traditional network system into a Web portal accessible by anyone with a browser. At the end of 2006, Gangnam launched TV GOV, an interactive digital broadcast system on the world's most widely accepted platform: television. The next step will be so-called "ubiquitous" services that integrate IT, mobile, wireless and GPS systems.

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**Dr. Sylviane Toporkoff, advisor to the mayor, Issy-les-Moulineaux, France, described the many benefits and many forms of broadband delivery there. The city actually lists more jobs than people.**

(over a very short range), could be used for telemedicine at the scene of a disaster, or high-definition video inside a building for those responding to a hostage crisis. With fiber, the range could be extended to bring the signal anywhere.

Matt Wenger, who runs PacketFront's North American operations, said no one application has been transformative,



**Left to right, Pierre Rival, City of Paris, France; William Hutchinson, Toronto Waterfront Revitalization; Anthony DiMaso, VP for Strategy and Development, Verizon; Lev Gonick, CIO, Case Western Reserve.**

but the whole network has been. "There's been a 6 to 7 percent increase in GDP [in Sweden], though it's hard to say it's a direct result."

Although visionary, strong leadership can lead to early successes, Wenger said, "best practices" must be developed to make it easier for others to follow. The community commons is the thing that made it work in the city of Västerås, Sweden, he added. "You don't turn on your PC and go straight to Google. It's best to have clear goals and objectives: x jobs in this industry or that, y educational goal, a health care goal, and so forth. Don't just say we'll build a network and something will happen."

The city of Sunderland, in the UK, once had the largest shipyard in the world. But by the early 1990s unemployment ranged from 20 to 35 percent of the workforce, said Thomas Hurst, the city's Chief Investment Officer (that is, the head of its development office).

"The city had a strong political consensus for economic development," he said. "This is unusual in the UK. We're now the software capital of the UK, but we still manufacture stuff, like auto parts. We have lots of that industry. We have Nissan's European car plant, the most productive in Europe."

But Hurst admitted that there is no direct way to tie the investment Sunderland made in broadband to the gain in jobs. "On an anecdotal basis there is obviously a significant link," he said. Apart from the city's success story, "buildings find it difficult to attract quality tenants without broadband."

Sharyn Gravelle, VP Wireless at Toronto Hydro Telecom (100 percent owned by the City of Toronto), said she had to measure ROI despite the public ownership. "We're a nonregulated affiliate; we operate as



**Thomas Hurst, Chief Investment Officer, Sunderland, UK.**

*Would Verizon rent space on open access networks? DiMaso: Sure, of course. My view is that nothing is impossible. Everything is an economic proposition, and a development proposition and a social proposition. You have to look at it holistically. ...Each party, public or private, defines where it can add value to the total mix and make money while doing it. ...We would look, at this point, at any opportunity.*

an Ontario business, like our competitors. There's no cross-subsidy with the hydropower operations. We're strictly separate. Our monthly rate is 35 percent below the telco rate, and they ride our fiber-optic cable. We're lower because we are a new entrant, with a small footprint. We do not cover the entire city of Toronto." But could Toronto itself compare the benefit of investing in Toronto Hydro Telecom rather than in something else to improve the city's infrastructure? Gravelle could not say for sure.

Lev Gonick, Chief Information Officer for Case Western Reserve University and the sparkplug behind the regional OneCommunity network centered on Cleveland, says the future is at the edge of the network, both wired and wireless. A community-centric view combines the best of public and private stakeholders, he said: "Broadband isn't a winner-take-all scenario. A community-built system is able to directly take community priorities into account. In northeast Ohio, we define the whole region (not just Cleveland) as an economic entity. Hospitals, schools, governments, libraries, universities, along with technology partners, are the creators of the network."

Anthony DiMaso, VP for Strategy and Development at Verizon, said the company was spending \$17 billion on new equipment and services in 2007 with 25 to 30 percent of it on FiOS. He listed the disruptive technologies for telecommunications worldwide as IP, broadband, mobile, and the microchip.

"We're focusing on FTTH and EVDO in the last mile. But we're looking holistically at the user, enabling platforms to transform the environment, collaborate, experience – broadband is NOT a utility! Our next step is working with Verizon Business on health care and environmental applications.

## Waterfront Neighbourhoods



## East Bayfront – The Future



**Bill Hutchison of the Toronto Waterfront Revitalization Corporation says social innovation will drive economic development. Waterfront Toronto was established in 2001 to reclaim underused waterfront dockland with an innovative community – 40,000 homes plus businesses. The vision is to replace old warehouses with parks and mostly medium-rise buildings. The focus is on attracting high-tech industries and green buildings, in part with the location and in part with low-cost fiber-fed ultrabroadband. The Waterfront Advisory Council includes representatives from all sectors.**

**Robert Lieber, President of New York City's Economic Development Corporation, noted that there are 800,000 technology-sector employees in the city, "three times more than in Silicon Valley."**

"Think about the whole ecosystem – how will the technology be used? Cable convinced us that the old paradigm wouldn't work. We can't just add TV to copper. The needs of users will go well beyond what they are today; 3DTV, hosted applications and storage, HDTV video on demand, also WiFi, WiMAX, 4G mobile.

"Access must be symmetrical. And it must be easy to use – we are setting up

all the way to the desktop. It costs more but it's worth it because it encourages people to adopt it. It's also more efficient for us to monitor customer service, to do remote diagnosis and repair.

### SABER-RATTLING DAYS ARE OVER

Gonick asked DiMaso about past "saber-rattling" by incumbents, especially about municipal wireless networks. "Technology makes open access pos-

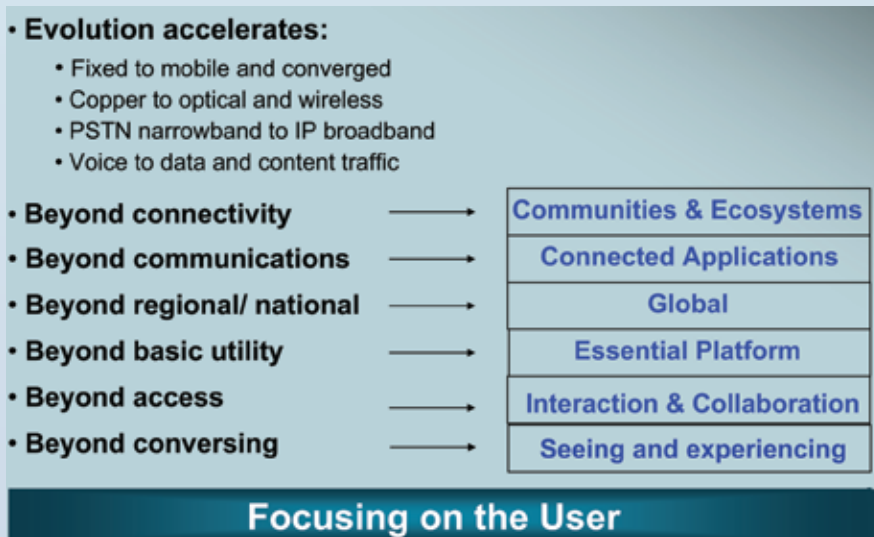
sible, but the legacy culture wants ownership of its own infrastructure – both public and private. There's a sense of entitlement in the private sector." Gonick cited Verizon's move to block Philadelphia's WiFi system four years ago, which resulted in Pennsylvania ending up with the nation's most restrictive state law on municipal deployments.

DiMaso responded that "Pennsylvania happened at an odd time when public versus private was unresolved. We've moved beyond that to be very much more intelligent about where we fit in the ecosystem. The market is segmented; there is no 'one size fits all.' We had that philosophical argument within Verizon. My personal view is that there is no public versus private. The best way for us to go out of business is to try to do everything."

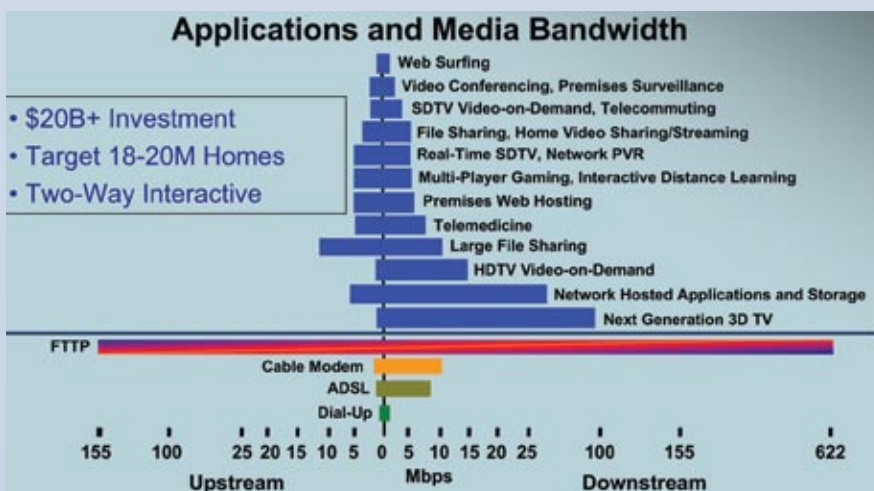
DiMaso added that Verizon sees a value in WiFi, because it takes pressure off the company in areas where it can't deliver broadband. Also, he noted that the world is moving toward more wireless infrastructure. "We use the spectrum, we're looking at supplying platforms that enable higher-level customers like hospitals and universities."

Asked by BBP if he would "see, some day in the maybe not-too-distant future, Verizon and other big incumbent operators renting space on open access networks," DiMaso responded: "Sure, of course. My view is that nothing is impossible. Everything is an economic proposition, and a development proposition and a social proposition. You have to look at it holistically. Sometimes ... we can't add any value... but the whole concept is that each party, public or private, defines where it can add value to the total mix and make money while doing it. And there are a thousand places to do that and they are not the traditional access places. You move from providing access to providing a platform where you can host all kinds of things, provide quality bandwidth on demand, and not get yourself into providing service everywhere. We would look at this point at any opportunity."

Alan Shark, president of Public Technology Institute in Washington, responded that "incumbents are still trying to block muni wireless in many



Thinking strategically at Verizon means thinking carefully about customers, says Anthony DiMaso.



Anthony DiMaso of Verizon says this chart of various applications' bandwidth needs focuses his attention.

places” and said that local governments should be willing to put some money into the game.

PTI represents about 100 small-jurisdiction chief information officers and mayors who have interest in technology. It has been working with two universities, Florida State and North Carolina, on a CIO certification program, which should be available this year.

DiMaso’s points about deployments making sense financially were echoed later in the conference by Scot Rourke of OneCommunity. “We feel that you have to think like an entrepreneur,” he said,

**Ramsey: E-government imperatives include an aging population, globalization, climate change, and public safety – for disaster relief and accidents as well as terrorism.**

“with eternal optimism and [the ability to] out-think everyone. You must leverage public and private assets and ideas, and try to monetize them so as to maximize impact.”

He noted that Cleveland was once the wealthiest place in the world. “It peaked in 1930, went into serious decline about

1950, and in two of the last three years was the leading metropolitan area in terms of poverty” in the United States.

“But after the tech bubble burst, dot.com-ers landed in Cleveland, saw schools without access and saw the fragmented local government. They got everyone together and tried to promote workforce development through technology. Now we have 400 schools on our fiber network. We’re doing high-definition streaming from the Cleveland Clinic to local schools. Fifty percent of the grants are for teacher training. We build collaboration, convincing the hospitals that they need to educate their future workforces.

“We have visioning sessions to educate the city, county, and regional governments. We let the government agencies propose cool projects, and then we get them funded. We can attract funding because of these collaborations. We’re doing a combined electronic medical records system. We’re getting an FCC grant to connect rural schools and networks to our network. We’re a neutral convener and seed investor.

“We run the videoconferencing system with 1,000 users. We put in free WiFi and gave out PDAs to help the citizens of Cleveland use mobile WiFi. We’re talking about hosting e-prescriptions. We’re hosting Discovery Education (education.discovery.com) – we the ISP, because that reduces the cost of getting it to the kids. Now we’re training the teachers to use it.

“We identified \$40 million in tax refunds for low-income people in downtown Cleveland – brought in \$6 million this year. Eventually people will file by themselves. Free computing in schools,

## Example: City of Corpus Christi, Texas Internal Apps

1. Aerial Video Surveillance
2. Andros F6-a Bomb Robot Video Surveillance
3. Automated Meter Reading with WiFi backhaul
4. Automated Vehicle location
5. Building Inspectors with WiFi
6. Code Enforcement/Neighborhood Improvement.
7. Independent School District Partnership with City of Corpus Christi.
8. Document Management and Imaging System
9. Dual Mode WiFi/Cellular Smart Device
10. Emergency Notification
11. Emergency Disaster Response
12. GPS Asset Mobile Tracking
13. Health-E-Cities/Emergency Medical Services
14. In-Car Video Policing
15. Mobile Data Computers
16. Mobile Emergency Operations / Web EOC
17. Mobile Work Order Management
18. Video Conferencing
19. System Control & Data Acquisition
20. Economic Development (small business)



Alan Shark of PTI said that too many local governments still have passive Web sites, but more of them are becoming transactional – you can pay taxes, get licenses, participate in polls on issues, leave comments. “Local government is entering Second Life with virtual City Halls. Local governments are getting higher marks from their citizens because of Web presence – but broadband is needed.” In Corpus Christi, city government put in 20 wireless applications, beginning with meter reading and then moving on to public safety and public access – then Earthlink bought the system. PTI is launching IPTV training, called GoGovTV.

churches, malls, bus stations, wherever people are – we just plug in monitors and keyboards. The computing power is elsewhere so no onsite tech support.”

The only cautionary note came from Estonia, which fell under cyber-attack from computers in Russia during the conference. Toomas Sepp, City Secretary of Tallinn, Estonia’s capital city, refused to comment directly on the attack, or even if it existed. “But if it is an attack, we are repulsing it, handling it routinely,” he said. **BBP**

## About the Author

You can reach Steve at [steve@broadbandproperties.com](mailto:steve@broadbandproperties.com). Also reporting for BBP were Masha Zager and Linda A. Schoener. See [www.intelligentcommunity.org](http://www.intelligentcommunity.org).



Left to right: Alan Shark, PTI; Richard Yin, advisor to Taipei’s city government and chairman of the Information Technology Total Service in Korea; Nina Ziv, academic director, Institute for Technology and Enterprise, Polytechnic University; Michael Freemire, mayor of Bettendorf, Iowa; Matt Wenger, PacketFront.

## ICF Top Seven Intelligent Communities for 2008

**B**y strengthening communities, broadband helps developers sell and rent more property. But what does “strengthening” mean? Here are some ideas, and some ways to get the job done.

### DUNDEE, SCOTLAND, UNITED KINGDOM

In the 1990s, the leaders of the city of Dundee looked back on two decades of economic devastation and vowed that the future would be different. In the mid-1970s, large-scale plant closures had thrown thousands out of work and caused an out-migration of skills and talent. Population losses hit the retail sector hard, discouraged inward investment, and sharply eroded quality of life.

In 1991, local government created The Dundee Partnership, a joint venture among key players including city government, the economic development agency Scottish Enterprise, universities, community groups and the business sector. Its original focus was on the traditional tools of economic development: rebuilding the city center, developing tourist and leisure facilities and attracting corporate investment. For the first time in decades, the city was experiencing net job growth, despite a continuing

*Broadband is commercially available to all households, businesses and institutions in Dundee, with 48 percent of households and 90 percent of businesses currently connected. Speeds of up to 10 Mbps are available for £13-30 (US\$25-60) per month.*

fall in manufacturing employment and levels of unemployment that remained well above the national average.

Research revealed that Dundee’s university sector was driving job creation, not only in established sectors like publishing and scientific research, but in such new fields as software, animation, computer games, film and television. In response, the Partnership refocused its effort on stimulating business formation in the new sectors. A government-funded Business Gateway project began providing e-business training and support to small and midsize companies, helping

to improve the e-readiness of nearly 600 companies in 2004 and 2005.

Broadband is commercially available to all households, businesses and institutions in Dundee, with 48 percent of households and 90 percent of businesses currently connected. Speeds of up to 10 Mbps are available for £13-30 (US\$25-60) per month. The city also operates 300 PCs with free Internet access at locations including 12 learning centers for adults, generating 15,000 user sessions per month. A network of 350 networked bus stops provides real-time travel information to digital signs and

kiosks onsite as well as to mobile phones. A professor at the University of Abertay has founded ADD Knowledge in partnership with government agencies to deliver Scotland's first home-study program for over 400,000 primary-school children using next-generation video game consoles. Local health services use

text messaging to remind patients about appointments and medications.

Dundee's universities established graduate business incubators and policies promoting the spinout of new companies. The University of Abertay Dundee opened the IC CAVE research center to support the computer game

and digital entertainment sector. A £20 million (US\$40m) Digital Media Park entered into development and, by 2007, opened its first phase, 100,000 square feet for e-businesses. Two new marketing partnerships, bringing together public, private and academic leaders, launched Web sites, e-newsletters and conferences

## Asia: Post-Immersion Reflections



**Learning from Asia's Smartest Communities. Left to right: Glynnis Rengger, managing director of the ICF Immersion Lab; Barbara Halloran, mayor of Waterloo; Shaun Belle, President and CEO, Mt. Hope Housing Company; Simon Farbrother, Chief Administrative Officer of Waterloo; David Elcock, Director, Mt. Hope.**

For nine days last March, participants of ICF Immersion Lab Asia 2007 visited the four ICF Top Seven Intelligent Communities in Asia: Taipei (Taiwan), Tianjin (China), Gangnam (South Korea), and Mitaka (Japan). Glynnis Rengger, Managing Director of the ICF Immersion Lab, said participants met with government officials and business leaders, visited major technology sites, and took part in briefings. This year's immersion tour is in North America, May 12-22. See [www.intelligentcommunity.org](http://www.intelligentcommunity.org) for details.

Shaun Belle, President and CEO of Mount Hope Housing in New York, said, "Many of these communities – many of these governments – have really been very supportive of the efforts of both private enterprise as well as the needs of the citizenry. We're really excited about that."

David Elcock, director of Mount Hope, said, "In the case of China, it seems that their infrastructure has been built to handle massive amounts of data, management of data consolidation, data distribution and data deployment. In Taipei, their system seems to be built around the ability to employ e-services, e-government, e-this, e-that, e-everything – directly to the client's or end user's doorstep. It's almost as if you can check your heart over the Internet – everything is so e-formulated. But all of this e-infrastructure design and each infrastructure buildout does not replace human interaction. These cultures are so very tuned into dealing and interfacing with each other."

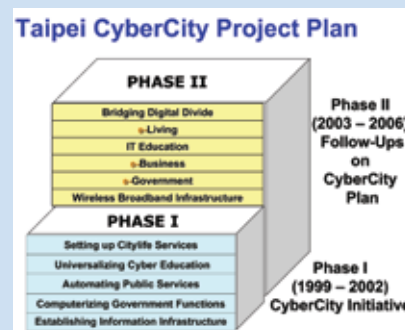
Rengger: "We saw how well IPTV is being used to actually target other groups that are not normally in the broadband economy. In Taipei, we

were just astounded by the functionality that is available in 7-Elevens and in Starbucks. You can actually go there and interact with all the government services and send faxes.

Simon Farbrother, Waterloo, Canada: "I saw a personless library in the mall in Taipei. You just go to this area, actually no bigger than this room, 2,000 square feet, and you go in and use your smart card to get into the library and use your smart card to check your books out. You use your smart card to leave the library. I can bring my kids to the mall, check them in, go off shopping and come back for them later. It works for me but in a different culture and context."

Farbrother: "A number of countries put your fingerprint on an ID card, and therefore that becomes essentially the [legal] identifier which all of these systems are essentially based upon. From a North American context, that would not be an obvious immediate step."

– Linda A. Schoener, Correspondent



**Developing an intelligent community strategy in Taipei.**

*Two new marketing partnerships, bringing together public, private and academic leaders, launched Web sites, e-newsletters and conferences promoting “BioDundee” to attract life science companies and “Interactive Tayside” to the digital media sector.*

promoting “BioDundee” to attract life science companies and “Interactive Tayside” to the digital media sector.

By 2007, the life sciences sector employed 3,900 people including 300 scientists from around the world. Wyeth Pharmaceuticals announced that it would locate the world’s first translational medical research center in the city. Over 380 digital media businesses have opened or moved into the Tayside region, compared with 150 in 2000. They employ more than 3,000 people and generate over £100 million (US\$198m) in annual sales.

The City Council’s Web site began offering online payment and processes to the public in 2002 and by 2007 had collected £25 million (US\$50m) in taxes and fees. With more than 60 online applications, the Web site is used by 32 percent of Dundee’s population and received satisfactory rankings from 86 percent of users. In 2006 alone, it processed 60,000 transactions and collected over £8 million (\$16m).

Behind the “public face” of the Web, Dundee established a Citizen Account database system that captured data on citizens (with their permission) and used

it to prefill online forms. Some of the data was amassed through issuance of the Dundee Discovery Card, which replaced 10 separate card-related services in the city, for everything from bus service and parking to social services. The Discovery Card was the first example in Scotland of a university (Abertay) and City Council sharing a single card for their different purposes. So popular has it become – with 44,000 cards issued, used by 87 percent of 12-18 year olds for school meals and bus travel, and 85 percent of 60+-year-olds for leisure access and bus travel – that the Scottish Government decided to deploy a multi-application card for the whole country and asked Dundee to run the program.

From 2000 to 2004, the city had net employment growth of 3.4 percent. That average number encompassed the loss of 3,300 manufacturing jobs, a 20 percent growth in digital media, and 50-60 percent growth in life sciences jobs. New business starts rose 7 percent and unemployment dropped, though it remains over a full percentage point higher than the average for Scotland.

## FREDERICTON, NEW BRUNSWICK, CANADA

Government and other noncommercial institutions made up the bulk of Fredericton’s economy for most of its first 200 years. In the mid-1980s, however, the Canadian federal and provincial governments began to run large deficits and downsized to reduce costs. As more and more functions were outsourced, the best and brightest among government employees opted for employment in the emerging entrepreneurial class.

By 2002, a KPMG study revealed that, per capita, Fredericton had more entrepreneurs than any other city in Canada. It had also become a young city, with an average age of 37, far below the national and provincial averages. Close to 70 percent of its labor force had some postsecondary training. But what Fredericton’s young entrepreneurs lacked was access to the information highway. New Brunswick is a rural province, with only 730,000 people living in an area the size of Ireland (home to 4 million).

## Coming Event: Muni FTTH Networking Day, February 20

**A** Muni FTTH Networking Day will be held February 20, 2008, at the Sheraton Downtown in Nashville, Tennessee.

The event, organized by David Russell of Calix, a FTTH Council member and chairman of the FTTH Council Marketing Committee, will provide a forum for municipal officials across the country to get together and discuss issues related to fiber to the home. Municipalities will have a chance to learn from each other and meet their peers who are deploying FTTH in other regions of the country. Tennessee was chosen as the site for this networking day because it is the epicenter of FTTH municipal deployments.

Municipalities and municipal utilities already deploying FTTH, as well as those considering FTTH deployments, are welcome to attend.

The Muni FTTH Networking Day is free of charge. Only municipal employees are invited – there will be no vendor presentations and no PowerPoints. David has recruited a great set of moderators, including Tim Nulty of ValleyFiber (and formerly of Burlington Telecom); Steve Mayo of Intelconnect; Greg Solomon, CIO of Pulaski Electric System; Frank Caruso of the Borough of Kutztown; James Salter of Atlantic Engineering; and several other leading figures in FTTH.

Moderated sessions include topics of interest both to municipalities pursuing their own builds and to municipalities working closely with service providers deploying FTTH in their communities.

You can register for the event, and view the draft agenda, at <http://munifthnetworkingday.calix.com>

*Fredericton's young entrepreneurs lacked access to the information highway. New Brunswick is a rural province, with only 730,000 people living in an area the size of Ireland (home to 4 million). As with most rural regions, broadband was sparsely available and only at high prices.*

As with most rural regions, broadband was sparsely available and only at high prices. Not even city government could obtain a simple wide-area network to connect its facilities. In 2000, the City Council decided that it had to act. By aggregating the demand of city government, the university and a dozen local businesses, the Council was able to purchase bulk commercial bandwidth at a more competitive cost. The following year, Fredericton began building its own fiber network, which it has expanded every year since then to the current 22-kilometer (17-mile) fiber ring. The municipal-owned carrier, e-Novations, operates as a coop and provides each member with guaranteed bandwidth as well as additional peak capacity based on availability.

By proving the existence of broadband demand, e-Novations spurred competition. Private carriers built out additional capacity, so that 70 percent of households and 85 percent of businesses are now connected to broadband, with monthly prices ranging from C\$22 for a 256 Kpbs circuit up to C\$100 for 18 Mbps service.

Encouraged by its success at delivering a high quality of service at low cost, the Council decided to give wireless broadband a try. The Fred-eZone was activated in 2003, using the city's fiber network as its backbone and 300 WiFi access points to cover an 8-square-kilometer (3-square-mile) zone downtown as well as public facilities and retail malls. Interestingly, the Council decided that, in Fredericton, wireless access would be an intrinsic part of the infrastructure, free to all. If they didn't

charge people to walk on the city's sidewalks, the reasoning went, why would they charge them for broadband access in the eZone?

### **SPURRING INNOVATION**

The University of New Brunswick (UNB), which accounts for 80 percent of the university research in the province, has developed multiple social and policy research clusters in areas ranging

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from threat-material detection to ocean mapping, and from e-books and Web publishing to biomedical engineering. Fredericton is also home to the National Research Council Institute for Information Technology. The Institute conducts research and develops licensable technologies as well as running an incubator for tech businesses.

There's a successful tech park, a joint project of UNB, the city, the province and the Atlantic Canada Opportunities Agency. Its tenants include CGI, Canada's largest IT service provider; e-learning company SkillSoft; the Wyndham Worldwide hotel chain; and Q1 Labs, a network security company. Other fast-growing Fredericton companies include Radian6, which provides social media monitoring solutions; Virtual Experts Clinics, offering online educational

therapy systems; and Atlantic Hydrogen, a clean-tech company with a process for enriching natural gas with hydrogen to sharply reduce emissions.

In 2004, after an intensive effort to improve its management and administration, Fredericton became one of the few cities in North America to achieve the ISO 9001 quality certification. Four years earlier, the city joined the Partners for Climate Protection program and committed to reducing its greenhouse gas emissions to 20 percent below 1990 levels by the year 2010.

The community's advanced ICT infrastructure has played an important role in this effort. A Municipal Automatic Logic System controls lighting and HVAC in 16 municipal buildings; it reduced greenhouse gas emissions by 6 percent from 1996 to 2004, and continues to generate about C\$180,000 in annual savings.

In 2006, Fredericton's average family income topped C\$70,000, according to the *Financial Post*, 19 percent higher than the New Brunswick average. It had more businesses per capita than any place in Canada, according to KPMG.

### **GANGNAM DISTRICT, SEOUL, SOUTH KOREA**

The Gangnam District lies to the south of the Han River, which snakes through South Korea's capital city from east to west. This district of 557,000 people contains 2.5 percent of Seoul's people but produces 25 percent of its gross domestic product. High-rise apartments make up 80 percent of its residential areas, and the district is home to the corporate headquarters of such Korean firms as POSCO and Korea Telecom, as well as the IT venture companies on Teheran Road, South Korea's Silicon Valley.

Gangnam's development as an Intelligent Community began in 1995, when the district launched its first "electronic government" project. By 1997, the district had a local area network connecting government offices and a set of tax pay-

## *Gangnam residents subscribe to Wibro, an advanced form of broadband that can be used even in a speeding car, while 8,000 South Koreans are using a digital broadcasting service to watch TV on their handheld devices during the commute to work.*

ment and other applications running on public kiosks. By 1999, the system could process all registrations, permits and other citizen applications electronically.

Gangnam converted the system to the Web in 2002, and by 2006 had collected 264 billion won (US\$280m) in taxes online – 15 percent of the total – and issued 2 million documents to citizens through the Internet or public kiosks. The system has made possible a 25 percent reduction in the local government's employment since 1995, saving 36.7bn won (US\$39m), even as population and economic activity have grown sharply.

In terms of what economists call “opportunity cost,” Gangnam estimates that it has saved citizens time worth another 28.5bn won (US\$30m). Just as important, it has minimized opportunities for corruption, because nearly every transaction between government and constituents (except those requiring the protection of personal privacy) takes place through Web-accessible platforms. Gangnam's system for providing access to public documents was adopted by the national government in 2002.

The years since 1995 were witness to an economic miracle in South Korea, which saw per capita GDP climb 71 percent through 2006. There was a matching broadband miracle as well. In 1995, only 1 percent of South Koreans used the Internet. With strong encouragement from the national government, private wireline and wireless carriers deployed broadband networks that reached 14 million subscribers (28 percent of South Korea's population) by 2006, ranking the nation fourth in the world. Residents also enjoy some of the fastest speeds in the world, with 100 Mbps available for as little as 35,000 won (US\$37) per month. Today, 3,000 Gangnam residents subscribe to Wibro,

an advanced form of broadband that can be used even in a speeding car, while 8,000 South Koreans are using a digital broadcasting service to watch TV on their handheld devices during the commute to work.

About 350,000 citizens are registered users of the district's Web portal, and 210,000 are subscribers to an e-mail system that asks for their comments on proposed laws and regulations. They seem to take their responsibilities seriously. Recently, the district proposed installation of surveillance cameras in a particular alley in a residential district. A local human rights organization opposed the move on privacy grounds. When polled by e-mail, however, 82 percent of residents supported the move and installation subsequently led to a 40 percent reduction in crimes in the area. One interesting aspect of the e-mail polling system is that Gangnam uses demographic weighting to adjust the results. It compares the demographics of the citizens who vote (provided in the registration process) with those of the district as a whole, and weights the voting in order to make it reflective of the whole population.

The Web has also played a vital role in a public campaign called the Move-

ment to Keep Basic Order, which was introduced by newly elected Mayor Maeng Jung-ju in July 2006. The campaign enlists citizens in reporting on public nuisances, from illegal parking to environmental violations, by phone and online. More important than improved law enforcement is the change it has created in public awareness. Within 10 months of the campaign's start, the average daily number of violations reported dropped nearly 9 percent.

Gangnam has also found innovative ways to bring the benefits of Web-enabled government to citizens who have never gone online. In 2005, Gangnam equipped its social service staff with wireless PDAs, enabling them to check information, make reports and request services while visiting clients. In 2006, it launched TV GOV, a set of interactive e-government applications running over the familiar medium of the television set. The system enables users to access services in 34 categories, as well as government news channels, cultural and arts channels, and specialized information for seniors, women and children.

In 2007, the district began offering a service that placed wireless motion detectors in the homes of the elderly and triggered a remote alarm if the sensor failed to detect motion for an extended period of time. In 2008, the service will be extended to provide citizens with the option of wireless location tracking for young children or the elderly suffering from dementia. These are the first of a set of “ubiquitous technology” services that the district expects to introduce in coming years to further improve the quality of life of its citizens.

*One interesting aspect of the e-mail polling system is that Gangnam uses demographic weighting to adjust the results. It compares the demographics of the citizens who vote (provided in the registration process) with those of the district as a whole, and weights the voting in order to make it reflective of the whole population.*

To equip citizens with digital skills, a program called the Regional Information Classroom has provided classes on computers and the Web to over 400,000 citizens in their middle and senior years. Additional instruction is available via programs on TV GOV.

Education is a major expense for families with children in South Korea, and low-income students are at a substantial disadvantage. Gangnam offers several programs to lower this barrier. The district offers over 100 online lectures from a famous private academy for only 20,000 won (US\$21) per year to more than 335,000 registrants. It has opened digital libraries in the empty classrooms of elementary schools, providing access to 330,000 electronic books not only in those schools but nationwide to more than 133,000 students in 123 communities.

This vast array of programs takes a great deal of investment. Gangnam also invests directly in business development. Its Small and Medium Business Development Fund invested 4 billion won (US\$4.2m) in 32 technology companies in 2006. It also underwrites the activities of local nonprofits dedicated to business development, child welfare, sports and conservation. But in addition to the intangible returns of good governance, the community sometimes receives a direct return that also makes headlines. In 2004, Saga City in Japan awarded a US\$2 million contract to a Gangnam company to build a complex software

platform. What Saga City wanted, and was willing to pay for, was Gangnam's e-government system.

## NORTHEAST OHIO

Northeast Ohio is an 18-county region that includes Cleveland, Akron, Canton and Youngstown. In 1978, Cleveland became the first US city to default on its creditors since the Great Depression and, in 2004 and 2006, was named America's poorest big city. Yet the region has retained world-class health facilities, a vibrant arts culture, three major professional sports teams and respected institutions of higher learning, including Case Western Reserve University and Oberlin College. Another major asset was buried in a literal sense. During the 1990s, the telecom industry built out more than \$4 trillion of fiber optic communications systems worldwide. In most cases, these circuits followed the traditional transportation corridors such as rail lines and highways, which meant that Northeast Ohio found itself once again at the hub of a high-capacity transportation network.

In 2002, Case Western named as its new chief information officer a visionary named Lev Gonick. With global technology and community development experience on his resume, he soon began outlining a revolutionary idea. He believed that the region's nonprofit institutions could spearhead development of a common community network that would not only save them money


and expand capacity but foster a wide range of innovation collaborations. The vision impressed many regional leaders, notable among them Cleveland Mayor Jane Campbell.

Case Western and the city assembled a core group of institutions including NorTech (an economic development organization focused on technology), Cuyahoga Community College, Cleveland State University, the county library system, the local Public Broadcasting System affiliate, and Cleveland's transit authority and school district. These were the founding members of a public-private partnership they called OneCleveland, which was eventually renamed OneCommunity. OneCommunity forged partnerships with the region's telephone and cable carriers, under which the carriers donated unused fiber optic circuits to OneCommunity and OneCommunity contracted for first-mile fiber and VPN services from the carriers.

To make the deal, OneCommunity had to overcome resistance to the creation of what carriers at first viewed as a new competitor. Fortunately, president and CEO Scot Rourke and his team came from the venture capital industry, which allowed them to talk the language of business plans and return on investment, and also ensured that OneCommunity began life with a sustainable business model. Eventually, they persuaded all parties of OneCommunity's essential value: By helping the

### OneClassroom Initiative

*"Bringing the world into the classroom, preparing Northeast Ohio students to succeed in the global economy Through the OneClassroom initiative"*




OneCommunity will:

- **Connect** more than 1,500 schools to the OneCommunity ultra broadband network. Ultimately, the network will connect more than 750,000 students to each other and to the world via the largest educational intranet in the U.S. designed for K-12 students.
- Provide an easy-to-use, single access point to an **unparalleled multimedia curriculum** from Discovery Education and Northeast Ohio's museums, hospitals, libraries, universities, schools and other community service organizations.
- **OneClassroom** allows students to actively engage with the people, places and ideas that shape our world. It uses 21st Century tools and technology that are transferable and applicable to students' lives outside the classroom. Ultimately, this will prepare students to succeed in the global economy.

### Community Fiber Network

• One of the Largest and Fastest Networks in the World



Working collaboratively Northeast Ohio ranks as a top 25 World Market with a population of more than four million representing a \$150 billion economy

1C aggregates and shares next generation digital infrastructure and tools across the region. Resulting collapsed costs and managed services encourage adoption, shared resources, capacity building, and innovation leveraging technology.

Lev Gonick, CIO at Case Western Reserve, described the 18-county OneCommunity project around Cleveland.

public and nonprofit sectors become better users of IT and telecom services, OneCommunity would save them money while simultaneously boosting demand across the region.

And boost demand it did. Lev Gonick reports that, prior to OneCommunity, Case Western was using about 40 Mbps of capacity for all of its operations. Within a few years of joining the OneCommunity network, average demand had risen to 400 Mbps. Since start-up, the OneCommunity network has expanded to connect more than 1,500 schools, libraries, governments, hospitals and universities.

Its OneClassroom content and digital asset management system connects these users to world-class content from the Cleveland Museum of Art, Cleveland Orchestra, PBS and other sources. In 2006-07, the network hosted an 18-month program called Voices and Choices, which engaged tens of thousands of area leaders in Web-enabled "town meetings" in order to educate people about the challenges facing the regional economy and obtain their input. Voices and Choices has led to a regional economic development plan called Advance Northeast Ohio, which focuses on business growth and attraction, talent development, inclusion and government collaboration for greater efficiency.

In November, OneCommunity announced that it would share with the Northeast Ohio Regional Health Information Organization (NEO RHIO) an \$11.2 million grant from the US Federal Communications Commission to develop a regional broadband health care network. The network will connect 19 rural hospitals and numerous clinics in 22 counties to over 30 existing hospitals

already on the OneCommunity network. The project will enable NEO RHIO and its collaborating medical providers to deliver telemedicine, records access, medical imaging and remote diagnostic services to improve community health care. At the same time, it creates an opportunity for the region to become a center of excellence in the emerging business of electronic patient records management.

## TALLINN, ESTONIA

When independence came in 1991, Estonia was left with a shattered industrial economy, decrepit infrastructure and impoverished schools. In 1995, Estonia's ambassador to the US and Canada (now president), Toomas Hendrik Ilves, publicized the idea of connecting all schools to the Internet. Estonia's then President Lennart Meri supported the idea and the government created a program called "Tiger Leap" to provide all schools with PCs and Internet connections by 1999.

This simple idea was a spark that lit a wildfire of innovation. Banks in Tallinn talked about their own Tiger Leaps while introducing e-banking, and newspapers put out online editions. An NGO created a program that put computers into vehicles to introduce ICT to the rural population. Lack of purchasing power, however, posed a clear obstacle. In response, the National Library in Tallinn introduced the first public access Internet services with funding from UNDP. The Soros Foundation began a program that invited enthusiasts to create public Internet access points all over the country, and in 2000, a private foundation called Look@World, funded by telecom, banking and computer companies, spread public access Internet even farther.

Today, all secondary schools connect to the Internet, and the public enjoys access to 325 public Internet access points and 360 WiFi hotspots in Tallinn, as well as 400 public access points and 775 hotspots outside it. Residential broadband penetration in Tallinn is at 44 percent, while 95 percent of businesses and 100 percent of government facilities are connected to broadband, with prices ranging from 125 krooni (US\$12) per month for 512 Kbps up to 545 krooni (US\$52) per month for 12 Mbps.

A good deal of the credit for this advanced telecom infrastructure goes to national policymakers who established a liberal and rational regulatory framework. In 1999, the government took the radical step of selling 49 percent of the undercapitalized and underperforming state-owned telecom carrier to Telekom Finland and Telia of Sweden. A Telecommunications Act, Digital Signature Act and Public Information Act were passed in quick succession in 2000 and 2001 to create the conditions for growth in all forms of telecommunications.

As part of Tiger Leap, the national government made wholesale purchases of computers and persuaded banks to support leasing programs that included Internet access. It encouraged the Look@World foundation to provide computer literacy training to 100,000 adults. The government also introduced an electronic ID card and developed a data security system to support safe e-commerce.

The ID card is a mandatory document for all Estonians over the age of 15, and 1.1 million cards were issued through October 2007. In addition to providing visual identification and a legally valid digital signature, the card can be used as a ticket on public transport,

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*Today, residential and business customers can select from broadband options ranging from 768 Kbps for \$15 up to 50 Mbps for \$90 per month. Over 3,500 companies have connected directly to the Westchester Telecom Network, as well as more than half of all municipal agencies in the county, and all of the county's schools, libraries and hospitals.*

as a bank card and as an authorization card for online voting. The government also created an e-government "middleware" platform called X-Road to bridge the many databases and systems that were springing up in different departments. X-Road not only allows different systems to talk to each other securely but includes standard tools to speed the development of new online services. It now takes from a few hours to a few days, at a cost of US\$1,000 to \$10,000, to develop a new service. X-Road has become the backbone for all e-government services. In December 2006, it linked 67 databases to provide 687 different services across 392 institutions and companies.

In Tallinn, members of city government use an eMeeting system to collaborate regardless of location, and work is now underway on a paperless system for drafting regulations. At Tallinn's banks, 98 percent of customers access their accounts online, and drivers use their mo-

bile phones to pay for parking. In 2002, an online information system called E-School was launched at five Tallinn schools. It connects parents, students, teachers and school administrators over the Internet, making school information accessible at home and reducing the routine workload of teachers and administrators. By January, E-Schools expanded to 15 schools in Tallin and, by September 2007, it covered 85 percent of students throughout Estonia.

Tallinn Technopol, a science and technology park, offers 550,000 square feet of space for ICT, biotechnology and new materials companies. It includes a 27,000-square-foot incubator offering a range of start-up support services. In addition to high tech, it has development programs aimed at maritime and tourism, and provides co-funding when individuals or companies apply for commercially viable patents abroad.

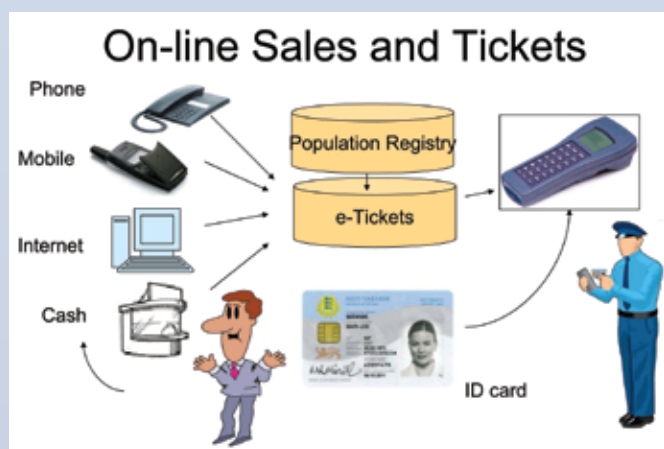
Today, Tallinn's advanced infrastructure, hard work and openness to

the world are paying big dividends. The city receives more than 77 percent of all foreign direct investment in Estonia, which attracts more foreign direct investment per capita than any nation in Central and Eastern Europe. The most active sectors are finance (46 percent), real estate and business services (15 percent) and manufacturing (13 percent). Geography strengthens Tallinn's hand, because its port offers one of the best transit corridors between eastern markets, Europe and North America.

Tallinn's newest success stories are in electronics. ABB Eesti and Elcoteq Tallinn are two companies providing outsourced manufacturing to such international companies as Ericsson, Nokia, ABB and Philips. E-health is Tallinn's latest area of focus. Four projects funded by the European Commission are piloting the creation of a unified health information system. Another pilot project, Doc@Home, is developing an integrated, standards-based, remote management system for patients with a range of chronic health problems.

## WESTCHESTER COUNTY, NEW YORK

Westchester County is a 500-square-mile region with a population of just under 1 million, just north of New York City. Known for some of America's wealthiest commuter towns, Westchester is also home to a fast-growing immigrant and low-income population, which today



The complex block is titled "ID Ticket in the Public Transport". It features a photograph of a hand holding a white Pilet ID ticket near a black scanner. To the right of the photo is a list of statistics:

- 100 000 ID-ticket users per day
- 72,0 % of passengers are ID-ticket users
- over 60 % of public transport revenue from ID-tickets

The Pilet logo is visible in the top right corner of the photo area.

**The ubiquitous payment card in Estonia. It can be used to get onto the bus, take a course, or pay a bill. Its core, however, is a national ID card database.**

*The network has permitted Westchester to create, attract and retain innovative organizations. E-government programs built on the network's foundation include FirstFind.info, a virtual library that provides general and local information to low-level readers and adults with limited English skills.*

makes up about 35 percent of the total. Its workforce of nearly half a million people generates an impressive 10 percent of all US patents.

Aside from a cluster of corporate headquarters nicknamed "The Platinum Mile," the county had fallen behind most of the areas with which it competed for people and jobs. Discussions with major telecom carriers made it clear that they were far more interested in winning competitive battles in New York City than investing in Westchester. The county's response was to conceive the Westchester Telecom Network, a multi-gigabit fiber backbone that now extends over 800 miles into every corner of the county.

The network's development was made possible by collaboration. The county government worked with 43 local governments, an independent library system, major hospitals and dozens of school and water districts to pool communication budgets worth \$50 million over five years. This long and intensive effort provided all the incentive needed for a cable TV company, Cablevision Lightpath, to build the network. Losing customers worth \$10 million per year also sparked the interest of the region's carriers, which subsequently built and

lit three OC192 (9900 Mbps) fiber rings within the county to create one of the best local telecom infrastructures in the United States.

Today, residential and business customers can select from broadband options ranging from 768 Kbps for \$15 up to 50 Mbps for \$90 per month. Over 3,500 companies have connected directly to the Westchester Telecom Network, as well as more than half of all municipal agencies in the county, and all of the county's schools, libraries and hospitals.

The network has permitted Westchester to create, attract and retain innovative organizations. E-government programs built on the network's foundation include FirstFind.info, a virtual library that provides general and local information to low-level readers and adults with limited English skills. The Shared Criminal Justice Data Warehouse, winner of a 2006 county achievement award, is used by county, local, state and New York City police departments. It offers a powerful search system that produces meaningful results from even vague and incomplete data, and provides access to aerial photography and GIS mapping. A revamped county Web site has become a primary communications tools and re-

ceives 22,000 visitors per day, compared with 12,000 in 2004.

The network also played a direct role in attracting major employers to the county, including Nokia, New York Life Insurance and Morgan Stanley. But small, innovative organizations have benefited as well, including animation company Blue Sky Studios (animator of the movie *Ice Age*) and Pace University Online Learning for Trade Unions, which creates distance learning programs in telecommunications.

Westchester has partnered with its neighbor, Fairfield County in Connecticut, to win a \$5 million, three-year US Government grant for a "Talent for Growth" program. It aims to create a talent-driven system linking education, workforce and economic development partners with regional businesses, in order to develop a pipeline of skilled workers and improve the mobility of workers and communications systems. Another partnership, with New York State counties, targets "green workers." The Green Talent Pipeline unites the county governments with private and public employers to focus on "green" workforce development, economic development and education, to leverage the region's initial successes in developing clean technologies.

To help bridge the digital divide, the county runs a Westchester Scholars Program, which awards computers, software, connectivity and training to 50 students from low-income families per year. A Westchester Access program distributes older computers from county and local government to nonprofits, many of which use them as incentives to bring low-income adults into computer and Web training programs. The county also funds a large network of computers and connectivity at 41 library locations throughout Westchester.

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## WINSTON-SALEM, NORTH CAROLINA

Winston-Salem's industrial economy thrived on a mix, traditional to the American South, of tobacco, textiles and manufacturing. All three play a role in the economy today, but none are positioned to deliver sustainable growth. In the mid-1990s, Wake Forest University began work on a plan to connect its medical school and undergraduate campuses with a high-speed network, which ultimately resulted in a 26-mile fiber-optic ring around Winston-Salem. The university's vice president of finance and administration, Dr. John Anderson, saw the potential to use this new asset for community development. He coordinated a series of leadership meetings that, with the active support of the Winston-Salem Chamber of Commerce, created an informal working group including the top government, institutional and educational users of communications.

In 1997, they dubbed themselves WinstonNet and, a year later, staged a demonstration at a local school – attended by North Carolina's members of Congress – of video collaboration and

*Today, 88 percent of households in Winston-Salem subscribe to broadband via DSL, cable, fiber, wireless and satellite, as well as 100 percent of government offices and nearly every business. Carriers including AT&T, Sprint, Time Warner Telecom, ITC Deltacom and DukeNet provide speeds ranging from 256 Kbps for US\$20 per month up to 8 Mbps for \$55.*

multimedia teaching tools. In 1999, WinstonNet won a US Department of Education grant in partnership with the Winston-Salem/Forsyth County Schools to connect the school system to the fiber ring and the fiber ring to the North Carolina Research and Education Network (NCREN), a nonprofit, statewide network of educational institutions. Once construction was completed, the school system gained access to the Internet at the then blazing speed of 155 Mbps.

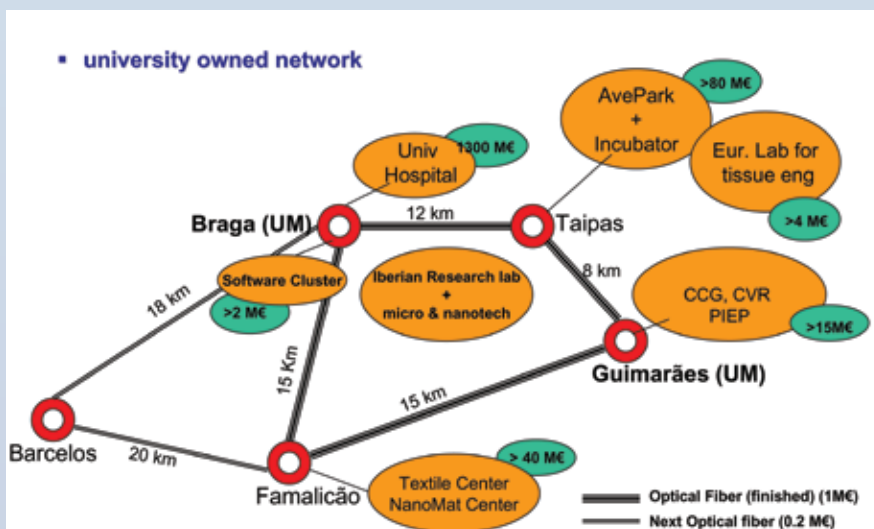
In the same year, WinstonNet incorporated as a nonprofit organization, with members including the city, the county, the school system, Wake Forest and its subsidiaries, the Chamber of

Commerce and the local community college. Each member paid an annual service fee for use of the network, which was now called WinstonNet. Wake Forest began to earn a return on its investment and the members gained some of the best broadband access in the world at a very competitive cost.

Citizens benefited, too. Institutional and public investment spurred demand for broadband and the private-sector investment needed to deliver it. Today, 88 percent of households in Winston-Salem subscribe to broadband via DSL, cable, fiber, wireless and satellite, as well as 100 percent of government offices and nearly every business. Carriers including AT&T, Sprint, Time Warner Telecom, ITC Deltacom and DukeNet provide speeds ranging from 256 Kbps for US\$20 per month up to 8 Mbps for \$55.

But the nonprofit WinstonNet was about much more than connectivity. Its real purpose was to enable Winston-Salem's transition from a manufacturing to knowledge-based economy. The WinstonNet Board believed that the community's future lay in services, logistics and biotechnology, which would place heavy demands on education and training to overcome not only the community's industrial legacy but fast growth in the immigrant population. North Carolina experienced a 37 percent increase in its immigrant population from 2000 to 2006, by which time Spanish speakers made up 7 percent of the total.

WinstonNet developed a three-pronged strategy to attack the problem. In 2003, the organization dedicated its first Community Computer Lab at a



**Dr. Antonio Cunha described the rebuilding and redevelopment of the ancient city of Guimaraes (it was once capital of Portugal). Some 20 to 30 percent of the economy is textile-based. There is also an ancient tanning industry. But the future involves tourism and a new university. The university has been the prime mover behind the city network's fiber backbone, which extends to non-university locations as well.**

*Winston-Salem's MyCityofWS service allows citizens to establish a profile on the City's Web site that defines their interests and location, so they can be notified by email of relevant new information. The fire department uses a wireless dispatch system with data routing and imaging, which has helped the department exceed standards for response time and effectiveness.*

recreation center. Over the next year, it opened a total of 30 sites offering free computer access to children and adults, with Wake Forest University and Forsyth Technical Community College leading the project and Microsoft and Cisco Foundation providing funding. Today, there are 44 labs operating in community centers, churches, schools and libraries, managing more than 3,500 e-mail accounts and logging over 75,000 user sessions per year.

In 2005, WinstonNet partnered with One Economy, a national non-profit, using a grant from Cisco, to build a community Web portal. The Beehive Web portal was launched in 2006. With content in English and Spanish at a 5th-grade reading level, the portal provides information on money, health, jobs, family, immigration, taxes, government services and computer training and support. The library system has taken responsibility for maintaining the portal, which, according to One Economy, now ranks third in the nation for the most hits to a community Web portal.

In 2006, WinstonNet put the last piece in place through a partnership with Forsyth County Libraries that created a sustainable computer training program. A three-year grant from state government permitted WinstonNet to hire a full-time coordinator, who has created a volunteer group of more than 40 trainers, created a standard curriculum of courses and developed a certification program. Classes are taught in both English and Spanish. In its first year, the program completed 189 classes with total attendance of just under 1,000 people. WinstonNet is now developing, in partnership with a local nonprofit, a set of classes for visually impaired and physically challenged computer users as well.

While working to raise the skills level of the entire community, Winston-

Net has also contributed to technology and economic development. In 2002, WinstonNet became North Carolina's first Regional High Speed Networking Hub (GigaPoP), boosting Internet connection speeds to 622 Mbps. In 2007, WinstonNet switched on a proof-of-concept WiFi network covering 1 square mile as a first step in creating what the organization calls "ubiquitous access to knowledge and information for everyone." Wireless Winston is a new public-private partnership backed by anchor tenancy agreements with the top employers in the community. Its goals are to reduce telecom costs, enhance education, improve student-teacher-parent communication and improve public health and safety.

In 2004, Targacept, a biopharmaceutical company spun out from R.J. Reynolds, joined WinstonNet in a cooperative program to demonstrate state-of-the-art "grid computing" in local schools. WinstonNet is now exploring development of a supercomputing center to be housed at the Piedmont Triad Community Research Park, where Wake Forest is constructing a high-performance data center. This research park, anchored in Winston-Salem's historic downtown business district, will provide 5.7 million square feet of "green" commercial space for life science research on land donated to the city by R.J. Reynolds. It is being developed by another public-private partnership called Idealliance and is currently home to five buildings, including the Biotechnology Research Facility of Wake Forest University Health Sciences.

In addition to actively supporting these efforts, the city of Winston-Salem has deployed ICT to improve its services. In 2007, it opened a Citizen Contact Center providing a single telephone

number for access to all city services. Greater convenience for citizens resulted in a significant reduction in total call volume as more service requests were satisfied on the first call. The MyCityofWS service allows citizens to establish a profile on the City's Web site that defines their interests and location, so they can be notified by e-mail of relevant new information. The fire department uses a wireless dispatch system with data routing and imaging, which has helped the department exceed standards for response time and effectiveness.

How does Winston-Salem measure the results of its many investments and partnerships? There have certainly been economic successes. Winston-Salem and Forsyth County now count 37,000 biotech employees as residents, and biotech companies contribute an estimated \$10 billion in annual revenue to the area.

Dell Computer opened a manufacturing facility in Forsyth County in 2005 that will create another 1,500 jobs and contribute at least \$100 million in new investment. But Winston-Salem also measures progress in human terms. WinstonNet is now in discussions with the school district and community leaders on development of a program to place computers in the homes of low-income students. The program proposal covers funding, curriculum integration, teacher training, technical staffing, hardware and broadband connections.

If WinstonNet is successful in attracting funding, as it expects, the program will start in 2008/09 with 550 students in middle schools with high percentages of low-income students. Success, then, is measured not only in today's jobs. It is also measured by the community's ability to build a more prosperous and inclusive broadband economy for tomorrow's citizens. **BBP**