



STRATFORD BECOMES A “SMART CITY” WITH MOTOROLA WIRELESS SOLUTIONS



Stratford, Ontario leverages its smart metering conservation network to provide ultra high-speed wireless broadband connectivity throughout the city.

SITUATION

Facing new energy conservation regulations, the city of Stratford decided to initiate a smart metering program that could do double duty.

Early in 2010, the Province of Ontario enacted its Green Energy and Green Economy Act, setting specific goals for energy conservation in municipalities like Stratford. The city itself had its own goal of providing broadband access for its residents and business communities, and stimulating economic development through its Smart City initiative. Stratford officials sought a safe, secure, cost-effective, high-performance network that would support a smart metering program and at the same time help enhance community-wide communications.

SOLUTION

A citywide municipal services network based on Motorola’s 802.11n mesh wide area network (MWAN) technology that supports both smart metering and high-speed mobile Internet access.

To meet this dual objective, Rhyzome Networks, an entity owned by the city but operating independently, and Festival Hydro, Stratford’s electric utility, opted for a citywide wireless network using the latest broadband technology

from Motorola. The system consists of wireless mesh infrastructure using Motorola’s AP 7181 802.11n outdoor mesh access points and the Motorola GPON AXS1800 system to transmit encrypted smart meter data and backhaul it to the Rhyzome fiber optic network. The system also makes the entire city a high-speed wireless broadband hot spot, enabling residents, businesses and visitors to enjoy instant Internet access from virtually anywhere in Stratford.

RESULT

The citywide wireless network is enabling Stratford to meet provincial energy conservation goals while bridging the digital divide.

With deployment completed in 2010, Stratford is reaping the benefits of its dual-purpose network strategy. Its smart metering initiative is in full swing, helping the city and its customers reduce both electricity consumption and utility bills. At the same time, the network offers ultra high-speed Internet access to every resident and business. Stratford has adopted a managed service model that offers access via local carriers that rent capacity on the wireless network, providing the city with an additional revenue stream. Stratford is also using the mesh infrastructure to provide mobile access for public works and municipal employees.

CUSTOMER PROFILE

Users

- Government, Utility, Residential, Business, Education

Applications

- Smart metering, citywide mesh-enabled wireless broadband connectivity for multiple departments, residents and businesses

Motorola solution

- Approximately 400 Motorola 802.11n MWAN AP 7181 outdoor access points
- GPON AXS1800 fiber-Ethernet system
- Broadband-Planner network design software
- Motorola Wireless Manager

Solution Features

- Superior throughput and network reliability, high network capacity
- Last mile ISP services offering to residents, and small and medium businesses (SMB)
- Real-time automated smart meter reading
- Remote energy management services for residential homes
- Remote network management and trouble-shooting

AN ADVANCED DEGREE OF CONNECTIVITY CREATES A SMARTER CITY

Stratford is a city with a mission. Located in southern Ontario Province just southwest of Toronto, the city has 32,000 residents. Through its new “Smart City” program, Stratford is preparing for the future of the city and its citizens by taking maximum advantage of high-speed technology. “Promoting energy conservation and stimulating economic growth are top priorities for Stratford and are key components of our Smart City initiative,” says Stratford Mayor Dan Mathieson. Crucial program stakeholders include Rhyzome Networks, a wholly owned entity of the city and Festival Hydro, Stratford’s electric utility.

PROVINCIAL MANDATE

The Smart City program’s roots are in the Green Energy and Green Economy Act introduced in May 2009 by the Ontario Ministry of Energy and Infrastructure. “[The Act] sets specific demand reduction and conservation goals on electrical utility companies like Festival Hydro, The City of Stratford’s owned utility,” explains Bill Zehr, President, Festival Hydro. But energy conservation was only part of the city’s initiative. As they planned for deployment of a smart metering network to meet the mandated energy conservation objectives, city officials looked for ways to leverage the network to increase inclusiveness and stimulate economic growth by making high-speed connectivity available for the entire community. “Our entire community will have access to all the city services, library services and local events. We are improving the inclusiveness of our community,” says Paul West, business development manager, Rhyzome Networks.

INNOVATIVE LEADERSHIP PLUS BREAKTHROUGH WIRELESS TECHNOLOGY

The City of Stratford needed a network that was not only highly reliable, but offered long term capacity to support the additional applications they wanted to deploy in the future. The city was aware that the new 802.11n standard, which greatly enhances WiFi technology performance, had recently become available for use in outdoor networks. Stratford chose Motorola’s outdoor 802.11n mesh wide area network that provides the carrier-class reliability needed to support current initiatives while offering the bandwidth and capacity to introduce new applications in the future. “Mesh was important to use because we didn’t want to have to fiber-connect everything,” says West, “We’re excited to be working with Motorola because they provide a technology solution that will not only address the economic viability of the city, but will also address concerns around energy conservation.”

BENEFITS OF SMART METERING

Once the network was chosen, Stratford began by deploying a pilot smart meter project in one section of the city. “Smart” or “intelligent” meters are installed in residences and businesses to automatically collect and transmit energy consumption data in real time. This

information is used to provide more accurate forecasting and billing and to let households and companies know exactly how they consume energy. Customers can adjust their schedules to take advantage of off-peak, lower rate periods during the day and night. This not only helps reduce bills, it helps promote energy conservation and reduces the potential of power problems such as brownouts during peak usage hours.

MESH ENABLED METERING FOR REAL-TIME DATA

In Stratford, meters were read once a month manually. In the test project, smart meters were placed in 200 homes supported by a test mesh network of 40 access points. During the trial period, Festival Hydro remotely accessed the smart meters in this area on a daily basis. This helped demonstrate how customers would be able to learn how to reduce their electricity usage by viewing their consumption levels daily, and calculating how much they could save by simply altering their usage patterns.

By mid 2010, the trial was successfully completed, and the city began full deployment of the wireless smart metering program, installing meters for 18,000 business and residential customers. The city is now able to retrieve hourly time-of-use data from its electricity meters without having to dig and run wires to each and every home and business. Every day, smart meters beam encrypted data to wireless collection points mounted on utility poles throughout the city, tap into the underground fiber grid and deliver the data to Festival Hydro.

WIRELESS BROADBAND FOR RESIDENTS AND BUSINESSES

At the same time, the city expanded its mesh communications network to cover the entire city and surrounding areas. The high-speed wireless network consists of 300 Motorola AP 7181 outdoor access points in the city, and 100 additional access points serving six smaller rural communities. The AP 7181 is a significant breakthrough in providing enhanced data speeds and capacity in the outdoor space. “About one in every six access points has fiber connectivity which helps provide fabulous throughput,” says West. The solution



“Stratford is one of the first communities in the world to deploy a metering platform enabled by wireless broadband.”

Paul West
Business development manager
Rhyzome Networks



uses the Motorola GPON AXS1800 fiber Ethernet system to provide high-bandwidth backhaul from the mesh radios to the fiber network. The GPON system also provides optical-to-electrical media conversion. The result is a network that provides up to 300 Mbps data rates, and serves more than 40,000 people over an area of eight square miles or 21 square kilometers. "The fiber optic grid is foundational as data infrastructure for local industry and business," says Mayor Mathieson, "and the wireless initiative brings broadband connectivity literally out into the open to serve Stratford residents and businesses."

WIRELESS BROADBAND STIMULATES ECONOMIC GROWTH

Although smart metering is a crucial solution for energy conservation, it is not a bandwidth-intensive application. Explains West, "In terms of network capacity, you can think of smart metering as a couple of cars on a super highway. We have plenty of room for more traffic." As a result, the city is putting the additional capacity to good use as it expands the network to create a citywide hot spot and provide high-speed Internet connectivity for all residents and businesses. The same network that is helping to conserve energy is helping stimulate economic growth by working to attract new residents and new business development. Signs are already positive. Stratford has recently been selected by Canada's largest bank to be a data center site, and the country's leading technology school, University of Waterloo, has chosen the city as the site for a satellite campus.

MANAGED SERVICES MODEL

To manage the network, the city of Stratford decided to adopt a managed services structure. Rhyzone Networks and Festival Hydro are the network managers, working directly with certain local institutions and with area carriers and service providers. "We have direct client relationships with a few customers," says West. "These include the city itself and our city hospital with which we have a strong partnership. In addition to fiber connectivity for the hospital, we want to provide doctors with full mobile connectivity over the mesh enabled wireless broadband network throughout the city to help improve communications and provide faster, better patient care."

What about other potential customers? "All other direct relationships are with carriers who lease fiber capacity from us, and will also lease our wireless broadband capacity." Through the model, the city is able to make high-speed connectivity available to virtually all residents and businesses. At the same time, the model enables the city to use its excess network capacity to provide significant new revenue streams for the city. Rhyzone Networks is managing the entire wireless infrastructure using the Motorola Wireless Manager, a comprehensive network management system that offers advanced visualization of all network elements for enhanced troubleshooting and performance management.

KEEPING MUNICIPAL EMPLOYEES CONNECTED

Stratford is also working with Rhyzone Networks to leverage the mesh infrastructure for mobile access by public works and other municipal employees. The city has approximately 400 employees. Communications for mobile workers are now achieved through the use of 150 Motorola two-way radios and another 150 smartphones. A strategic plan was developed to identify the many applications that could run on the network. "Currently, Rhyzone Networks is in the process of migrating municipal cellular users over to wireless broadband handsets for connectivity within the city," says West. "We're also exploring the ability to provide radio-link capabilities through the Motorola TEAM platform to the PBX." The result of this migration to wireless broadband will be a significant reduction in recurring costs.

The city is also exploring other ways of using wireless broadband to aid in operational efficiency. "We have a couple of pilot programs with GPS on some city equipment such as plows," says Ron Roy, manager of information technology for the City of Stratford. "GPS tracking lets us know how the plows are running." The cellular solution the city uses today comes with a monthly cost and is under review. "A WiFi solution would be significantly more cost effective for the city," notes Roy.

"By choosing a managed services model, we are able to deploy a world-class solution that meets our objectives, but which would otherwise be cost-prohibitive, especially in today's challenging economic climate."

Dan Mathieson
Mayor
The City of Stratford



MOTOROLA PROVIDES CONNECTIVITY FOR CANADA 3.0 CONFERENCE

The City of Stratford also tasked Motorola with providing connectivity for Canada 3.0, a premier IT conference held on the University of Waterloo campus. The conference attracted more than 2,000 attendees from the worlds of business, higher education and government, including Canada's Premier. The installation included 23 AP 5131 indoor access points and redundant RFS 6000 connected to a fiber backbone as well as AP 7181 units outside. The result was the deployment of a robust, cutting-edge network at the conference, helping to further solidify Stratford's leadership position in the technology of government, business and community. Says Rhyzome Network's Paul West, "Attendees were able to email, blog, network, tweet, upload, download...everything they need high-speed Internet access to do."

A STRONG PUBLIC / PRIVATE PARTNERSHIP MODEL

The City of Stratford, Rhyzome Networks and Festival Hydro have formed a strong partnership with Motorola to bring the city into the forefront of Canada's energy conservation programs and broadband technology initiatives. Working together, the team has created a powerful and practical solution that provides for real-time oversight and management of the entire system to achieve maximum uptime, consistently high performance, increased employee productivity and enhanced customer satisfaction.

Future plans include leveraging Stratford's Smart City initiative as a model for bringing wireless-driven energy conservation strategies into other Ontario municipalities covering a population of over 2.7 million people. For Stratford itself, the network is exceeding expectations in both energy management and in delivering high-speed wireless connectivity. The system enhances the lives of residents, makes businesses more viable and profitable and creates a technology-driven climate that fosters community growth by providing high-speed access to virtually every constituent: residents, businesses, visitors, government agencies, city workers and more. A Smart City indeed.

"We're building for the future. We're looking at getting better service for the same price, if not better, and again, [we're preparing for] future growth."

Ron Roy
Manager of IT Systems
The City of Stratford

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