



# Niagara Region

## Public Works Department, Water and Wastewater Services Division

Solutions for Efficient Water Management

### RESULTS

- One seamless, integrated network that enables comprehensive visibility and easy access to information from any point
- Creation of a common knowledge base across both maintenance and operations
- Streamlined software maintenance
- Common application look-and-feel to increase productivity
- Robust remote, fault-tolerant data logging from field instruments

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*Mark Presti, Manager of Technical Trades*

### Niagara Takes Advantage of Latest GE Proficy\* Technology for Water Management

Niagara – the very word conjures images of water -- spectacular, seemingly unlimited abundance of water.

But it is still a resource that needs to be carefully managed. And the regional government of Niagara in Ontario, Canada, is investing in a major upgrade to its technology infrastructure to provide better, faster, and more reliable access to critical information. Timely information is essential to ensure water quality and availability, and strict compliance with governmental regulations.



Niagara Region is the regional government comprised of 12 local communities that lie in a narrow neck of land that separates Lake Ontario and Lake Erie. The Water and Wastewater Services Division of the Region's Public Works Department is responsible for managing the annual flow of 65,000 mega liters – some 1.71 billion gallons – of fresh drinking water to nearly half million people. It's also responsible for managing the processing of 77,000 mega liters of wastewater. Both water and wastewater treatment necessitate timely, fault-tolerant real time access to information from hundreds of remote field instruments and 16 treatment facilities to ensure absolute control over the vast network of plants, wells, and pumping stations.

It's a big job; growing bigger as the population and industry base continues to expand. In 2007, the Water and Wastewater Services Division launched a complete overhaul of its control system infrastructure. The goal: to create one seamless, integrated network that would enable comprehensive visibility and easy access to information from any point. The department wanted a solution architecture that would:

- streamline software maintenance
- integrate local plant data repositories with a central corporate historian
- provide common application look-and-feel to increase productivity
- provide for robust remote, fault-tolerant data logging from field instruments

### Upgrade leverages new platform capabilities

Long an HMI/SCADA customer, Niagara elected to upgrade to state-of-the-art GE Intelligent Platforms' Proficy iFIX software to take advantage of its powerful, new technology platform. Key features included:

- Microsoft® Windows® operating environment
- flexible object technology
- terminal services to support thin clients
- powerful conversion tools
- improved security

Niagara's new network infrastructure is built around Proficy iFIX HMI/SCADA control system technology, with links to local plant and corporate Proficy Historian data repositories. Additionally, QuickPanel RTU components were added to serve as remote operator interfaces and data collectors in the field.

"Remaining with GE made sense for a lot of reasons – and also made for a much easier conversion, given iFIX's powerful conversion tools," states Mark Presti, manager of technical trades in the maintenance section of the Water and Wastewater Services Division.

iFIX is part of the GE Proficy family of software products, a single intelligent production solution that works with existing multi-vendor hardware and software solutions to gather and analyze data. Solutions can connect to equipment across the entire physical utility to deliver both on-line monitoring for rapid operational response as well as collecting historical data as the foundation for continuous improvement.

iFIX enables drill-down capabilities to view detailed tag information; access and analyze trend variables; and enterprise data access via thin-client, terminal services connectivity to all SCADA nodes. Proficy Historian is unmatched in speed and performance in providing access to vast stores of normalized process data – including alarms and events – for mission-critical monitoring and control. The software is specifically designed for capturing large volumes of process data, storing it for long periods, and providing quick retrieval by other applications for trending and analysis.

### Overcoming Barriers

"We reached a point where there were significant challenges with the existing infrastructure that had been in place for several years," says Presti. Plants had differing SCADA system configurations with a widely variant look-and-feel to critical applications and overall constrained network integration. "Most plant networks failed as new PLC or SCADA nodes were added."

Each plant hosted its own separate SCADA configuration. The six water treatment plants were paired and linked over the organization's fiber-optic WAN – but any time a change was made in one system, it had to be separately engineered elsewhere. If a manager wanted a link into a plant's SCADA system, that configuration needed to be loaded on their desktop. That effort multiplied across numerous plants "made for excessive and very time consuming maintenance," Presti says.

Also, field instruments at hundreds of remote points in the water and wastewater systems provided readouts on chlorine levels, turbidity, water levels and other factors that were routed through PLCs via leased land-lines to various plant SCADA systems, and then to plant historians. But there was no storage capability at remote sites, so when there was an interruption in communications, real time data logging ceased. This created gaps in information stored in the plant historian.

### Focus on Infrastructure

An integrated, distributed iFIX infrastructure was seen as the right solution for moving forward. The decision was made to handle the upgrade internally. "After visiting other system sites our size, we decided that we could perform the upgrade in-house," Presti says. Taking on the project would provide the technical trades team the opportunity to become intimately grounded in the network architecture, boosting its skill and knowledge base to manage maintenance and support, and ongoing extensions and

upgrades. “We had two SCADA and instrument technicians when I started here. We brought in three more,” he says. The team has called on Gray Matter Systems, the local channel partner and VAR located in nearby Mississauga, Ontario and a local consulting firm when additional technical expertise was warranted.

The network infrastructure involves individual rack-mounted iFIX solutions and Proficy Historian data repositories at each treatment plant. Additionally, the main services division headquarters also gained a central Historian – which provides a single data repository fed by each of the individual plant historians for comprehensive, long-term data storage. It, in conjunction with its own separate iFIX server installation, provides centralized operations management visibility to performance across the entire facilities network.

“We didn’t have one central data repository before,” Presti says. “This now gives us one location to go to when we want to share data.” The central Historian is the foundation for general and ad hoc reporting for widely distributed plant operations. The central Historian is also integrated with the Infor Enterprise Asset Management (EAM) solution for improved asset maintenance and repair across the facilities organization.

Each plant operates a pair of iFIX SCADA servers, one primary, the other secondary, to provide fault tolerance and to support periodic software maintenance, ensuring that one server remains live while the other is down. Additionally, two terminal servers provide links to Proficy iFIX clients – remote thin clients that provide operations personnel web-based access via Citrix enabling technology. The terminal servers ensure consistent application functionality and common look and feel – and greatly streamline system maintenance. Changes can be made to the application on the terminal servers and then pushed out to all remote locations.

A perennial network problem was resolved with the addition of QuickPanel RTU collectors at remote stations. The QuickPanel RTU not only provides a field-based operator interface, but also provides critical data storage capabilities. The compact, slim QuickPanel communicates with Allen-Bradley PLCs via OPC and Modbus industrial network protocols, and forwards data over leased Bell Canada landlines.

The QuickPanel’s wireless-enabled technology will allow the Water and Wastewater Services division to eventually migrate to wireless transmission. In either case, communication interrupts will no longer result in data gaps in plant and central Historians, as the QuickPanel RTU provides store-and-forward functions that ensure continuous data logging fidelity for historical purposes.

The technical trades team has spent three years engaged in a methodical plant-by-plant migration to implement the network infrastructure build around the iFIX HMI/SCADA platform. “Conversion was the hardest piece,” Presti says. “The advantage of doing it ourselves is we now have a thorough understanding of what we own and how to support and maintain it. We never had that before.”

### Empowering Users

The team is now turning its focus to work with operations management, “the ultimate end users,” Presti says, to develop standardized applications and graphics that will be used across all plants. “The initiative was to ensure the systems in each plant were identical in design.”

The common technology infrastructure will greatly enhance the ability of the Water and Wastewater Services division to manage maintenance from one central location, gaining economies of scale and efficiencies over its previously decentralized, plant-centric maintenance operation. “One of the objectives was to create a common knowledge base across both maintenance and operations,” says Presti.

“We’ve given management the tools – now we’re working with senior management in both water and wastewater to standardize how they want to see the information. The goal is to give them the means to get the information themselves with web-based access.”

The investment in time to put the infrastructure in by themselves has been well worth the effort. “We’ve built a very solid infrastructure,” states Presti. “And we have full understanding and ownership of how it works. We’re confident it’s ready to support our growth in operations.”

### GE Intelligent Platforms Contact Information

Americas: **1 800 433 2682** or **1 434 978 5100**

Global regional phone numbers are listed by location on our web site at [www.ge-ip.com/contact](http://www.ge-ip.com/contact)

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