



Cisco IoT solutions support compliance, fuel innovation

The Ontario Clean Water Agency operates and maintains more than 800 water and wastewater facilities in Ontario, Canada – serving municipalities, First Nations communities, businesses, governments, and institutions across the province. With a full array of water and wastewater services, the agency aims to be the “Total Water Solutions Provider.”

As Director of Operational Systems, Ciprian Panfilie is responsible for managing the core operational and information technology systems that power the organization. That includes human-machine interfaces (HMIs) as well as supervisory control and data acquisition (SCADA), data collection, and remote monitoring systems for a diverse base of client facilities – from small to massive scale and distributed across the vast expanse of Ontario. Panfilie and his team also oversee the business systems that must integrate with control systems so that operational data can flow upstream and downstream.

Who is Ontario Clean Water Agency?

Customer name

Ontario Clean Water Agency

Industry

Utilities

Location

Toronto, Ontario, Canada

Customer Overview

The Ontario Clean Water Agency is a Crown agency of the Government of Ontario, Canada that delivers operations, maintenance, and management services for 800+ water and wastewater treatment facilities throughout the province.



In serving clients, the Ontario Clean Water Agency must address a complex array of regulatory requirements enacted as a result of the Walkerton disaster in May 2000. At that time a bacterial contamination of municipal water in Walkerton, Ontario, led to seven deaths and sickened more than 2,000 people. The incident prompted Canada's Minister of the Environment to enact strict requirements around monitoring of water quality, including residual chlorine, and floridity. Conducting that monitoring within required time frames to meet compliance requirements can be a significant challenge given the size of the province and the need to manage facilities in far-reaching locales.

Panfilie explains that the local operator of a water or wastewater service may have to travel three or four hours to get to a facility. These circumstances have long made remote monitoring a necessity. To meet that longtime need, the agency built a homegrown solution to capture data from about 700 locations. While it was largely successful, there were opportunities to improve data collection and reporting.

"If you have a single data point missing in a data stream, that can create compliance issues," Panfilie says. "Then compliance professionals must invest significant time on paperwork to satisfy the regulation."

Panfilie notes that the agency also saw an opportunity to improve the way it manages mission-critical assets, including water or wastewater pumps and aeration systems, as well as other high-value equipment, such as diesel generators and large transformers. Finding tools to improve maintenance of these assets could increase energy efficiency and enable more proactive identification of operational issues to support faster, more cost-effective resolution.

With those factors in mind, the team at the Ontario Clean Water Agency began experimenting with potential solutions that would improve data collection and establish a capability for better equipment monitoring and management. Panfilie says it was a fairly informal effort – until a client request put the initiative on a fast track.

“Our main objectives were to collect and store data in certain ways while enabling remote accessibility and cloud integration – and it works flawlessly.”

Ciprian Panfilie

Director of Operational Systems,
Ontario Clean Water Agency

The search for a centralized, standards-based approach

In 2016, a First Nations community asked the Ontario Clean Water Agency to support remote monitoring from a central location. Although the agency initially proposed its existing proprietary solution, the client had a clear vision to use an independent solution. Panfilie and his team got serious about a cloud-based solution but soon encountered a series of connectivity roadblocks, including supporting areas with no Internet and spotty cellular service. What they needed was a solution that, with the help of antennas, could provide strong cellular connectivity. And that solution came from Cisco IoT routing technology.

“That’s when we started to look at Cisco’s equipment because it had everything we wanted,” Panfilie says. “It was the only way to get coverage in some of those areas. We couldn’t find signals with cell phones, and we still got the systems working.”

It’s been two years since the agency implemented the solution based on the Cisco 829 Industrial Integrated Services Routers (IR829) in six locations to support that First Nations client. These routers, which have become the new standard for the Ontario Clean Water Agency, provide highly secure, reliable, and easy-to-manage 3G/4G LTE WAN cellular and Wireless LAN connectivity for mobile environments. They are ideal for connecting IoT devices and applications, as these routers are very compact and designed to withstand harsh environments.

The solution for the First Nations client uses the Cisco IOx application environment, which combines Cisco Internetwork Operating System (IOS) and Linux, to support two forms of data collection: one, local collection inside stainless steel control panels that house the Cisco routers; and two, and integration with the cloud. The agency can even store up to 100 Gigabits of data locally using the Cisco routers inside the steel panels.



Summary

Clients of the Ontario Clean Water Agency operate under strict regulatory requirements related to data collection and reporting about water quality. Working with Cisco® Internet of Things (IoT), the agency is implementing a modern, standards-based infrastructure that addresses compliance requirements – and provides a strong foundation for continued innovation.

“It may seem like overkill to store the data both locally and in the cloud. However, that approach reflects how valuable the data is to our clients. The IR829 routers make it easy for us to have the local backup in the panels,” Panfilie says. “We haven’t had one failure, and data quality is fantastic.”

Data collection from inside the panels has another important advantage: the ability for local operators to view and analyze their own data, independent of any IT system or cloud provider. And the panels are proving to be fertile ground for other mobile apps that Panfilie and his team are actively investigating.

A focus on the future

The agency isn’t waiting idly as IoT sensors undergo the process to become certified for use in Canada. Instead, they are collaborating with Cisco to explore an integration between the IR829 routers and long-range wide area network (LoRaWAN) Gateways to collect and analyze data from low-battery sensors. With the network infrastructure in place, the Ontario Clean Water Agency will be well positioned to monitor a variety of sensor-connected assets to collect data on vibration levels, temperatures, and other parameters. The data would then allow the agency to do predictive failure and predictive maintenance so they can fix problems before they occur.

Panfilie says the agency is also eager to implement IoT solutions on the Cisco infrastructure to enable sophisticated energy management. The goal is to leverage smart grid technologies that help with forecasting the value of electricity and then use real-time energy pricing in any controlled system: “The IR829s will integrate with either the cloud, the web, or an API to monitor real-time pricing, so we can adjust the plant equipment operations to reduce electrical consumption.”

In the shorter term, the Ontario Clean Water Agency is collaborating on IoT solutions with some of the school districts in Northern Ontario. These districts maintain their own water system and cover a large geographical footprint. By using the Cisco IR829 routers, the agency will help these districts better monitor their well and treatment systems – ensuring compliant data collection and safe water for the students in their care.

In short, what started as a trickle is becoming a powerful current – with Cisco IoT solutions providing the core for continued innovation and success.

“Reliability, maintainability, support capabilities – they’re all there,” Panfilie concludes. “In terms of performance, whatever we have tried – every docker image we developed, every app we built – works. It’s a fantastic technical achievement.”