Just Add SCADA

Internet-hosted SCADA systems are a modern answer to modern municipal water and wastewater concerns.

by Thelma Akwei and Ben Manlongat

Water and wastewater utilities are under increasing pressure to prevent service disruption, control costs, and provide management and regulators with detailed process information. This requires a modern supervisory control and data acquisition (SCADA) system, including remote monitoring and control hardware such as programmable logic controllers (PLCs) and remote terminal units (RTUs), a communication network (usually radio-based), and a human machine interface (HMI) software application running on one or more networked computers. Many utilities simply cannot afford either the up-front cost of this infrastructure or the long-term maintenance it requires. This article describes how a hosted Internet solution can help such utilities quickly achieve advanced SCADA systems that would have been impossible considering the costs of traditional SCADA architecture.

A detailed pump station screen: monitors well levels, pumps, alarms, station power, panel temperature, and communication links; controls pumps, pump setpoints, and well alarm setpoints.

Hosted SCADA Solutions — A New Approach

In an Internet-hosted SCADA solution, equipment information from each remote site is transmitted via cellular modems to a central third-party SCADA software application. For a monthly fee, authorized utility personnel can monitor and control their equipment, change system set points, view active and historical alarms, and create custom reports. Secure Internet clients provide customer access from any computer with an Internet connection. This allows utilities to adopt a complete SCADA system including mission-critical components like trending, alarm dialer, remote access, and system redundancy that they could otherwise not afford using traditional server architecture. A working system can be up and running in a

matter of days or weeks, not months or years.

Hosted solutions eliminate the upfront hardware costs and software licensing fees required to install a traditional SCADA system. In addition, there is no need to maintain licensing support contracts, server computers, or an IT department.

A custom overview screen for monitoring remote buildings. Displays status of communication links, alarms, and equipment.

In 2010, systems integrator Kennedy Industries, Inc., developed its own cloud-based SCADA system, KI Station Master (KISM), to meet the needs of the Michigan Department of Transportation (MDOT). MDOT was considering a SCADA system to monitor and control pump controllers at 160 stations across the state of Michigan. Due to the large number of sites that MDOT wanted to monitor, Kennedy Industries proposed KISM as an efficient way to meet MDOT's needs. After a careful review, MDOT approved the proposal not only because of the features of KISM, but also because the hosted application is installed at a server farm in Michigan.

A SCADA Software Central

Hosted solutions require a SCADA software application to provide a central repository for process information collected from each client utility. The application makes this information available to the appropriate utility via online graphic displays, reports, and trend viewers. It is important to research and examine various aspects of a system (thin client, thick client, cloud, or local installation) before choosing a SCADA platform for the hosted solution. Kennedy selected VTScada software from Trihedral because of its built-in communication drivers for more than 100 different devices, making it easy to connect to any type of equipment. It also provides the capability to perform hosting by grouping all customer areas into

a single realm, ensuring that different utilities are not able to see each other's private information.

Installation And Customization

The hosting process requires a PLC at each site to collect data that can be sent to the hosted SCADA application by the cellular modems. If a customer already has these devices in place, they are simply reused in the new system. If not, the utility is provided with a PLC that can communicate with its existing equipment.

If the customer has a piece of equipment that cannot communicate with DNP3, Modbus, or any other communication protocol that the SCADA software recognizes, the engineer can tie in a PLC, which has a built-in DNP3 communication driver and directly wire in the equipment information into inputs and/or outputs of this new PLC. The PLC can then transmit equipment information to the hosted SCADA system through any cellular-based network. In addition to standard pre-built template pages, Kennedy also provides engineering time to create a selection of customized graphic screens unique to each of their customers.

Since each customer remote site is configured as an area within the Internet hosted SCADA system, all that customers require to view the realm of their areas is a Windows computer with Internet connection running Internet Explorer. Customers can also access the system from their smart phones or tablets.

A Secure Cloud

Kennedy runs their hosted application at a local server farm, which guarantees 24/7 power and Internet connection. For security, the integrator uses its own SSL certificate, which encrypts username and password information in addition to the VTScada advanced security features. As a further safeguard, Kennedy is working on an approach where the hosted solution is configured as the main system but another VTScada application is installed at the customer site as an automatic backup.

Room to Grow

Beginning with a hosted solution makes it easier to switch to a traditional SCADA application in the future as their resources grow. Since KISM is built on Trihedral's fully featured SCADA software, customers can choose to end their service contract with Kennedy and

roll out to a full installation at their site if their needs change.

Just as in the backup scenario mentioned above, Kennedy can move the customer's application to an on-site SCADA server. Reasons to change could include greater ability to customize the application in house.

Hosted solutions allow utilities to quickly implement world-class SCADA systems while eliminating the need for extensive infrastructure and IT staff. Customers have peace of mind knowing that their system is always available and supported by a team of dedicated experts. ∎

Thelma Akwei joined Trihedral in 2009 as a marketing coordinator. Outside of Trihedral, Thelma is involved in various volunteer organizations for community development and is currently the public relations and communications officer for the African Diaspora Association of the Maritimes (ADAM) in Halifax, Nova Scotia, Canada. Thelma holds a Bachelor of Commerce degree in marketing and psychology from Saint Mary's University in Halifax.

Ben Manlongat was hired as a controls engineer with Kennedy Industries based in New Hudson, MI. He currently manages the Controls Group for SCADA, PLC, and controls integration projects. In 2010, he led the design, programming, and implementation of Kennedy's new product offering, the KISM Internet Hosted SCADA Solution. Ben holds a Bachelor of Science Degree in electrical engineering from Kettering University, Flint, MI.