Just Add SCADA

A Michigan Integrator's Hosted SCADA Solution helps local utilities achieve world-class monitoring & control systems for less

By Thelma Akwei and Ben Manlongat

The Increasing Need for SCADA

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. These typically include remote monitoring and control hardware such as Programmable Logic Controllers (PLCs) and Remote Terminal Units (RTUs), a communication network (usually radio-based), and Human Machine Interface (HMI) software 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. In this article, Ben Manlongat, a controls engineer with systems integrator Kennedy Industries, Inc., describes how their hosted Internet solution is helping such utilities to quickly achieve advanced SCADA systems that would have been impossible considering the costs of using traditional SCADA architecture.

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.

Ben Manlongat manages the Controls Group for SCADA, PLC, and controls integration projects. According to Manlongat, "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. These are replaced with simple monthly fees for each online site."

Manlongat recently led the design, programming, and implementation of Kennedy's KI Station Master (KISM) Hosted SCADA Solution. They adopted this cloud-based approach to meet the needs of one of their clients, the Michigan Department of Transportation (MDOT). MDOT was considering a SCADA system to monitor and control pump controllers at 160 stations all over Michigan.

As a result of the large number of sites that MDOT wanted to monitor, Kennedy Industries proposed an hosted solution 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 would be installed at a server farm in Michigan.

A detailed pump station screen. For monitoring: well level, well alarm setpoints, pump status, pump setpoints, pump info, station power, communication status, panel temperature, and alarm status. For control: pump control, pump setpoints control, and well alarm setpoints control.
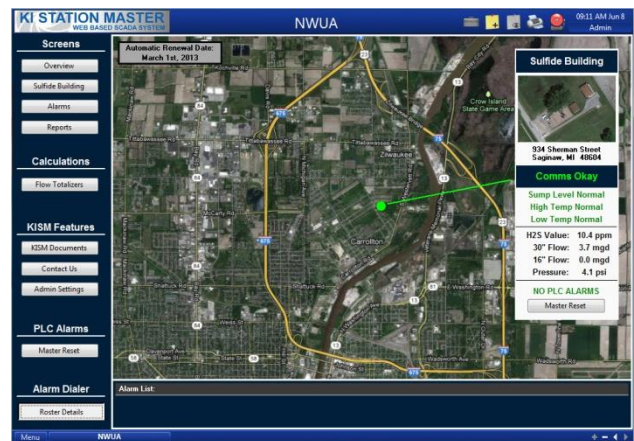
A custom overview screen monitoring a remote building. Features: communication status, alarm status, equipment info. Additional screens: building view, flow totalizers summary, and KISM project document storage on a KISM ftp site.

Kennedy Industries, MI

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. "We selected VTScada™ software from Trihedral because of its robust built-in communication drivers for over a 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. The efficiency of Trihedral's excellent technical and 24/7 support team was also a deciding factor," explains Manlongat.

Installation & 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. Manlongat explained the installation process as follows: "assume a customer has a piece of equipment that cannot communicate with DNP3, Modbus, or any other communication protocol that the SCADA software recognizes, the engineer could 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 remote site is configured as an area within the 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

When asked about the security of their hosted solution, Manlongat affirms, "Kennedy runs their hosted application at a local server farm, which guarantees 24/7 power and Internet connection. For security, we use our 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 for utilities to switch to a traditional SCADA application in the future as their resources grow. "Since our KISM Solution is built on Trihedral's fully featured SCADA software, customers can choose to end their service contract with us 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. "That kind of changeover would only take days." Reasons to change could include greater ability to customize the application in house.

"There are no real disadvantages for customers using an Internet hosted SCADA solution," Manlongat stated. 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. He concluded, "we are very proud of the system we created."
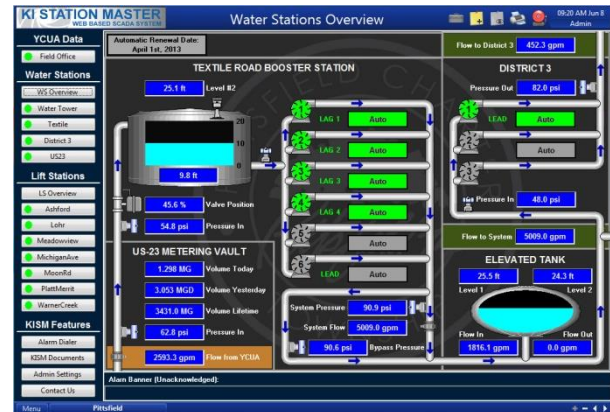
A custom overview screen for monitoring multiple remote sites. The system currently monitors Allen Bradley MicroLogix and SLC controllers across 5 water stations, and MultiTrode MultiSmart pump station managers across 7 lift stations.

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