

# Getting More Efficiency out of your Water SCADA System

Water utilities have been using Supervisory Control and Data Acquisition (SCADA) for many years. A SCADA system's primary function is to monitor and control the conditions of remote assets, such as pump and lift stations, distribution networks, and treatment plants while ensuring data integrity, overall system visibility and security. Due to population growth, water scarcity, regulatory requirements, and aging workforce, water utilities are left to manage expanding service areas with less financial and human resources. Many utilities have a handful of professionals who can manage, maintain, and expand their infrastructure. Doing more with less is becoming a necessity. With the right hardware and software components, advanced, scalable SCADA systems could play a role in assisting water utilities, small and large, to cope with ever changing demands in data collection and reporting.



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## **Intelligent SCADA**

SCADA systems have quickly evolved over the past 50 years from simple tone telemetry to web-centric solutions. SCADA systems were most often used in a reactive manner to identify problems as they occurred and to record system data and events. Increased demand for higher productivity and efficiency has led to a second trend in SCADA where systems are designed and deployed to be more pro-active, supporting extensive data management and security capabilities, in order to prevent problems from happening in the first place.

A third trend that is just emerging in the design and implementation of SCADA systems pushes more intelligence throughout the infrastructure to drive further efficiency by reducing the amount of time and cost required to maintain, adjust, and expand the system. In a sense, an intelligent SCADA system will adjust itself to suit ever-changing demands in data collection and remote monitoring without putting pressure on the utility's technical staff.

The corner stone of such a system is a smart integrated hardware and software solution that is able to detect and adapt to changes as they happen across the infrastructure. For example, bringing a new remote pump station online in a traditional SCADA system would require manual downloading

of the control logic application, customizing the HMI/SCADA host software at the central monitoring station to accommodate the new site, and manually integrating the pump station in all reports. An intelligent SCADA system has the ability to detect the newly added remote controller and automatically download the proper control application, provided that a communication link is available. Using templates, the existing screens and reports can be easily adapted to integrate the new site.

Other daily events such as losing the communication link between the remote controller and the control center would be immediately detected by the remote controller. To mitigate the risk of losing critical data and facing possible fines from regulatory agencies, the controller will log and time stamp data in its non-volatile memory during the time communication is down. Once the communication link is re-established, the controller will automatically upload the logged data to the SCADA host software to populate trend and event files based on actual time of occurrence rather than time of receipt of the data. If the communication loss persists for a longer period of time, the controller may automatically report critical data to an alternate server or even a mobile operator.

Since security is a major challenge in managing critical infrastructure, intelligent field controllers are now capable of encrypting data before it is transmitted over the communication link. The controller can also reject messages from unidentified sources that are not on its 'list of friendly addresses'.

For the past 30 years, **Control Microsystems**  
**has been the leader** in developing intelligent field  
controllers for telemetry, SCADA, and remote asset monitoring.

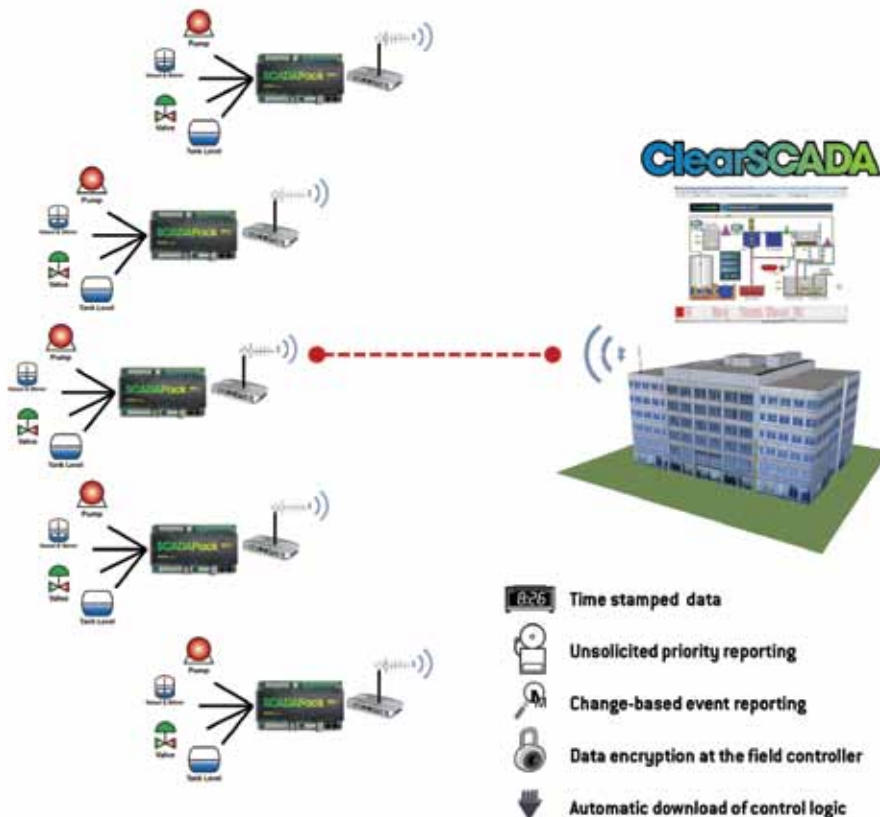
# Is this for Real?

For the past 30 years, Control Microsystems has been the leader in developing intelligent field controllers for telemetry, SCADA, and remote asset monitoring. The Control Microsystems SCADAPack Series of rugged, cost effective, programmable field controllers is designed specifically to operate in harsh remote environments. In recent years, Control Microsystems has expanded its offering to include ClearSCADA, an advanced SCADA Host Software platform. Even though SCADAPack controllers and ClearSCADA software can be integrated with a variety of third party HMI/SCADA software and PLCs respectively, an integrated solution combining the two products drives substantial cost savings and dramatically increases system efficiency.

The SCADAPack E-Series is a line of remote field controllers that has an embedded historian allowing time-stamped

event logging for extended periods of time. Events can be logged in the unit's internal memory and is easily accessible to the user. With multiple serial and Ethernet ports on-board, the SCADAPack E-Series is well-suited for concurrent communications with multiple field devices. It can simultaneously report to several master servers based on user preferences. Additionally, it can share information with other peer units in the field, thereby reducing network traffic to the main server and increasing the system's overall reliability. Control algorithms are developed using an IEC 61131-compliant programming package and downloaded to the field controller remotely over any communication link.

The SCADAPack E-Series uses a secure, standard communication protocol and data transfer mechanism that transfers the data based on priority and event changes. This frees up communication links to be used for other demanding services such as remote asset video surveillance. Data values include data quality flags, a time stamp with



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millisecond resolution to indicate when the event occurred, and a class/priority to indicate how it should be handled by the SCADA host.

To realize the concept of Intelligent SCADA, ClearSCADA was designed from the ground up to manage small and large Wide Area SCADA systems and address critical issues such as unreliable communication links, security, data integrity, and ease of deployment. The product is optimized for low and high bandwidth communication links over public networks, such as dial-up landlines, mobile networks, and WiMAX. It is also well-suited for private serial and Ethernet radio networks. Extensive diagnostics features are available for monitoring the performance of the communication network. ClearSCADA supports main and standby communication links to remote devices for uninterrupted monitoring and control.

Data integrity is maintained across the system as a result of its inherent ability to synchronize historical events in its database after a communication loss with the intelligent field controllers such as SCADAPack E-Series. Since all data is time stamped in the intelligent field controller, less important data can be buffered by the controller until it is convenient for the SCADA host to receive it. In addition, time-stamped data allows the system to tolerate failure of the communication links. Eliminating gaps in data helps users to comply with regulatory requirements by providing accurate reporting and maintaining a high level of data availability.

Multiple security models are available in ClearSCADA. Security is configured to the object level where a wide range of permissions is applied to discrete system points. For example, depending on the permission policies, a group of users may see details on a screen that are not available to another group that has a lower level of security permissions. This level of intelligence and flexibility allows users to offer access to a much larger group of internal and external stakeholders without compromising system security and integrity.

Furthermore, to reduce time-to-deployment and ongoing maintenance, ClearSCADA offers a zero-configuration Web client that is ideal for monitoring and controlling the SCADA system through a standard web browser. All features, including full mimic display support, control and trending capabilities, and alarms and reporting, are made accessible through a secure SSL connection that is managed by security login privileges.

## Conclusion

Water utilities can realize tangible and intangible benefits by deploying intelligent SCADA systems where both hardware and software are tightly integrated leveraging standard protocols and programming environment. Tangible benefits include:

- access to better data quality;
- reduced communication costs or bandwidth utilization in other applications such as video surveillance;
- enhanced system visibility;
- regulatory compliance and reporting; and
- reduced cost of maintaining and upgrading the system.

Improving both customer perceptions regarding the level of service and employee morale by reducing the pressure on the utility's technical staff are some of the intangible benefits that could be realized.

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Printed in Canada ■ V001