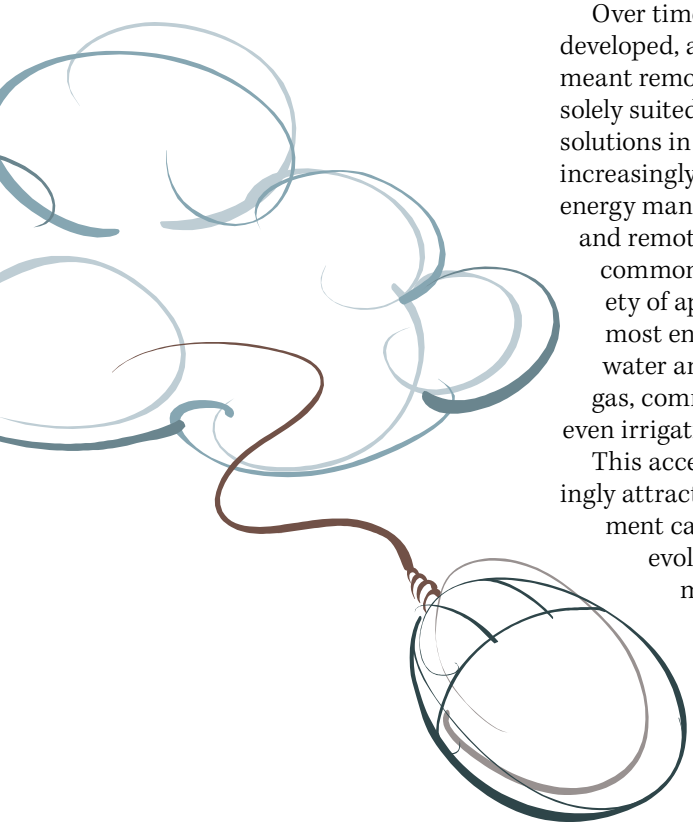
remote monitoring comes of age

By Jack Creamer

Monitoring remote pumping systems in a secure cloud



Evolving remote monitoring technology in the pumping environment is allowing water managers to use increasingly sophisticated tools to measure and optimize pump performance. In the past, for example, monitoring was not often recognized as a crucial function in the closed loop process for optimizing energy management.

Over time, technology was developed, and associated costs meant remote monitoring was solely suited to critical pumping solutions in remote locations. But increasingly, technology trends in energy management have evolved, and remote monitoring is a more common solution in a variety of applications, including most end-user markets such as water and wastewater, oil and gas, commercial buildings, and even irrigation.

This accessibility and increasingly attractive return on investment can be attributed to the evolution of two fundamental technologies with relevance to cost and pricing portions, monitoring needs and location. The first is a SCADA-based system that uses sophisticated software and puts various communications options into play. The second are cloud-based and utility Web-based tools, and communications networks such as cable modems, Wi-Fi, DSL and GSM, among others. Both types of technology play an important role in the pumping world.

SCADA

Remote monitoring technology based on SCADA software is the most commonly used method in remote monitoring. In a larger facility control system, SCADA system remote telemetry typically is one component of a more comprehensive system. In this type of solution, powerful and dynamic software running on PCs and/or servers stores data, generates trends and alarms, updates operator screens, etc. The data generated can be exported to spreadsheets and databases. Furthermore, these types of systems provide a gateway to enhance operational tools.

For instance, pumping data can be combined with data from hydraulic models, GIS, energy monitoring and laboratory information management systems to provide a complete overview on a group of easy-to-use dashboards. Furthermore, the communications options are vast. For years, end-users have used serial-based protocols for communications.

Today, many of these protocols have Ethernet equivalents. Remote monitoring systems can use phone lines, cable modems, DSL, GSM, GPRS, satellite or dedicated radio. The choice depends on the application, geography and system designer's preference. If a dedicated network is used, then the cost for data transmission can be eliminated. This can be advantageous for large systems. Over the years, experience within these systems has shown that remote monitoring has different needs than in-facility data monitoring. To respond to

this a new protocol was created called DNP3 (Distributed Network Protocol). Most traditional protocols are register based and transmit a range of registers regardless of if they have changed. Event sequencing is managed based on when the registers arrived at the host. DNP3 works differently; it only communicates what has changed since the last communication cycle, and when those changes occurred. This provides a means to retain data during communication losses, something that register-based protocols tend to perform poorly.

Furthermore, DNP3 has secure authentication and encryption tools that help address the concerns of cyber security. True remote telemetry units understand the value of DNP3 in remote monitoring and have adopted it. While these systems are powerful, they require dedicated computers, software, field devices, and some form of remote communication. Oftentimes, these need to be updated or maintained over the years to ensure continuous reliability. Cloud-based remote monitoring provides an alternative that has many advantages of its own.

Cloud Computing

As an evolving solution, cloud computing for remote monitoring is an ideal alternative method to the traditional SCADA systems in which software must be purchased, installed and configured into end-users' PCs and tablets. Likewise, access for these traditional SCADA systems also is limited to authorized devices running the software or mobile phone application. The typical business model for cloud computing is to use software as a service by providing authorized users access to application software and databases on cloud servers.

Cloud-based systems allow end-users to monitor remote pumping systems as well as transfer and store data in a high-security Web cloud, which is accessible via any device, anywhere in the world, with nothing more than a Web browser. PS

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