Each time a utility gathers, treats, and distributes water — every time a pump starts, a tank is filled, or a tap is opened — data is being generated and distributed. This paper addresses the issue of how that massive amount of data converts into meaningful information and is then shared with appropriate stakeholders. Such a “smart” water network saves water, reduces labour costs, aids in compliance and security, and ensures superior customer service.
Executive summary

The smart water network takes advantage of real-time data, from pumps, tanks, valves and other vital distribution network points, to automate process control and support real-time operations decisions as needed. It operates with an information management system with open channels that also make operations data available accurately, securely and in a timely manner to business processes across the utility. This enterprise approach not only improves efficiency and effectiveness of treatment and distribution functions, but also supports planning, O&M coordination, customer service, and business office activities.

The monitoring, control and information management solution serving the smart water network is flexible, allowing the utility to integrate the water management technology that creates the specific functionalities it needs, such as energy optimization, demand forecasting, leak detection and water quality management. The utility is the true owner of its system, not obligated to proprietary technology, and invests in only what it needs to realize improvements in its particular processes.

Yet, because it reflects open architecture, this system can be adapted with extensions and system enhancements to continue benefits as the utility’s needs change or expand. This extensibility protects existing infrastructure investments and ‘future-proofs’ the system.

Close examination of water management technology systems in place often reveals the utility can make more of its existing information management infrastructure and realize more smart water network returns.
Introduction

Every time your utility gathers, treats, and distributes water — every time a pump starts, every time a tank is filled, every time a tap is opened — you are also generating and distributing data. In general terms, each and every water management activity creates data that can reveal valuable network operations and business insight.

The challenge is to transform this massive amount of data into meaningful information and transfer it quickly and accurately throughout the utility to all functions and departments that can use it, both within the utility and beyond the utility.

A smart water network not only provides enhanced automated process control, but also can fully process data in real time to yield the meaningful information that can be put to work — to save water and labour costs, optimize compliance and security, and ensure good customer service.
Smart water networks are achieved through information, integration and innovation
Creating a smart water network

To realize a smart water network, the utility must consider:

- **Information:** The large amount of data produced during water network operations presents a great opportunity for making smarter decisions about current processes. But how does the utility optimize today’s operations with today’s information? The answer lies in making the most of existing capabilities, through legacy information systems integration.

- **Integration:** By integrating existing systems, a utility can obtain much more information than if it considers its information tools as individual, isolated systems. This approach fortifies existing systems, ensures past and current investments in information technology, delivers the maximum return, and identifies the most critical areas for potential innovation.

- **Innovation:** A smart water network does not neglect tomorrow’s requirements to achieve today’s needs. A utility can consider its installed base as the starting point for planning future investments, evaluating current assets to identify gaps in both present and future information requirements.
Think in terms of the enterprise

A smart water network builds on new water management technology that integrates well with legacy systems. This approach creates the channels that will make information transformation and flow available to the persons and departments using the existing technology and realize the full potential of all infrastructure investments, past and future.

As a result, information is available to support real-time operations decisions and business processes throughout the enterprise. With a smart water network, the utility as a whole, not just one department or function, benefits from water management system investments.

In other words, the utility that wisely integrates current and new technology water management solutions realizes economy-of-scale returns, improving efficiency and effectiveness not only for the treatment and distribution functions, but also for planning and O&M coordination, customer service, and business office activities.

No single solution

“I see attempts to label certain applications and equipment as the paradigm of a smart water network. They might be a part of the puzzle, but I do not believe there is a silver bullet out there that can resolve or prevent all management problems for water utilities.”

Manuel Parra
Director, Schneider Electric
Water Product Centre
Target the right solution

Every utility is different, so each has different needs. The smart water network incorporates the control and information management solution that provides the tools and information needed, and can adapt to the utility’s processes — and not the other way around.

There is, of course, standard information necessary for effective management of nearly any water utility. Yet, there also are specific challenges that translate to different priorities, and consequently, different information needs.

For example, a water utility that has to pump water from hundreds of miles away and distribute it to a scattered population will most likely have different energy management concerns — and information needs — than a utility that distributes by gravity to a concentrated population.

What is universal to the smart water network: regardless of the management system a water utility chooses, that system must be flexible and open in its architecture so as to integrate as much as possible with the technology base already installed in the utility, and accommodate extensions and system enhancements to meet future needs of the utility.

How does an integrated information management system help the utility to operate more efficiently?

Simply, information from a well-integrated system is accurate, secure, and timely, and helps the utility as a whole make better decisions in less time. The cross-departmental nature of the smart water network even allows the utility to take proactive actions in areas where it was not possible before.

Managing water leaks is a good example, because the occurrence of a leak usually impacts several departments. The utility operating with a smart water network has reliable information that can help prevent leaks and expedite location and repair when they do occur — and save costs and water:

- Real-time information from the supervisory control and data acquisition (SCADA) system alerts the operator about unusual patterns in the minimum night flows for a specific District Metered Area (DMA). Based on this information, hydraulic supervision software helps to confirm an actual leak and the need for action.
- This same real-time SCADA information triggers a review order in the maintenance system, which, in the well-integrated information management solution, is linked to a geographic information system (GIS).
- The GIS query identifies where the problem exists, which course of action will minimize impact on the rest of the network, and notify the control room as to which valves must be closed to isolate the problem.
- Linked with the client database, the GIS identifies the customers who will be impacted, allowing Customer Information Service (CIS) to notify those customers prior to remedial action.
- Integrated with the Enterprise Resource Planning system (ERP), all maintenance activity and even the actual amount of the leak is converted into time and cost information identifying the impact on several performance indicators at a corporate level.
Schneider Electric solutions support processes from the meter to the boardroom

Schneider Electric believes the best way for utilities to establish a smart water network that serves their specific needs is to follow a phased approach:

- First, prioritize issues across the organization
- Then, look at what systems are already in place and what can be done with those systems
- Then, decide what new investments are needed to complement existing capabilities

As logical as this sounds, utilities too often proceed directly to the third phase, without first determining what the enterprise needs and if it is making the most of existing information management infrastructure.

Referring to the previous example of leak detection and response: most water utilities have a control system and a hydraulic model, but how many utilities link these two systems together for real-time leak management? How many link these two systems with a GIS and a maintenance management system for preventive leak management? Further, how many link these three systems to an ERP to know the total cost of their leaks?

Schneider Electric Water Management Suite for smart network control

Designed with industry-standard interfaces, Schneider Electric’s OASyS SCADA system accepts integration with third-party control systems and applications, as well as these popular Schneider Electric operations tools:

- Energy optimization — monitor power consumption throughout the network, and optimize energy costs, reduce carbon footprint
- Demand forecasting — balance supply and demand, using weather forecasts and consumption history and trends
- Leak detection — apply one or more methods best suited for the network
- Water quality management — optimize treatment based on real-time quality monitoring

The open-architecture OASyS SCADA also interfaces with other vital utility systems, such as a Maintenance Management System (MMS), Laboratory Information Management (LIM) system, and geographic information system (GIS) to ensure data accuracy and timely availability for business processes, environmental and quality compliance, and even emergency response.
Schneider Electric solutions support processes from the meter to the boardroom, continued...

The water utility that implements monitoring, control, and information management processes through a suite of modular, integrated solutions will not only see immediate improvements in operations efficiency and security, but also will continue to reap benefits as its needs change or expand. Water utilities worldwide that have adopted Schneider Electric’s approach to open, standardized information management solutions:

- Can upgrade and extend the system easily without costly configuration — ‘future-proofing’ their infrastructure

- Become the true owners of the system, determining which vendors and applications best serve changing needs

- Are not constrained by existing technology in their future business decision making
Conclusion

Smart water networks in a nutshell:

- By automating processes and improving operations efficiency, the smart water network reduces costs, saves water, optimizes security and compliance, and provides better service to all stakeholders.

- Water utilities that adopt Schneider Electric’s approach to open, standardized information management solutions are the true owners of their monitoring and control system and can determine which vendors and applications best serve their changing needs.

- They can upgrade and extend the system easily without costly configuration and are not constrained by existing technology in their future business decision making.
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