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Innovation At Every Level

FUTURE

Yarra Valley Water benefits from mobile SCADA system

Yarra Valley Water's SCADA system allows them to better monitor distributed assets, perform predictive and reactive maintenance, and respond to incidents, such as environmental spills, more rapidly.

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Yarra Valley Water (YVW) is the largest of Melbourne's three water corporations providing water supply and sewerage services to over 1.7 million people and over 50,000 businesses in the northern and eastern suburbs of Melbourne. Its substantial water network spreads over 4,000 sq km, including over 9,000 km of water and 18,000 km of sewer mains. Development in Melbourne's growth corridor to the north is increasing the pressure on Yarra Valley Water to deliver sustainable water solutions.

YVW's 30,000-point SCADA system monitors approximately 550 sites, including 11 treatment plants, 67 water pump stations, over 100 sewer relief facilities, over 96 sewer pump stations, and 102 sewer flow control facilities.

The challenge

YVW was looking to upgrade its legacy system, which was commissioned in 2001. The system had received minimal updates in functionality since that time. It had no graphical interface for mimics and relied on a text and tabular displays to show alarms and current status, with basic graphical trending capability for historical analysis. The system was used largely as an alarm system, from which the control room generated work requests for the field crews. Having no graphical context made finding the information needed time consuming and was not very user friendly.

There was a large reliance on external knowledge and support services for this legacy system, which were largely provided by a single vendor, as the system was not in widespread use.

Yarra Valley Water identified the need to develop a more open and maintainable system with wide industry acceptance for increased future-proofing and to remove the dependence on a single vendor for support. Bringing the support in-house was a key objective.

The new system also had to provide a high level of security, with a secure architecture and current generation security concepts.

Goal

Future-proof the aging legacy system of Melbourne's largest of three water corporations

Story

With a large reliance on external knowledge and support services, Yarra Valley Water needed to develop a more open and maintainable system for increased future-proofing and to remove the dependence on a single vendor for support

Solution

Schneider Electric StruxureWare SCADA Expert, ClearSCADA

Results

- 66% reduction in faults reported
- 80% reduction in external support cost
- Simplified troubleshooting and allowed for condition-based preventative maintenance
- Created ability to generate work orders automatically
- Real-time information collection on the performance and operation
- Streamlined process of dispatching work crews and increasing efficiency

The telemetry communications system was no longer meeting YVW's needs. The system was a mix of analog radio network, NextG, PSTN, and GSM dial-up/dial-in modems, spread across its many sites.

Separate to the SCADA host upgrade works, a parallel project was needed to upgrade the radio network.

The solution

Schneider Electric replaced Yarra Valley's legacy SCADA system with StruxureWare SCADA Expert ClearSCADA, which is Schneider Electric's telemetry SCADA system for the water industry.
Schneider Electric's solution included over 800 detailed schematics for zones and all of Yarra Valley Water sites. The GUI (Graphical User Interface) is a critical aspect of any SCADA system and the "look and feel" of the GUI was co-developed by Yarra Valley Water and Schneider Electric's Telemetry Competency Center to incorporate end user needs and industry best practices.

The completed system comprised a redundant server configured in Main/Standby setup, with the standby server operating from the disaster recovery site. A third level of resilience is provided with a server that can be run in a standalone mode, independent of IT infrastructure.

The SCADA alarm system included alarm notifications and acknowledgment via SMS and email. Concerns over the reliability and timeliness of email and SMS mean they were largely used for less critical notifications. To ensure reliable delivery of alarms to operators using smart phones or tablets, the ClearSCADA Mobile system is used. The ClearSCADA Mobile client requires very little specific configuration to work. Once connected to the main SCADA system it provides a full alarm client interface to allow notification of alarms, viewing of all alarm details, acknowledgement (with comment if desired), and short-term alarm disablement to manage nuisance repeat alarms. Data from anywhere in the system can be browsed so that other statuses can be easily checked by the operator if needed. They can decide how they want to respond to the alarm without having to spend time powering up a laptop and connecting into the system.

Schneider Electric established custom data exchange interfaces between Melbourne Water and YVW that used the format of the legacy system. An application was built to handle the export/import process that exchanges data between YVW and Melbourne Water's database every three minutes, updating over 700 points. This interface has been so successful that it has been extended for use with other systems, and now also exports approximately 1,200 points or about 83,000 values to a third-party leak detection application every hour.

By using the extensive template feature set of ClearSCADA, Schneider Electric was able to deliver a system that any of YVW's approved System Integrators can work on without fear of compromising the integrity of the Host SCADA system. To help achieve this, the Schneider Electric project team implemented a test and development server regime. This offline test and development (T&D) environment allows for offline configuration and testing prior to roll out on the production servers. This ensures the integrity of the operational environment is maintained at all times and that contractors do not need to be granted full administration privileges to access the production system.

YVW is now using the SCADAPack E Series RTUs, where the configuration of the RTU is included in the ClearSCADA objects and can be downloaded to the RTU remotely. YVW has adopted these as their standard RTU to deliver large savings on field system configuration. Templated standard SCADA sites include the RTU configuration. Changes can be made in the SCADA system and downloaded to the RTU remotely, avoiding the need to waste time in travel. This integrated RTU management improves system configuration

"[Before the Schneider Electric telemetry system], we averaged 150 SCADA incidents per month. Within 4 months this had reduced to less than 50... External support costs dropped by more than 50%."

— Roger Brown, SCADA & Control Systems Manager, Yarra Valley Water

"The powerful templating functions in ClearSCADA make it very easy for us to now manage nearly all changes in-house ... and we can configure a new site in the system in minutes. This has allowed us to add functionality such as communications diagnostics to a large number of items."

— Roger Brown, Yarra Valley Water

management for the RTUs, as all changes are tracked and managed in the main SCADA system. With the new system there are no more unidentified changes made on site and there is no longer the potential to lose the RTU code.

YWV also upgraded its communications systems with over 200 Schneider Electric Trio Digital radios and six new radio base stations. This included fully redundant base stations and the capacity to later add diagnostics across the whole network.

As part of the upgrade project, a trial project was undertaken for a sewerage treatment plant to be fully integrated into the main host SCADA system, allowing operators to have full access to their own plant information and also visibility across the whole SCADA system. This allows for better management of the inflow and outflow process. This trial was successful and will ultimately be rolled out to the remaining treatment plants on a programmed basis.

The benefits

Yarra Valley Water staff now have a modern SCADA system that allows them to monitor the distributed assets and perform predictive and reactive maintenance, and be better able to respond to incidents, such as environmental spills, in a timely manner. The user interface and open database tools allow real-time and historical information to be made available to operations and strategic planning staff for informed decision making. Some of the tangible benefits that the project produced include:

Reduced maintenance support cost

- 66% reduction in faults reported (eight months after going live)
- An 80% reduction in external support cost
- Integrated diagnostics from both Schneider Electric data radios and RTUs simplifies troubleshooting and allows condition based preventative maintenance

Powerful alarm capability and mobile data access

- Ability to generate work orders automatically and then send the alarm/work order directly to the maintenance co-ordinators for action
- Ability to escalate alarms if not acknowledged within set times
- Less load on control room operators
- Real-time information on the performance and operation of the system, even while working in remote locations

Business Reporting

- An interface with the customer's existing asset management database was developed to allow for automated work order generation from ClearSCADA alarms, streamlining the process of dispatching work crews and increasing efficiency. This interface also allowed for historic recall of open and closed work orders from within the SCADA environment, previously only accessible externally.

"We have reduced the total number of alarms by more than 40% in six months. This was largely achieved by spending 30 minutes a day addressing the most frequent alarms. We can now use the system to track our alarm performance against the benchmarks recommended in the international alarm standards."

— Roger Brown, Yarra Valley Water

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Innovation At Every Level

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EcoStruxure is Schneider Electric's open, interoperable, IoT-enabled system architecture and platform.

EcoStruxure delivers enhanced value around safety, reliability, efficiency, sustainability, and connectivity for our customers.

EcoStruxure leverages advancements in IoT, mobility, sensing, cloud, analytics, and cybersecurity to deliver Innovation at Every Level including Connected Products, Edge Control, and Apps, Analytics & Services. EcoStruxure™ has been deployed in 480,000+ sites, with the support of 20,000+ system integrators and developers, connecting over 1.6 million assets under management through 40+ digital services.

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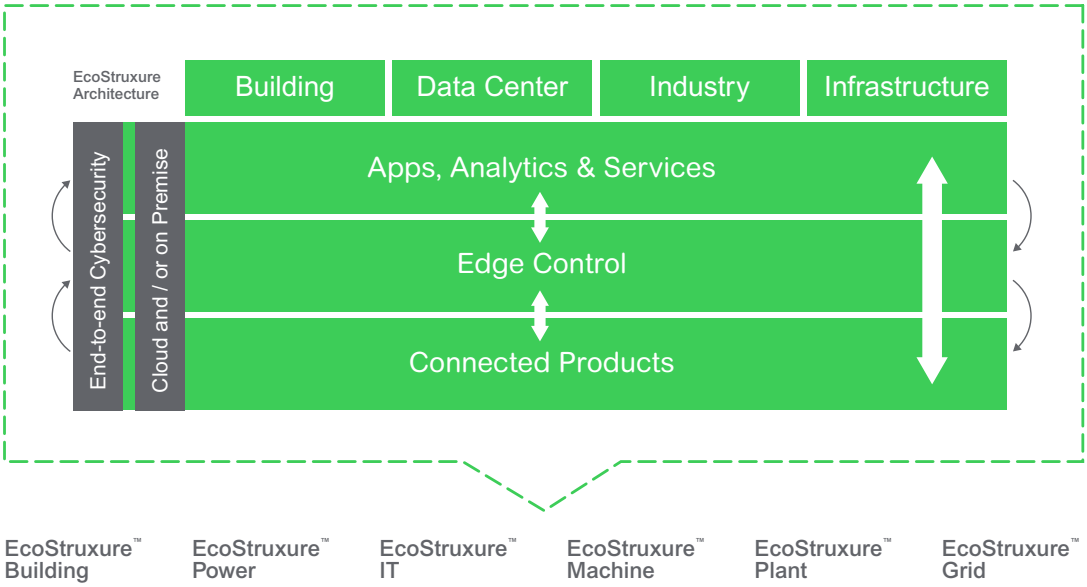

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