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TasWater drives IIoT innovation with AVEVA™ PI System™

TasWater - www.taswater.com.au
Industry - Water

Goals

- Use operations data to identify sewage blockages before they become spills

- Implement IIoT technology and advanced data tools

Challenges

- TasWater oversees one of Australia's oldest sewer networks, which covers mountainous terrain and remote locations

- The system manages many assets relative to population, with 113 sewage treatment plants and 75 drinking water systems

Results

- AVEVA™ PI Vision™ dashboards deliver custom views for key users with detailed, real-time information about individual devices

- Eliminated manual monitoring to check for regulatory compliance

Solution

- AVEVA PI System

In 2017, a sewage spill infiltrated an important Tasmanian nature reserve – with adverse environmental and economic consequences. TasWater, the Australian state's primary water and sewage utility, aimed to prevent similar disasters.

The first step was harnessing the data it had been collecting from its sewage pump stations, using AVEVA PI System and a data-analytics solution to predict blockages before they turned into spills. The solution worked well enough, and if TasWater were an ordinary water utility, the work might have stopped there. But TasWater is not an ordinary water utility. With a passion for innovation and powerful tools from the PI System and Nukon, an AVEVA, partner, TasWater launched a proof of concept (POC) trial to explore the cutting edge of what data and IIoT technology can do for the water industry.

Innovating with IIoT

In addition to its commitment to innovation, there are many distinctive aspects of TasWater. The company manages one of the oldest sewer networks in Australia. Its network spans both urban and remote territories, including an unforgiving mountainous terrain. It manages an uncommonly high number of assets relative to the population it serves, including 113 sewage treatment plants and 75 drinking water systems. Stormwater and sewer systems were historically combined, so TasWater needs to respond to rain events which can easily result in an unusual influx of water into the pipes and pumps.

"Our original use of AVEVA PI System to monitor data at sewage pump stations enabled us to identify which of our stations was involved in a backup," Anthony O'Flaherty, Manager of Data and Analytics at TasWater, said during a recent interview. "However, the pump stations can have 15 manholes between them, requiring us to investigate each manhole to pinpoint the precise location of the blockage. This is time-consuming and introduces safety issues."

The goal of a recent POC was to use a new data set to quickly identify if and where a blockage might be occurring by monitoring the levels underneath particular manholes.

The project, managed by Nukon, involved placing battery-operated IIoT level-sensing devices inside the manholes. If water levels in the sewer main under a particular manhole began to rise, the water would cause the float sensor attached to the installed device to rise as well. This level change would cause a connection within the sensor to close, sending a signal to AVEVA PI System and generating an alert. With these alerts, TasWater would be able to pinpoint the blockage's location between two manholes and take prompt action to prevent a spill.

TasWater used 30 battery-operated, water-proof level detectors from two different vendors in 28 locations for the POC. The company also tested different connection solutions including databases and AVEVA PI System connectors, and multiple communication gateways, including commercial mobile phone networks and private system networks. Once the devices were in place, AVEVA PI System could collect up to 12 to 16 data points per device, depending on the model.

To gain immediate visibility of the 30 devices, TasWater used AVEVA PI Vision templates to create three displays. Users could quickly drill down to dashboards with detailed, real-time information about individual devices. "Once the template was set up, it took about 40 seconds to set up these dashboards," Danny Taylor, Enterprise Historian Specialist at TasWater, said. "AVEVA PI System also enabled us to create multiple visualizations of the data to suit different personas," O'Flaherty added. "So, you're meeting the needs of the engineers, you're meeting the needs of systems specialists and data analysts, you're meeting the needs of the vendors through different data visualizations."

"The biggest benefit of the Enterprise Agreement is the agility you have with AVEVA PI System software components. So, if there are proof of concept projects or training needs, you can stand up the technology and give something a go very easily."
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Anthony O'Flaherty
Manager of Data and Analytics, Taswater

By taking the analytics component from its SCADA system and pulling it into the read-only secure environment of AVEVA PI System, TasWater reduced the cost of the project and expanded the visibility of its data and analytics. "AVEVA PI System and AVEVA PI Vision dashboards enable us to get the information not just to the control attendant, but also the scientists and engineers," Taylor said. "This project, in particular, helps send that clear message to the business that AVEVA PI System exists to help with data and analytics," O'Flaherty added.

AVEVA PI System has also enabled TasWater to make everyday operations more efficient, freeing up time for senior scientists to focus on innovation. One example: critical control point monitoring at wa`ter treatment plants. Previously, a team of eight scientists had to spend half of every Monday logging onto four control systems to look at six parameters at 75 treatment systems to confirm whether TasWater had met compliance regulations the previous week.

The process was slow, and the information came too late. "With AVEVA PI System, we brought the information in, templated it, put it in dashboards with dropdowns for the assets, and added stoplight charting and email notifications – eliminating the need to do manual monitoring," Taylor explained.

Now the scientists just look at dashboards and monitor their emails for notifications about the status of treatment plants, liberating them to do more valuable work. For example, with time now freed-up, one scientist devised a way to send a small, remote-control submarine instead of human divers to inspect water reservoirs.

"By saving time on normal operations, we gave our scientists space and time to innovate. We are shifting labor from data crunching to data analytics across the business," O'Flaherty noted.

By increasing access to AVEVA PI System, TasWater's recent Enterprise Agreement (EA) supports the company's organizational change and digital transformation goals. "That's very key," Taylor noted. "With an EA, everyone in the business can access AVEVA PI Vision. We're not restricted. And there's no limitation on the number of points or tags. I've got half a dozen engineers working in different areas that are doing analytics every day and generating tags." Taylor said. To further streamline everyday business operations, TasWater plans to bring other types of data into its AVEVA PI System including laboratory data, spatial data from the company's Esri ArcGIS system, as well as weather, tidal, precipitation, and other types of environmental data.

Innovation doesn't happen by accident at TasWater. The utility sets aside a portion of its annual budget to enable its scientists, engineers, and data analysts to explore new solutions that offer potential operational, safety, and environmental advantages to Tasmania. As with the IIoT project, these AVEVA PI System-supported POCs are helping TasWater join a select group of companies that are leading the water industry into a pioneering, more data-driven future.

For more information about TasWater and AVEVA PI System,
watch the full presentation here.

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