SOLUTION OVERVIEW

Utilities / Water Treatment

Bringing IT & OT Together in an Ignition Ecosystem

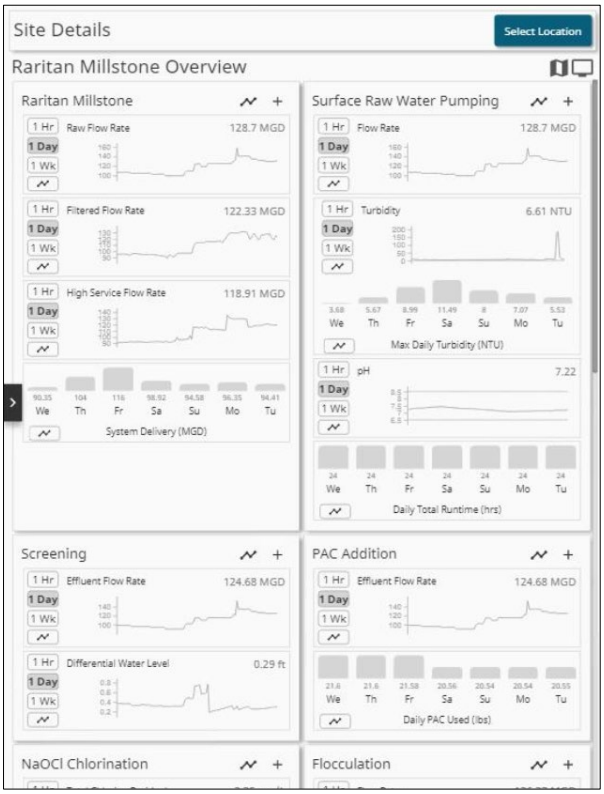
An increasing number of organizations are bringing Information Technology (IT) and Operations Technology (OT) together to assist in business decisions at every level of the organization. American Water teamed up with Flexware Innovation and Automated Controls Concepts (ACC) to create an Ignition ecosystem for SCADA HMI standards, central data collection and visualization, and data integration with backend systems.

The Challenge

The first problem that American Water wanted to solve was the lack of a SCADA HMI standard at each of their sites. American Water has hundreds or water and wastewater plants across the US. Currently, these systems are on different platforms and utilize different types of colors, symbols, etc. for viewing and control of the processes. There needed to be a way to normalize safe and typical operating conditions so that when attention needs to be focused on an abnormal event, the operator has the pertinent information to help make the correct decisions. Mobilization and wider user familiarity with the systems was also desired. However, with different standards deployed at these plants, the end user would need to have familiarity with all the different symbols and styles to be effective in each of these systems.

Another problem that American Water wanted to solve was creating a single portal to view key performance data from of all their plants. To have digital transformation across the American Water organization, there must be a standard way to get the data from the systems to a central location at the enterprise level. American Water had multiple different systems, that contained data for its site or region, so there was no way to get to that data unless you had direct access. Even then, comparing data across systems became a difficult task to perform. There was no central location to get to all the information needed for data-driven business decisions.

Finally, another challenge that American Water faced was bringing in data from external systems such as asset management and Geographic Information System (GIS). American Water needed a platform that not only had the ability to pull operational data up to a central location but also bridge the gap to other organizational information systems. This would allow American Water to further take advantage of the operational data by providing more definition and context that it could provide on its own.



The Solution

To solve each of these unique challenges, Flexware leveraged its existing expertise with the Ignition platform to work through the system architecture, database development and Perspective front-end providing American Water with a system that is robust and flexible for the whole enterprise.

Perspective was used to create a SCADA HMI platform standard for use across all American Water sites. The standard was built around the ISA High-Performance HMI practices to highlight abnormalities in the system and increase operator awareness. Styling, color standards, and theme guides were created to promote a common look and feel across processes, sites, and systems. This allows operators to easily understand new systems due to the commonality. In addition, a library of process objects was created to give legacy system a jump-start to the Ignition conversion and development process.

To create a central place to view the data, an enterprise portal was built. Organizing the data being pulled from the local systems and displaying it in an intuitive way that is easily consumed by end users from multiple disciplines. This portal serves as the single place to consume the data as well as build future site integrations. Because this will be a work in progress, for years to come, there needed to be a way to configure new sites in the portal and have minimal development work to display that data. This was achieved by creating a database backend that would support and drive new additions to the portal. The front end is then dynamically created from that new configuration.

Flexware also utilized Ignition's dynamic capabilities to interface with other systems. Ignition is securely moving operational data, via Cirrus Link's MQTT modules, from the SCADA implementations at the sites to the portal. Data is also being integrated from existing OSI PI servers using Ignition's OPC DA module to communicate directly with that infrastructure. Ignition is using REST API calls to communicate with American Water's GIS system. This system holds the geographic polygons and layers that are associated with each of the systems and sites across American Water. Ignition's integration with this system allows the end user to visually see the various systems on a map and the operational data that is being pulled from them in real-time.

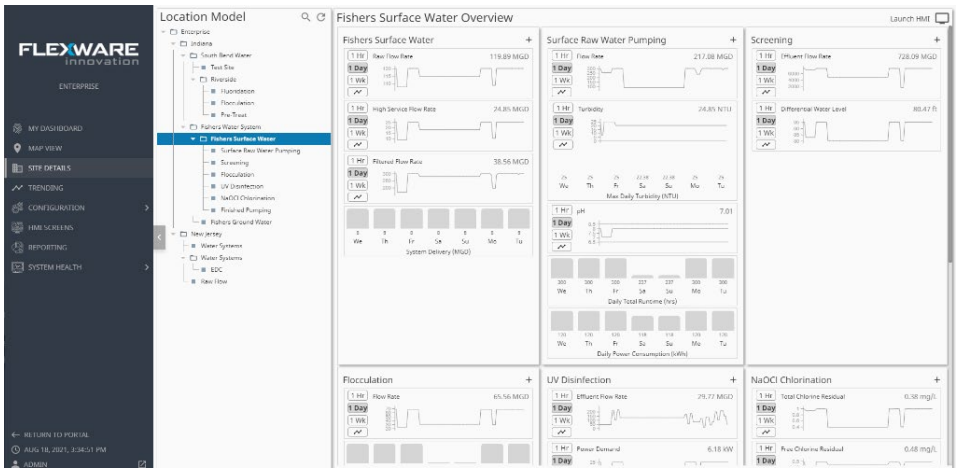
The Outcome

With limited training, the American Water staff has been able to achieve a resolution to each of the problems mentioned above. Several SCADA conversions to Ignition have been executed, or are in flight, using the SCADA HMI platform and standards developed. Data from existing and new deployments is being sent up to the enterprise portal, via MQTT, and organized for consumption. Additionally, the integrations with the other systems have been put into place to give the operational data even more context and drive deeper analysis.

This project is a work in progress. What has been achieved thus far will lay the groundwork for future integrations and more in-depth analysis. As more sites are converted and more data is available, the power of this system will continue to grow. More functionality is under development, to create predictive analysis for when assets are being depleted, in depth alarming at each level of the infrastructure, cost analysis for processes across systems, and more.

Features:

- Perspective SCADA platform
- High performance SCADA standards
- Perspective component library with simulation, symbols, and popups
- MQTT data infrastructure
- Dynamic enterprise configuration with SQL database backend
- Dynamic enterprise portal visualization using Perspective
- Mobile visualization capabilities with Perspective
- OPC UA and DA integrations
- REST API integrations
- EAM module for deploying updates to the production environment
- Scalable Ignition infrastructure



Numbers at the enterprise portal:

- Tags: 35,000+ and growing
- Ignition servers: 24 at the enterprise and growing at the SCADA level
- Clients: (5) load-balanced front-end servers to serve up 100s of Perspective sessions simultaneously
- Architecture: Hub and Spoke/Scale Out Architecture
- Databases: (2) Microsoft SQL Server
- Historical Data logged: Over 3.5 million data points, and growing