Case Study

Agricultural Equipment Manufacturer Enables Predictive Maintenance and Increases Efficiency with MQTT and Sparkplug

A manufacturer of agricultural equipment sought an Industrial IoT solution to help them collect data and use it to implement advanced analytics, predictive maintenance, and ultimately run their facilities more efficiently. They set out to adopt a solution that would accomplish those goals by unifying OT systems and getting the right operational data to their data scientists so it could be used for improved and efficient operations.

Project Goals and Challenges

At the highest level, the agricultural manufacturer was focused on digital transformation to continuously improve efficiency across their many factories. In order to accomplish these goals, they needed to provide the right data to their data scientists in near real-time to perform advanced analytics and enable better business decisions.

They had several facilities with different processes and varied equipment. They had adopted AWS as their cloud solution but did not have a standard way to get the data models into AWS IoT SiteWise.

The customer identified various use cases for the project from predictive maintenance to AI, but the key was to first put the right technology pieces in place with a standardized way to model all plant processes and assets and provide and a single source of truth for OT data. Until these OT-IT integration challenges were solved, their data scientists could not get the full value out of SiteWise.

Solution Requirements

The customer had AWS IoT SiteWise for a few years, which is a managed service designed to collect, model, analyze, and visualize data from industrial equipment at scale. The next step after adoption was to solve their data modeling challenges.

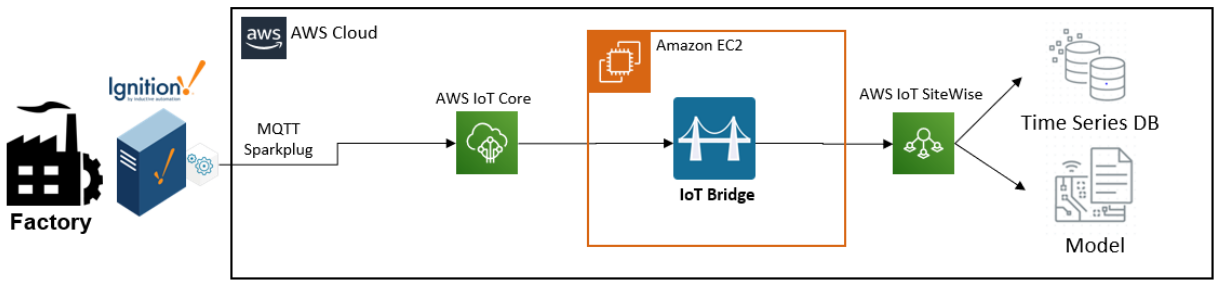
At the foundation they needed a modern SCADA system to maintain, manage and control their OT assets and gather data from them, then interface with SiteWise for further value. They also needed a piece in the middle between the SCADA system and AWS SiteWise to handle the data standardization and data modeling piece seamlessly.

Since they had multiple facilities with various processes and equipment, they needed a solution that could work on-premises, then standardize and send the OT data to a central system for AWS integration across many factories.

Implementation

The customer chose the Ignition SCADA platform from Inductive Automation as the central control system for its high-availability and robust toolset for data acquisition, real-time status and process controls, optimized HMIs, alarms, and analytics. They appreciated the ability to customize the modular solution and powerful visualization tools were also part of the decision.

Cirrus Link Solutions offers MQTT Modules for Ignition to integrate, or push, data from OT to IT. The IoT Bridge for SiteWise, in particular, delivers OT data from industrial applications to SiteWise with minimal configuration and zero coding. Cirrus Link's IoT Bridge for SiteWise was the perfect piece in the middle the customer needed to bridge the OT-IT gap.



The best thing about the solution deployed is the agricultural manufacturer can simply point the Cirrus Link module at the AWS IoT service and the asset model, properties and hierarchy are 100 percent self-discovered by SiteWise. As a result, they can easily connect to OT data, gain access, then start delivering standardized data models in real-time to SiteWise so it can be used for advanced use cases like predictive maintenance and AI.

At its core, the solution is based on the MQTT protocol and Sparkplug B specification. The MQTT protocol is a proven, standard machine-to-machine data transfer protocol that is quickly becoming the leading messaging protocol for Industrial IoT. MQTT was ideal for this use case as a publish/subscribe, extremely simple and lightweight messaging protocol ideal for constrained networks.

Sparkplug B is an open-source software specification that defines how to use MQTT in a mission-critical, real-time environment. The Sparkplug B specification provides the data model needed to define a tag value for use with OT, also providing data to IT, making it 100% self-discoverable and easy to consume.

Results

The agricultural equipment manufacturer is now using Ignition, Cirrus Link, and the MQTT and Sparkplug technology at their local sites to model data at the plant level and then send it upstream. They now have a standardized way to define all of the data models within their facilities so they can publish them via Sparkplug into AWS SiteWise.

Now, with the right OT data in SiteWise, their data scientists can query that data, perform analytics, and power their use cases for improved operations including more uptime, reliability, predictive maintenance, and more.

The real benefit is they have a simple, no-code solution to make this happen seamlessly. OT-IT integration **goals** have been achieved and now the real value can be built on top of the data by the data science team.