Major Industrial Deployment of AI & IoT Applications

Case Background

More than 1900+ gas wells in Origin Energy's Integrated Gas business portfolio are equipped with 50+ sensors each, providing a rich data set of real-time data – over 200 million reads per day. Unifying, analyzing, and deriving operational value from those data, in conjunction with petabytes of data in other siloed enterprise systems, is extremely difficult. To help the enterprise solve this challenge, Origin selected Specture IoT on AWS.

The initial 12-week project was to develop two AI / machine learning applications targeted to achieve specific operational goals:

- Well Equipment Health (Specture Predictive Maintenance): Predict and optimize the run-life of installed Progressive Cavity Pumps based on machine learning models that detect failure parameters and optimize equipment design choices for each well.
- Well Output Forecasting (on the Specture IoT Platform): Predict output of individual wells before drilling commences, optimize well placement by accurately detecting low-producing wells, and identify parameters that maximize well output.

Project results included:

- Single, unified data image with all relevant data: A unified, federated, cloud based data image was built by integrating data from sources including hourly and daily sensor measurements from each well, drilling logs, geology estimates, permeability assessments, well work logs, equipment asset records, among others.
- Single master data schema: Data complexity was overcome through the creation of a single, consistent data schema. Previously, each source system codified individual wells differently or used different terms to refer to similar entities.
- Codification of insights from experienced development and sub-surface engineers: Insights available informally within the organization were captured in an application, resulting in the best response across the organization.
- Data and insights converted into a usable enterprise application with predictive models: A set of integrated analytic modeling, application logic, and visualizations with integration to other enterprise systems, enabled rapid development and deployment of insights to the field.

Since the end of the initial project, Origin has deployed one production application to monitor and recommend optimal sub-surface equipment. Further, Origin has standardized on the Specture IoT Platform for AI and IoT application development – creating a team of data scientists, application engineers, and data architects working with the business to design, build, deliver, and operate the next ten AI and IoT applications for the company.

Together, Origin and Specture IoT have moved from an initial trial to a comprehensive deployment of the Specture IoT Platform to help achieve Origin's operational and cost savings goals.

Project Highlights

- Two production-ready applications built in a matter of weeks
- Hundreds of wells analyzed over three-year period
- Data integrated from 12 disparate source systems
- Structured and unstructured data (e.g., field work logs) processed
- More than 500 machine learning features tested
- Low-producing wells identified resulted in up to 4x increase in predictability over baseline
- Impending failures detected >4-week timescale
- >300-day improvement in pump run life

Center of Excellence Highlights

- Ten developers, data scientists, and data engineers from Origin
- Trained and supported by Specture IoT resources
- Eight to ten applications identified; scoping and delivery underway

About Origin
Origin Energy (ASX: ORG) is the leading Australian integrated energy company. Origin is the leading energy retailer with approximately 4.2 million customer accounts, has approximately 6,000 MW of power generation capacity and is also a large natural gas producer. Origin is the upstream operator of Australia Pacific LNG, its incorporated joint venture with ConocoPhillips and Sinopec, which supplies natural gas to domestic markets and exports LNG under long term contracts.