Internet of Things Enables Smarter Oilfield Operations

Cognizant delivers IoT strategies at major oil services provider

Lower oil prices compel oilfield operators to increase efficiency. The client, a leading oilfield services provider, sought to significantly reduce the costs of pumping oil. The client owns and operates tens of thousands of electric submersible pumps (ESPs) for its global oil-and-gas customers. ESPs are lowered into boreholes to provide artificial lift when underground pressure is too weak to force oil to the surface.

The client periodically needs to reset each pump's motor speed to optimize production. The ideal setting on a given day depends on well conditions, such as pressure and viscosity, as well as market prices. Historically, reprogramming the pump profile required dispatching an engineer to the oilfield --a costly proposition that sometimes requires helicopter travel to a dangerous land or sea location.

To reduce costs, the client wanted to:
- Eliminate trips by engineers and technicians to reprogram pumps.
- Minimize downtime, which can cost hundreds of thousands of dollars in lost production each day.
- Lower infrastructure costs for analyzing pump sensor data --up to gigabytes a day from each pump.

AT A GLANCE

A leading oilfield services provider wanted to reduce operational costs and increase the efficiency of tens of thousands of electric submersible pumps. The company engaged Cognizant's expertise for all layers of the solution: sensors, server infrastructure and analytics.

Cognizant's role:
- Developed software agent to configure pumps over the network.
- Migrated server infrastructure to Microsoft Azure cloud, leveraging IoT-specific services.
- Integrated sensor data with the client's decision-making applications and databases.

Projected results:
- Eliminate the significant time, costs and safety risks of dispatching engineers to remote oilfields to recalibrate or update pump software.
- Reduce the time to identify pump issues from ~15 minutes to a few seconds.
- Enable predictive maintenance, reducing costs and avoiding downtime.
- Build foundation to connect more oil field equipment (oil tankers, crude-oil processing equipment, trucks and even the pipeline) to the Internet of Things.

The Internet of Everything Modernizes Oilfield Operations

The client engaged Cognizant to recommend and implement an Internet of Things (IoT) solution. The client valued Cognizant's expertise with the various components of IoT solutions. Unlike partners that provide IT services only, Cognizant has the skills and resources to develop technology for the ESP sensors, the controller that collects sensor data, Microsoft Azure IoT cloud, and big data analytics.

Cognizant consultants began by conducting an end-to-end analysis of all current systems and processes, identifying opportunities to optimize software, hardware and processes. Based on the analysis, Cognizant engineers developed an IoT solution to efficiently gather sensor information, analyze it to determine optimal ESP settings, and program those settings over the network.

Less Travel and Faster Response to IoT Intelligence

Using the pump software agent that Cognizant developed, the client's engineers can recalibrate pumps over the network instead of traveling to remote oilfields. If pressure readings change, for example, engineers can adjust the motor speed with a few clicks. This flexibility helps the client orchestrate the dozens of pumps in an oilfield to avoid leaving oil behind in hard-to-reach pockets. The same interface enables engineers to configure rules to prevent equipment failure – for example, by shutting down equipment when drill temperature reaches 100 degrees and resuming when the temperature falls to 90 degrees.

Downtime Avoidance

Now the client receives alerts about impending pump failures instead of notifications that a failure has already occurred. Faster repairs and avoidance of breakdowns minimize revenue interruption and increase customer satisfaction. What's more, the client receives fewer false alarms because engineers can remotely change the alarm threshold – raising the temperature threshold on hot days, for example.

Cognizant is now working on a big data analytics solution for predictive maintenance. The analysis might reveal that pump valves tend to fail after they've been cycled on and off 1,000 times, for instance. Replacing the valve before the threshold is reached will reduce downtime. Predictive maintenance also eliminates the cost of dispatching technicians before maintenance is needed.

Cognizant's IoT solution also plays a role in protecting the environment. With real-time awareness of conditions that can signal an impending a leak, the client can dispatch engineers sooner. And if a leak does occur, having a history of pump operations will enable a swift and effective response.

Real-time Information Informs Better Decisions

Cognizant integrated real-time sensor data with the client's other applications and databases using OPC Unified Architecture (OPC UA). Now the client can decide whether to increase or decrease volume based on a mashup of well conditions and current market prices.

Platform for the Future

After completing tests on the first IoT-enabled ESPs, Cognizant will connect an entire oilfield -- and then the tens of thousands of ESPs the client operates worldwide. Cognizant and the client are also preparing to connect more oilfield equipment to the IoT platform: oil tankers, crude oil-processing equipment, trucks, and even the pipeline. Projected benefits range from more efficient fleet management to earlier detection of pipeline leaks or blockages. The client's long-term vision is the "digital oilfield" – connecting people and things from the drill bit to the chairman's office to produce actionable intelligence.

Learn More

To learn more about Cognizant, visit us at www.cognizant.com/internet-of-things or contact us at internetofthings@cognizant.com.

ABOUT COGNIZANT

Cognizant (NASDAQ: CTSH) is a leading provider of information technology, consulting, and business process outsourcing services, dedicated to helping the world's leading companies build stronger businesses. Headquartered in Teaneck, New Jersey (U.S.), Cognizant combines a passion for client satisfaction, technology innovation, deep industry and business process expertise, and a global, collaborative workforce that embodies the future of work. With over 100 development and delivery centers worldwide and approximately 221,700 employees as of December 31, 2015, Cognizant is a member of the NASDAQ-100, the S&P 500, the Forbes Global 2000, and the Fortune 500 and is ranked among the top performing and fastest growing companies in the world.

Visit us online at www.cognizant.com or follow us on Twitter: Cognizant.

World Headquarters

500 Frank W. Burr Blvd.
Teaneck, NJ 07666 USA
Phone: +1 201 801 0233
Fax: +1 201 801 0243
Toll Free: +1 888 937 3277

European Headquarters

1 Kingdom Street
Paddington Central
London W2 6BD England
Phone: +44 (0) 20 7297 7600
Fax: +44 (0) 20 7121 0102

India Operations Headquarters

#5/535 Old Mahabalipuram Road
Okkiyam Pettai, Thoraipakkam
Chennai, 600 096 India
Phone: +91 (0) 44 4209 6000
Fax: +91 (0) 44 4209 6060

KEEP CHALLENGING™

Cognizant