Integrated monitoring solution helps major energy company improve safety and profitability

Capgemini develops a new platform to deliver reduced downtime, improved maintenance efficiency, and better environmental protection

The oil and gas industry faces consistent pressure to meet demand for safely generated fuel. While fulfilling the needs of their customers, these organizations also seek to minimize the environmental impact of oil extraction and refinement. At the same time, energy companies are always exploring new ways to reduce fuel production costs and maintain continuous operations. This balancing act means that modern oil and gas producing businesses must embrace new approaches and technologies to remain at the forefront of their industry.

A leading European-based energy company sought to do just that by using the latest hardware, software, and Internet of Things (IoT) devices to monitor oil refining systems.

Success Story Overview

Customer: Leading European energy company

Industry: Oil and gas

Location: Europe

Client challenge:

- A European energy company wanted to reduce fuel production costs while optimizing continuous operations

Solution:

- The company deployed a wireless, XIoT-based real-time loss detection, asset monitoring, and predictive maintenance system

Benefits:

- Faster leak identification reduces fuel loss
- Easier and faster deployment of new services
- Improved employee safety and reduced risk
- Increased manufacturing ROI

Finding needles in the haystack

Oil refining systems involve a complicated and extensive combination of physical infrastructure and chemical technologies.

Monitoring every element of the infrastructure for potential anomalies creates significant challenges. Visual inspection of refining systems can reveal apparent issues that need maintenance.

Finding the exact location of a leak in a vast network of piping is difficult. Without advanced monitoring in place, diagnosing, finding, and remedying the problem can require days. In addition to the potential workplace hazards that escaped gases can pose, the loss of fuel products – and the possible revenue loss associated with it – create a supplemental business challenge.

The energy company wanted to lead the industry in efforts to reduce the risk of carbon-based atmospheric fuel leaks. To accomplish that, it needed much better monitoring approaches so that maintenance personnel could address issues more rapidly and prevent unexpected and costly downtime. The corporation turned to Capgemini to develop an innovative solution that addressed all of its requirements and aspirations.

Designing an integrated monitoring system

Capgemini engineered a real-time loss detection and asset monitoring system that supplements the client's existing solution. The Capgemini solution adds IoT devices, backend systems, monitoring software, and cloud-based services for more in-depth insights.

Temperature sensors assist in detecting leaks. Other IoT devices, such as pressure sensors and vibration-detecting accelerometers, were added to provide more monitoring data for comprehensive analysis. The combination enabless the system to scrutinize refinery infrastructure for any deviations from normal operations that might indicate a future problem and a need for preventive maintenance.

The use of wireless connectivity among devices eases deployment of new services and reduces solution costs. Because the solution hosts multiple IoT types, new sensors deploy quickly in a "plug and play" fashion.

The solution also enables comprehensive reporting via a unified dashboard, which can be accessed from desktop computers or handheld devices. It features the ability to record and maintain accurate historical data that can be fed into machine learning algorithms to improve process development over time.

Simplifying risk management

Protecting the refinery against both internal and external threats represents another vital consideration of the new monitoring system design.

An environment involving combustible fuels under pressure always poses the potential for safety risk. The IoT network instantaneously determines where leaks occur and ensures appropriate actions for needed repairs and adjustments. It also helps maintain employee safety as part of complying with certifications and regulations.

External security represents another mandatory element of the broader solution. Should a malicious party identify vulnerabilities in the refinery's infrastructure, sensitive machinery or software could theoretically face exploitation. Therefore, Capgemini implemented security layers at all levels of the monitoring solution to protect critical systems and meet ANSSI-certification requirements.

Substantial return on investment

The refinery's capital expenditure for the Capgemini solution offers long-term ROI. Since the monitoring system helps increase uptime and avoid operational delays, it pays for itself by maximizing gas output and minimizing customer service interruptions. Identified leaks are addressed more rapidly than ever before, so the company also avoids revenue losses and the environmental impact associated with escaped fuel.

A future-ready, open solution

When designing the monitoring system, Capgemini sought to make the solution as future-proof as possible to maximize its client's investment. The solution involves industry standard devices alongside open source APIs and software. The agnostic system can, therefore, tap cloud-hosted Software as a Service (SaaS) from a variety of providers including Amazon Web Services, Microsoft Azure, or Google Cloud.

While Capgemini's solution thrilled the energy company since it addresses their mission-critical needs today, the company also anticipates longer-term benefits. The system's extensibility offers the refining company enhanced capabilities to deploy new services, extending the value of their customer-centric operations and creating new revenue streams.

Developing the IoT-based analytics and monitoring system was in part the result of Capgemini's work with Intel to develop an end-to-end solution for tracking the asset lifecycle. Intel's proven hardware, software, and security ecosystem, including Intel gateways and XIoT framework, enable the system's underlying architecture.

These Intel ingredients, in combination with Capgemini's industry experience, XIoT middleware, and analytics capabilities, create a fully integrated system. The result is a customizable, secure, end-to-end IoT platform solution, available as-a-service and ready for deployment within a variety of industries.

Find out more

To learn more about the ways Capgemini solutions can increase your mission-critical infrastructure's reliability, operational efficiency, and performance, please contact your region's Capgemini representatives and visit: https://www.capgemini.com/service/energy-internet-of-things/

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