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Heavy equipment manufacturer enhances global IIoT deployment with CloudRail

Case Study

Customer

The customer is one of the largest manufacturers for heavy equipment. The US-based company is listed in the Fortune 500 and operates factories all over the world.

Challenge

The customer aimed to digitize both their products and factories using technologies such as Industrial Internet of Things (IIoT) and Machine Learning. While this strategy proved highly successful for their products, the factories continued to operate with numerous manual processes and limited data insights.

Data acquisition on the shop floor was highly complex due to heterogeneous technologies and diverse communication protocols. Each IIoT project demanded extensive customization by IT and OT experts, resulting in significant costs. Additionally, the bespoke machine connectivity services did not meet the customer's stringent IT security requirements. These challenges hindered a large-scale IIoT rollout.

Solution

Recognizing the need for a scalable, secure IIoT connectivity solution that could be implemented without extensive customization, the customer began evaluating various technologies available in the market.

Given their cloud strategy is built on Amazon Web Services (AWS), the IIoT solution needed to seamlessly integrate with this platform. The customer discovered that many providers, particularly large automation vendors, offered suitable hardware but failed to address their software requirements.

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Solutions were mostly closed OT ecosystems that did not align with the AWS-based strategy of a global enterprise. Alternatively, edge gateways required significant project-based development and customization by experts.

Furthermore, none of these solutions met the scalability and IT security requirements of a global enterprise.

Eventually, they found CloudRail, a comprehensive platform designed for industrial cloud connectivity, enabling seamless integration of shop-floor data with IIoT applications. The customer tested the solution in an initial Proof of Concept (POC) at one of their German factories. Within less than a day, a planned material flow optimization project based on CloudRail and AWS was successfully implemented. Subsequently, they expanded this use case across multiple lines and factories globally. Additional IIoT use cases, such as Condition Monitoring and AI-based Predictive Quality, followed shortly thereafter.

CloudRail has joined Belden's Automation Solutions (AS) business, which includes prominent brands like Hirschmann, ProSoft Technology, OTN Systems and Lumberg Automation. The combination of CloudRail's strengths in data acquisition and cloud connectivity with Belden's expertise in industrial networking and edge computing creates a comprehensive networking infrastructure solution. This synergy enhances automation and digitalization efforts, providing seamless connectivity from sensors to the cloud.

Results

By leveraging CloudRail, the customer reduced the realization time for various IIoT use cases from multiple weeks to just hours. This was achieved through CloudRail's Plug&Play functionality, which ensures a standardized rollout process for both retrofitting legacy brownfield equipment and connecting new machines via OPC Unified Architecture (OPC-UA). The customer reported that this standardized rollout process for machine connectivity to AWS services accelerated implementation by a factor of 20.

While the equipment is installed by maintenance staff at the shop-floor level, the devices are provisioned centrally by the customer's Tier-2 IT support. All edge devices and sensors are managed and monitored via the cloud-based CloudRail Device Management Cloud by a centralized IoT competence center. These factors enabled the customer to quickly introduce a variety of IIoT-enabled use cases and scale projects vertically across multiple global production sites.

CloudRail met the customer's stringent security requirements with features such as end-to-end encryption, Trusted Platform Module (TPM), and built-in firewalls. Additionally, it offers the ability to centrally roll out remote firmware updates across the entire fleet of edge devices.

Moreover, the CloudRail solution integrated seamlessly into existing IT systems, such as the internal Public Key Infrastructure (PKI). Since CloudRail integrates with all relevant AWS IoT services, the full functionality of AWS is leveraged, ensuring long-term compatibility through frequent updates.

As CloudRail technology significantly reduces effort and implementation time, the Return on Investment (ROI) for many IIoT projects improved considerably. Furthermore, the rapid rollout of IIoT ecosystems using this scalable solution enables customers to achieve their digitization objectives efficiently.

About Belden

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