



Unlock the Power of Industrial IoT

eBook



PARTNER
AWS IoT Core
Delivery

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ABSTRACT

In this eBook, we will discuss Innova's partnership with one of the leading global fastener manufacturers in their transition from on-premises to Amazon Web Services (AWS) and how it resulted in a shift to a cloud platform, reduced machine downtime, and improved operational efficiencies globally.





DAWN OF A NEW ERA IN INDUSTRIAL DEVELOPMENT

The convergence of technologies, from the physical and digital to biological spheres, marks the beginning of the fourth distinct era of industrial development since the 18th century.

The growth rate of digital transformation in the manufacturing sector accelerated rapidly during the pandemic, enhancing

the focus on self-management, efficiency, and productivity. This growth helped manufacturers attain flexible, customer-centric production while reducing operation and maintenance costs within the industry.

When manufacturing clients move from on-premises solutions to cloud

platforms as part of their digital transformation drive, the journey often begins with an application lift-and-shift. This involves software deployment with minimal modification, and for many organizations, it can serve as the first step in an eventual move towards a cloud-native solution.

DEVELOPING AN INDUSTRY 4.0 STRATEGY

To begin, Innova collaborated with the client to review their existing Industrial Internet of Things (IIoT) solutions and recommended the replacement of on-premises technology with a scalable, modernized solution. The proposed [IIoT solution](#) can be leveraged across different AWS regions, making on-demand data accessible anywhere in the world.

With plans to expand its portfolio of fastener products, the client decided to deploy a multi-year “Industry 4.0” strategy (a nod to the fourth industrial era) with Innova Solutions to digitize their manufacturing plants worldwide. The collaboration focused on the development of contemporary industrial solutions that leveraged IoT, cloud, and

other emerging technologies to gain real-time insights from each plant’s machinery and create smart production facilities.

Initially, the client had around 50 programmable logic controllers (PLCs) operating at one of the target facilities and required a new communication system to connect them.

During the discovery phase, we worked with the client to develop an IIoT strategy that encompassed the entire gamut of their worldwide manufacturing operations. While one of their manufacturing plants had begun implementing an IoT solution and was gathering data, scaling up the solution was a challenging activity.

The manufacturer was utilizing an on-premises solution to improve the plant’s operational efficiency, which posed risks and demanded the relocation of data from on-premises to the cloud, despite the absence of a standard architecture to deploy the IIoT technologies.

The manufacturer would require considerable support from different technologies; the risk to deploy, operate, and support IIoT initiatives would have increased with a deployment failure, resulting in a global level loss, near real-time view of its manufacturing metrics. Thus, the manufacturer needed a well-defined, enterprise-wide standard architecture to implement the Industry 4.0 strategy.

The key components involved in the initial design of the solution were:

- Data normalization at the edge
- Ingestion
- Visualization
- Long-term storage
- Implementation of Solution

Below are the three major focus areas we identified before implementing the solution:

- Transfer of existing on-premises IoT solutions to the AWS Cloud and providing real-time information on the status of machines with operational equipment efficiency (OEE) performance metrics.
- Collaborating on innovation with the Center of Excellence on Processes (COEP) to develop a new framework based on the initial IoT implementation on AWS.
- Creation of a planning guide/playbook that includes the automation scripts to help the COEP readily deploy new instances of the IoT environment at other locations as well.

During the initial stage, the focus was on retiring the on-premises solution and identifying the appropriate IoT gateway

software to communicate with various types of installed PLCs. From KEPware, [KEPServerEx](#) was identified as the IoT gateway to communicate between machines and AWS.

In the [AWS IoT Core](#) service, Innova first set up a device in Things under the Manage heading. It also utilized a device data endpoint (REST API endpoint in the Settings section).

We have Mosquitto broker and Node-RED services on the edge server inside a Docker container. The data collected from PLCs of multiple vendors is sent to the KEPServerEx, which unifies the collected industrial automation data into a single source. KEPServerEx is configured to transmit data to the Mosquitto broker.

The Node-RED service running in the Docker container is configured to listen to the Mosquitto broker at port 1883. At this point, users should get the incoming message from KEPServerEx. They can also configure Node-RED to perform raw-data transformation and forward the message to the AWS IoT Core endpoint by specifying the message topic. A secured connection can be established with AWS IoT Core using the correct certificates and keys.

The edge gateway software routes the data from the tagged PLCs to AWS IoT Core. Each time the rule is triggered, Innova uses rules in the [AWS IoT](#) service to query the message and forward it to Amazon Kinesis. Innova has approximately 24 hours of retention setup in [Amazon Kinesis](#), and the contents will be exported to an [Amazon Simple Storage Service](#) (Amazon S3) bucket via Kinesis Data Firehose.

For visualization, the data stored in the S3 bucket is then queried by [Amazon Athena](#), which offers a means to Grafana to provide interactive visualization of near real-time machine status thus fulfilling the OEE metrics requirement.

The deployment of Industrial IoT will provide executive leadership and plant operators with invaluable near real-time manufacturing plant floor visibility. In the event of a disaster or network outage, Innova will use local historians as a cache. Since the backup can be retrieved, a local historian stores data in local storage (hard drive), helping reduce the risk of data loss in the cloud.

The COEP has adopted the installed framework as a blueprint to leverage for their other manufacturing plants as well.



SUMMARY

Modernization of the manufacturing industry began with the introduction of machinery and continued with the use of PLCs and manufacturing execution systems (MES). Today, the industry strives to become more resilient by investing in digital transformation efforts such as cloud computing that enables the fulfillment of customer demand on a near real-time basis.

To achieve these objectives, manufacturing companies are shifting from on-premises IT infrastructure to a cloud-based solution. This helps

minimize significant human and capital infrastructure costs while facilitating remote monitoring, data modernization, and advanced analytics.

By collaborating with Innova Solutions to develop and implement a customized digital transformation strategy, the manufacturing client increased its resilience and agility. The transition to AWS reduced the machine downtime, improved plant efficiencies at a global level, and decreased the overall IT expenses as well.



ABOUT INNOVA SOLUTIONS

Being a leading global information technology, consulting, and business solutions organization, [Innova Solutions](#) has positioned itself as a trusted partner to mid-market and enterprise clients worldwide in their digital transformation journey for over two decades.

Innova Solutions' industry-based domain expertise and passion for innovation, combined with the power of technologies in Cognitive Sciences, Cloud Computing, Data Sciences, Product Engineering,

Robotic Process Automation, Machine Learning, and blockchain have helped clients envision, build, and run their businesses more efficiently.

Innova Solutions is an AWS Advanced Tier Services Partner participating in the APN Immersion Days, Public Sector, and Managed Services Provider (MSP) programs. It also has a recognized AWS IoT Core Service Delivery Program, demonstrating its strong commitment to and expertise in AWS IoT Services.


ADDITIONAL RESOURCES

[Cloud Edge IoT Solutions from Innova](#)

[Innova Solutions partnership with AWS](#)

[Industrial IoT Solution on AWS - A presentation](#)

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