Lightbend

reflek.io

French startup reflek.io aims to transform manufacturing efficiency with an innovative digital execution platform that enables companies to track, manage and optimize assets. By creating 'digital twins,' reflek.io empowers companies to progressively transform legacy systems, reengineer business processes, and streamline working practices, with the addition of real-time intelligence and global systems analysis.

reflek.io Helps Renault Group Transform its Global Manufacturing with its Akka-based SaaS Digital Twin Execution Platform

The Need

For industries such as manufacturing, energy, raw materials, agriculture and logistics that manage large sets of complex assets in multiple locations, the ongoing globalization, digitization and acceleration of the economy are creating enormous challenges. Increasingly, companies must respond in real time, adjusting production levels to match changing demand and to avoid supply chain ruptures and control energy and carbon footprint.

Over the decades, waves of computerization have created digital discontinuity in many large organizations. For example, automotive manufacturers typically use five or six major applications to manage the vehicle production cycle from design to delivery, each with their own view of the world and their own way of representing physical assets. Any time the business wants to modify a system, it typically also has to adjust every other system in the chain, which is slow, costly and disruptive.

When these systems were first deployed, they met business needs within the technical constraints of the time. Two things have changed: firstly, manufacturing is undergoing a profound business transformation with numerous paradigm shifts. Secondly, new technologies are bringing new business opportunities.

Jean-Philippe Le Roux, CEO at reflek.io, says, "In many industries, the key systems offer only a fragmented view of information, which for today's integrated global operations is not good enough. Replacing systems is often risky, disruptive and expensive, particularly in the case of industrial technologies, and many companies have found themselves trapped by cost or complexity."

The Challenge

Renault Group operates one of the largest numbers of factories in the world compared to its peers. Like many other large manufacturers, it was suffering from digital discontinuity: legacy manufacturing systems exchange data in relatively opaque and inflexible ways, and integration with the new world of digital tools is far from ideal. In addition, several systems were no longer covered by support contracts from their vendors and the employees responsible for them were approaching retirement age.

Looking to accelerate and optimize production through innovation in manufacturing, yet without the risk appetite or the budget to rip out and replace existing systems, Renault Group approached reflek.io to help it make a quantum leap and reinvent operations on top.

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Jean-Philippe Le Roux
CEO, reflek.io

The Solution

reflek.io provides a SaaS platform between the cloud and the edge. This platform provides digital execution twins that can be seen as real-time APIs of reality. Each industrial object is reflected in a reactive, event-driven digital execution twin. The twin serves four purposes: building real-time digital services (MES, MRP, Documentation, Logistics), real-time analytics (graph and big data), OT/IT convergence, and generative AI. The core of the platform is a digital-twin service called Quantum Asset, which is built on the Akka framework from Lightbend. Akka uses the Actor Model to enable highly concurrent, distributed and resilient message-driven applications.

"I didn't consider anything else but Akka," says Jean-Philippe Le Roux. "Specifically, the Actor Model is ideally suited to creating digital twins of execution that provide a real-time, accurate mirror of objects and processes that can interact with their counterparts in the real world."

reflek.io's vision was to model, through interactive digital twins, the entire complex ballet of dynamic relationships between physical assets in the factory.

Jean-Philippe Le Roux explains: "We model everything – cars, robots, operators, spare parts, areas and buildings – in natural language to create a full picture of the entire factory and all its real-time operations. Renault Group can then see what was supposed to be done and what needs to be done next, combined with the status of each machine, and with the identity, location, and CO2 and energy consumption."

To fit the global operation models of manufacturing companies such as Renault Group, reflek.io needed a fully distributed environment that can run across the continuum from on-premises to cloud, and this is precisely what Akka Distributed Cluster technology enables. "Our digital twins need to be available in any location and to be moveable from place to place," says Jean-Philippe Le Roux. "Akka gives us this capability, and makes it easy for us to push data to different platforms."

The Results

Thanks to reflek.io's digital twin SaaS platform and services built with Akka, Renault Group has entered the industrial metaverse, gaining a real-time digital replica of its distributed factories and extended supply chain. By populating the simulated ecosystem with production data, the company can close the information and execution gaps that currently exist between its legacy applications.

"Essentially, what we're doing with our SaaS platform at Renault Group is breaking down the silos between infrastructure, execution and analytics," says Jean-Philippe Le Roux. "We recreate a layer of digital continuity starting from the legacy systems, enabling Renault Group to provide valuable use cases while decommissioning the shopfloor's critical systems step by step. We model processes and assets in natural language so that they can work together seamlessly. This drastically simplifies the application landscape."

Digital twins enable Renault Group to reinvent and rebuild its business logic. reflek.io provides a next-generation development framework that combines serverless, no OPS and generative AI, making development costs marginal. By abstracting the physical complexity of factories, reflek.io makes it easy to identify bottlenecks, recombine processes, optimize operations, and then share knowledge seamlessly with colleagues around the world.

"We see this as creating a new type of manufacturing, which we call reactive lean," says Jean-Philippe Le Roux. "By giving complete information to people on the factory floor, we empower them to continuously improve. At the same time, Renault Group can instantly see the accurate status of everything in all factories. For companies with complex, distributed manufacturing operations, legacy equipment, and code that is hard to change, reflek.io running on Akka provides a way to transform rapidly and non-disruptively."

The solution also helps Renault Group ensure compliance with manufacturing best practices and sustainability regulations, because all real-world activities are reliably recorded and stored in the digital twins. "It's easy to enrich the digital twins with information such as the cost or the carbon footprint of each operation," says Jean-Philippe Le Roux. "You can then roll up the information to see the picture for the entire factory. This kind of granular information is extremely hard to access today, yet it is essential if companies are to achieve continuous improvement."

For Renault Group, a key benefit of reflek.io is that it enables a steady, low-risk, low-cost migration from existing systems and processes. The solution provided immediate value while enabling Renault Group to keep iterating toward its vision of the future. On the financial side, accurate real-time views of the consumption of vehicle parts will potentially translate into millions in annual savings by enabling the company to hold reduced inventory.

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> CEO, reflek.io

The digital twins built on Akka make it easier for Renault Group to assess manufacturing operations and make optimal decisions in a timely manner that reduce costs and increase quality. With real-time monitoring and traceability of key parameters, Renault Group can also plan better and adapt faster to disruptions in the broader supply chain.

Jean-Philippe Le Roux concludes: "Working with Lightbend continues to be a great experience - their technical expertise is extremely high, which gives us confidence to serve high-level customers like Renault Group. What's more, Akka's technology works perfectly, allowing reflek.io to focus on the high-level business of helping our customers innovate to improve efficiency and accelerate manufacturing."

Visit **Lightbend** to learn more about **Akka Platform** and our other product and service offerings.

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