CAF achieves digital transformation of predictive train maintenance

LeadMind uses advanced analytics to monitor fleets and reduce train lifecycle costs

"We're going to deal with automating activities without the need to send anyone to check fleets or a specific train. We will use the digital twin to take a practical approach: Feed engineering with real data to better operate and maintain."

— Javier de la Cruz,
Managing Director, CAF

CAF manufactures, maintains, and operates trains and provides services for the entire mobility ecosystem. It uses advanced analytics to decrease lifecycle costs and improve the availability, reliability, and condition of its trains. The company offers an innovative digital solution to get its customers the best performance from their fleets and maintenance efforts.

Historically a train manufacturer, Spain-based CAF now offers comprehensive digital solutions for infrastructure, operations, and maintenance. Its unique LeadMind platform provides these services underpinned by advanced analytics for visualizing fleet status in real time and optimizing the maintenance plan based on the real condition of the train assets.

LeadMind, built on Spotfire® software, uses analytics, the cloud, and all the data from onboard sensors to create over 20 analytics applications to maximize train operations and optimize maintenance. CAF's digital platform integrates data from the train ecosystem and then automates maintenance and operational processes, ultimately enabling its railway customers to achieve massive cost savings.

152%

EXTENDED LIFECYCLE OF TRAIN COMPONENTS

100+

TRAINS MONITORED WITH LEADMIND GLOBALLY

20+

ANALYTICS APPLICATIONS

powered by aws

Overcoming operational excellence challenges

With increasing worldwide customers and infrastructure costs, CAF was committed to optimizing its services to meet its customers' growing needs. The company wanted to help its railway operation and maintenance customers achieve operational excellence through agile decision-making with the aid of real-time analytics. In turn, its railway operators are improving relationships with their customers by providing more reliable, cost-effective railway transport.

Furthermore, the train industry has been facing major consolidations in recent years, resulting in increased market competition. CAF met the competition by modernizing its architecture, allowing fast deployments of its services.

The company required a highly adaptable analytics platform to adjust to a variety of deployment conditions: different types of trains and mission profiles, and environmental constraints such as rainy areas and deserts. Each condition can affect a train's lifecycle differently. To save costs and avoid unnecessary delays, CAF wanted to optimize parts, including wheel lifespan, one of the most expensive train components.

Cloud-based transformation

The company chose to start building its solution natively in the cloud. Built upon a foundation including AWS (EC2 & Athena) and Spotfire solutions, LeadMind was created to provide condition-based and predictive maintenance services to help railway operators improve costs and fleet performance.

CAF

CAF is a railway industry leader, offering one of the most comprehensive and flexible arrays of products in railway related markets, such as rolling stock, components, infrastructure, signaling and services.

Acquiring Spotfire through the AWS Marketplace gives CAF the flexibility for quick expansion when needed with a pay-as-you-go opex hosting model. It can also onboard new customers faster and easier—all while avoiding upfront costs and contracts. A full cloud solution allows CAF to provide standard and custom maintenance analytics to its global customers so it can optimize maintenance with real-time data, which means app updates are always available to customers immediately upon deployment. LeadMind's multi-tenant platform, built within the AWS cloud, ensures all customer data remains private and secure. To top it off, this data is available anywhere, anytime via interactive dashboards.

Safe, reliable, and on-schedule transport

Thanks to its new advanced analytic and data visualization platform, CAF can use real-time insights to automate tasks, improve delivery times, reduce costs, and provide personalized services to each of its customers. Its Digital Services unit helps clients reduce costs by proactively mitigating the risk of out-of-service trains. The company's clients now benefit from easy-to-use visually interactive analytic dashboards developed to bring deeper insights, discover patterns in railway performance, and identify relationships between infrastructure and customer fleets.

The powerful combination of timely data, engineering expertise, and best-in-class cloud technology allows CAF, through its Leadmind platform, to provide comprehensive solutions for delivering excellent service. With Spotfire, LeadMind excels at helping customers provide safe, reliable, and on-schedule transport for millions of passengers worldwide.

Javier de la Cruz, managing director at CAF Digital Services, explains what's on the horizon for automation: "We're going to deal with automating activities without the need to send anyone to check fleets or a specific train. We will use the digital twin to take a practical approach: Feed engineering with real data to better operate and maintain."

The success of CAF's LeadMind platform has helped them secure more than 30 projects within the last three years in 12 countries, optimizing fleet operation and maintenance to fleets such as Zaragoza Tram, Actren, Metro Chile, and SAR, among others. As an example, its reputation landed an impressive contract to install real-time remote monitoring for Northern, the biggest train franchise in the UK. More than 100 trains in the fleet will be monitored with LeadMind, and the company looks forward to expanding its global reach even more.

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