

CAF Digital Services Optimizes Train Performance with TIBCO Spotfire and the AWS Cloud



Executive Summary

Based in Spain, [CAF](#) provides comprehensive transit solutions across the entire mobility ecosystem, including the manufacture, operation, and maintenance of trains. CAF Digital Services was formed to bring the benefits of advanced analytics to CAF customers: decreased lifecycle costs and improvements in train availability, reliability, and safety. [LeadMind](#), CAF's digital platform built on [TIBCO's Spotfire](#) software and powered by [AWS](#), uses analytics, the cloud, and data from onboard sensors to optimize train performance and solve technical problems in real time, extending the lifecycle of specific train components up to 152 percent, reducing the overall cost of ownership, and improving the experience for passengers, who in the EU traveled more than 416 billion kilometers in 2019.¹

Fighting rising costs and increasing competition with advanced analytics

Faced with the challenges of rising infrastructure costs and an increasingly competitive environment resulting from major consolidation in the railway industry, CAF focused on developing a solution that would provide its customers with agile decision-making capabilities using advanced analytics. To respond to a variety of deployment conditions, including different types of trains with different mission profiles operating in different environments, CAF required a highly adaptable analytics platform that could also handle massive amounts of data in real time. LeadMind has positioned CAF as an innovative industry leader, providing its customers with the tools needed to visualize the status of their fleet, optimize maintenance based on real conditions, and ultimately achieve significant cost savings.

LeadMind: Combining the strengths of CAF, TIBCO, and AWS

The LeadMind platform brings together the industry expertise of CAF, the immersive visual analytics capabilities of TIBCO Spotfire, and the cloud computing strengths of [AWS Elastic Cloud Compute \(EC2\)](#) to create a unique digital solution. LeadMind uses Internet of Things (IoT) technology through [AWS IoT Core](#) to collect performance data from train-based sensors. [Amazon Kinesis](#) then ingests the IoT data in real time and sends it to [Amazon Redshift](#), which functions as a data warehouse. Spotfire uses the data stored in Redshift to create easy-to-use visually interactive dashboards and predictive analytics capabilities that provide CAF customers with actionable insights into train performance. By acquiring TIBCO through the AWS Marketplace, CAF has the purchasing flexibility to expand as needed, allowing the company to onboard new customers quickly and easily. And, because LeadMind is built within the AWS cloud, app updates are immediately available, customer data remains secure, and that data is available anytime, anywhere.

¹ Railway passenger transport statistics - quarterly and annual data, November 2020. <https://ec.europa.eu/eurostat/statistics-explained/pdfscache/7066.pdf>



About CAF Digital Services

CAF Digital Services offers comprehensive digital solutions to optimize the reliability, safety, and performance of trains using advanced analytics to visualize fleet status in real time and provide predictive maintenance services.

“With train control and monitoring systems, we’re dealing with milliseconds and thousands of variables. That was something only TIBCO Spotfire could support.”

**- Javier de la Cruz,
Managing Director,
CAF Digital Services**

“With AWS and TIBCO, we’re able to support 25 to 30 different clients all over the world with only two employees. That’s something we couldn’t do with our on-premise solution.”

**- Javier de la Cruz,
Managing Director,
CAF Digital Services**

“Before we started using TIBCO Spotfire, it took up to 45 days to onboard a new client. Now we can configure our platform and have a new client up and running in only five or six.”

**- Javier de la Cruz,
Managing Director,
CAF Digital Services**

Reducing maintenance costs and extending lifecycle

Because LeadMind was built on Spotfire’s “hyperconverged analytics” approach, which seamlessly combines visual analytics and data science, CAF customers have unprecedented access to their data and the insights that data can provide. For example, when an alarm is detected, customers can drill down from the perspective of their entire fleet to a specific train, and from there to a specific car and a specific component on that car. Within six clicks of a button, they can understand both the complete picture and every detail and then use that understanding to troubleshoot problems in real time and detect when further maintenance is needed. As a result, customers have reduced their maintenance costs by 10 to 30 percent, depending on the age of their fleet, and extended the life of wheelsets, one of the most expensive train components, by 152 percent.

Improving operational efficiencies and internal decision making

The LeadMind platform also offers CAF significant internal benefits that have resulted in substantial cost savings and operational improvements. According to Javier de la Cruz, Managing Director, “because TIBCO implemented Spotfire through a Software as a Service (SaaS) model, CAF has been able to reduce the number of employees required to maintain the system from five down to only two.” In addition, the time to diagnose a failure has been reduced by a third because CAF engineers have both current data at their fingertips as well as several years of historic data to provide valuable background and context—no longer does a CAF employee have to physically travel to a train site with a laptop to download hundreds of gigs of information. Further, with over 200 internal users of LeadMind, more CAF employees are now making decisions based on the best available information gleaned from years of data and multiple use cases, ranging from energy consumption and passenger counting to issues of safety.

Driving global market expansion and industry leadership

As CAF seeks to expand its presence in the highly competitive railway industry, LeadMind has been a key differentiator. Over the last three years, CAF has secured more than 30 new projects in 12 countries, including a contract to install real-time remote monitoring for Northern, the largest train franchise in the UK, along with projects in Saudi Arabia and Australia. While the railway industry is historically conservative and generally slow to adopt new technology, the proven reliability, speed, and security of the AWS cloud, coupled with Spotfire’s powerful analytics and CAF’s engineering expertise, have positioned LeadMind as the go-to solution for railway companies around the world looking to provide safe, reliable, and on-schedule transport for their passengers.

About TIBCO

TIBCO Software unlocks the potential of real-time data for making faster, smarter decisions through tools like Spotfire, which uses immersive dashboards and advanced analytics to empower actionable insights.

