

LEAP RAIL



Leap Rail provides a flexible platform for streamlining operating room management through artificial intelligence, workflow automation, and patient, physician, and staff engagement. Leap Rail's AI-driven tools offer a comprehensive solution to these challenges. By delving into the hidden layers of data within hospital systems, Leap Rail can provide intuitive, actionable insights.

Innovative Healthcare AI Startup Leap Rail Builds on Akka to Transform the Operating Room with Advanced AI

Executive Summary

Leap Rail is an innovative startup targeting advanced healthcare organizations, including surgery centers, operating rooms, and similar facilities, to help them manage and extract value from their data. The modern operating room (OR) is filled with sophisticated medical equipment and electronic medical records (EMR) systems, all of which generate significant amounts of data. Despite this abundance, many ORs need help in leveraging their data effectively. The challenge lies in the extraction, compilation, and analysis of this data to support decision-making that can drive efficiency, optimize resources, and enhance profitability.

Leap Rail's mission is to deliver a distributed, cloud-based application to simply and reliably collect and utilize the data. To do so, the Leap Rail developer team turned to Akka as a foundation for its solution, enabling the small team of developers to quickly bring to market a world-class solution that meets the stringent standards of today's OR.

The Challenge

Operating rooms generate massive amounts of data daily, ranging from patient records and surgical outcomes to equipment usage and staffing schedules. This data, embedded within EMR systems, ERP platforms, and other medical technologies, holds the potential to transform healthcare delivery. Leap Rail's team had designed the ideal solution to provide an intelligent data aggregation and analysis tool, but it required an outstanding framework to serve as the bedrock of its innovation. Leap Rail's solution set out to address the common pain points faced by ORs, including:

- **Data Silos:** Information is often scattered across various systems and departments, making it difficult to compile a comprehensive view.
- **Manual Data Extraction:** The process of extracting relevant data is manual, time-consuming, and prone to errors.
- **Lack of Real-Time Insights:** Without real-time data analysis, decision-makers rely on outdated information, leading to inefficiencies and delayed action plans.
- **Complex Data Interpretation:** Even when data is available, interpreting complex datasets requires specialized skills that may not be readily available in every OR.

“If you’re coming from a different mentality of software development, Akka is worth learning because it unlocks massive productivity gains and it allows our developers to work in completely separate realms while still collaborating towards a common goal.”

Shayan Zadeh, CEO, Leap Rail

In building a system capable of overcoming these obstacles, Leap Rail had multiple requirements for the foundation of its new platform. First, they needed a framework that would facilitate large amounts of data in a fast and efficient way. Second, they wanted an architecture and environment that was event-oriented. Finally, this platform foundation needed to be flexible enough to integrate with the diverse set of solutions found in modern ORs but could also run reliably and not fail. This last ingredient is critical, as this solution has the potential to impact patients’ physical well-being.

Based on its experience building distributed applications, the developer team knew that Akka could meet each of these requirements.

The Solution

The Leap Rail core development team had built distributed applications with Akka and used almost the entire complement of Akka modules to build their solution.

By leveraging Akka, Leap Rail had:

- **Flexibility and Customization** – Each OR has very specific needs and a unique set of data sources. Leap Rail’s solution is designed specifically to adapt to each individual environment.
- **Fault Tolerance and Resilience** – The system needed to operate flawlessly, so Akka was an ideal solution. Akka applications automatically restart failed components, ensuring availability – critical to Leap Rail’s distributed application platform.

- **Simplified Concurrency** – Processing of messages sequentially, avoiding the complexity of managing thread synchronization and locking mechanisms typically found in traditional concurrent programming.
- **Modularity and Loose Coupling** – Akka-based applications make it easy to maintain and modify.

The Results

Akka allowed the Leap Rail team to quickly create a system capable of supporting a diverse set of healthcare organizations with resiliency and reliability. According to their founder and developer lead, Shayan Zadeh, without Akka they *would have needed 20 times the number of developers and almost five times as long to build the system.*

With Akka as its foundation, Leap Rail’s solution is capable of scaling to serve any number of customers with complete reliability for the foreseeable future. Akka’s persistence capabilities ensure that all data changes within the application are durably stored, providing a reliable system of record that can withstand failures and recover gracefully.

Most importantly, Akka serves as the bedrock of a system that is helping improve patients’ lives by extracting important insights from ORs worldwide.

Visit [Lightbend](#) to learn more about [Akka](#) and our other product and service offerings.
