

From Legacy to Leading-Edge

Transforming the Fleet Management System for a Fortune 100 Telecom Provider

Client: VZ, May 2024

Background:

Our client, a prominent Fortune 100 telecom provider, offers a comprehensive fleet management service that integrates both hardware and software solutions. The hardware component includes advanced cameras and vehicle tracking units, which are essential for real-time fleet monitoring and driver safety operations. The accompanying software facilitates various critical functions such as tracking fleet locations, ensuring driver safety, and managing fleet operations efficiently.

Despite the robust nature of the hardware, the software component faced significant challenges due to its reliance on an outdated technology stack and inefficient architecture. The system was originally built on a legacy .NET backend with a monolithic architecture, which over time, became a bottleneck for performance and scalability. This outdated framework struggled to keep up with the evolving demands of the business and the increasing expectations of its users.

Business Problem:

The client's fleet management software comprised several key modules—order management, activation, and report generation—that were built on a legacy .NET backend and monolithic architecture. This outdated system led to several issues:

- **Slow Activation Process:** Activating a single device took between **8-10 seconds**, a delay that hindered scalability and negatively impacted client onboarding processes. This inefficiency was particularly problematic for large-scale deployments where multiple devices needed to be activated simultaneously.
- **Inefficient Order Management:** The slow and unreliable order management module prevented efficient order processing and tracking.
- **Poor User Interface:** A cluttered and unresponsive UI made it difficult for system managers to monitor device status and resolve issues, resulting in poor customer service and reliability.

Users Impacted:

- **Wholesale and Retailers:** These users depend on the fleet management service to track the movement and delivery of goods and supplies. Efficient tracking is critical for their operations, as delays or inaccuracies can lead to significant disruptions in supply chain logistics. The outdated software's slow response times and inefficiencies directly impacted their ability to monitor fleet status and ensure timely deliveries, affecting their business operations and customer satisfaction.

- **System Managers:** Employees of this telecom client responsible for managing and maintaining the fleet management system. Their role involves overseeing the activation of devices, monitoring system performance, and resolving issues as they arise. The cluttered and unresponsive user interface, along with the inefficient backend processes, made their job more difficult, reducing their productivity and the overall reliability of the fleet management service.

Approach:

To address these challenges, the telecom provider engaged Creospan Inc. for a comprehensive modernization project. The goal was to overhaul the system by migrating from the legacy .NET backend to a modern SpringBoot-based microservices architecture and upgrading the frontend to React.

Solution Implemented:

- **Architecture Transformation:** Migrated from a monolithic architecture to a microservices-based architecture, enhancing scalability and maintainability.
- **Backend Modernization:** Transitioned from .NET to SpringBoot, implementing over **25 microservices** to handle different functionalities like device activation, order management, and report generation.
- **Frontend Modernization:** Upgraded the frontend from a cluttered, unresponsive UI to a streamlined, responsive React-based interface.
- **Performance Optimization:** Improved internal microservices and API connections with external carriers like AT&T and native carriers like Verizon, reducing device activation time **from 8-10 seconds to 2 seconds**.
- **Enhanced Communication:** Utilized **Camunda BPMN** for better communication between developers and business units, facilitating more efficient development and deployment processes.
- **Improved Reporting:** Enhanced the device report generation system, allowing system managers to fetch detailed reports based on criteria such as time range, activation status, and ESN (Electronic Serial Number).
- **Order Management Overhaul:** Modernized the order management module to ensure reliable and efficient order processing and tracking.
- **Messaging System Upgrade:** Introduced a combination of **Kafka and Amazon SQS** messaging systems to improve inter-service communication and enable asynchronous operations.
- **Monitoring System Enhancement:** Replaced the Splunk monitoring system with a much more robust and holistic monitoring system called the **ELK stack (Elasticsearch, Logstash, Kibana)** for better system performance and reliability.
- **Security and CI/CD:** Implemented BlackDuck for security vulnerability monitoring and JFrog for a secure CI/CD pipeline.

Tech Stack:

- Backend: SpringBoot, MSSQL, Kafka, Amazon SQS
- Frontend: React
- DevOps: GitLab, Jenkins, JFrog
- Monitoring: ELK stack (Elasticsearch, Logstash, Kibana), BlackDuck
- Communication: Camunda BPMN
- Cloud: AWS

Benefits:

- **Increased Operational Efficiency:** Device activation time was reduced from 8-10 seconds to 2 seconds, resulting in a **75-80% improvement in activation speed**. This significantly enhanced the client onboarding process, allowing for quicker and more efficient service deployment.
- **Enhanced User Experience:** The modern, responsive UI led to a **40% increase in user satisfaction scores**, as measured by internal feedback from system managers. The streamlined interface improved the ease of monitoring device status and resolving issues.
- **Scalability and Maintainability:** The transition to a microservices architecture facilitated better scalability and easier maintenance. This architectural change **reduced downtime by 30% and improved system reliability**.
- **Improved Communication:** The implementation of Camunda BPMN improved the communication between business units and developers, leading to a **25% increase in project delivery speed and efficiency**.
- **Robust Monitoring:** The ELK stack provided a comprehensive and holistic monitoring solution, reducing system downtime by 20% and enhancing overall system performance and reliability.
- **Order Processing Efficiency:** The modernization of the order management module resulted in a **35% increase in order processing speed and reliability**, directly impacting customer satisfaction and operational efficiency.

Overall Impact:

The modernization project had a significant positive impact on the client's operations. The faster activation process and improved user interface led to higher customer satisfaction and better service reliability. The efficient order management and robust reporting capabilities enabled system managers to perform their tasks more effectively, ultimately contributing to the overall success of the fleet management service.

Next Phase:

The next phase involves continuous monitoring and optimization of the system, incorporating user feedback to further enhance the software's performance and usability. Additionally, the team plans to explore the integration of advanced analytics and AI capabilities to provide predictive insights and further improve fleet management operations.