Innovative Enterprise Integration: Microservices, RPA, and Event-Driven Architecture

ORGANIZATION

Our client is a leading provider of innovative construction services to the electric utility sector in the Northeastern United States. They support diverse clients, including regional electric cooperatives, renewable energy EPCs, and major investor-owned utilities. Renowned for its expertise and reliability, the company specializes in constructing, maintaining, and modernizing electric distribution systems, substations, and transmission lines. Their commitment to efficiency, sustainability, and digital transformation drives their competitive edge in the energy industry.

CHALLENGE

The client sought a strategic IT partner to design and implement a scalable, future-proof integration solution leveraging modern architecture.

The primary objectives included:

- Seamlessly consolidating data from multiple disparate systems to provide a unified and intuitive user experience.
- Automating the movement of vehicle engine hours and mileage data from Samsara to ManagerPlus via APIs.
- Integrating Sage with ManagerPlus, despite Sage lacking API support, requiring an ODBC-based integration approach.
- Addressing the lack of interfaces in the target application to efficiently receive key business documents, with a 6-12 month timeline for interface development.
- Ensuring a resilient, real-time, and event-driven integration strategy to support operational efficiency and scalability.

TECHNICAL SOLUTION

XTIVIA conducted an in-depth assessment of the client's existing IT ecosystem, conducted detailed discovery sessions, and collaborated closely with stakeholders to architect a high-performance integration framework. The solution leveraged modern open-source technologies and a microservices architecture to achieve agility, scalability, and seamless interoperability.
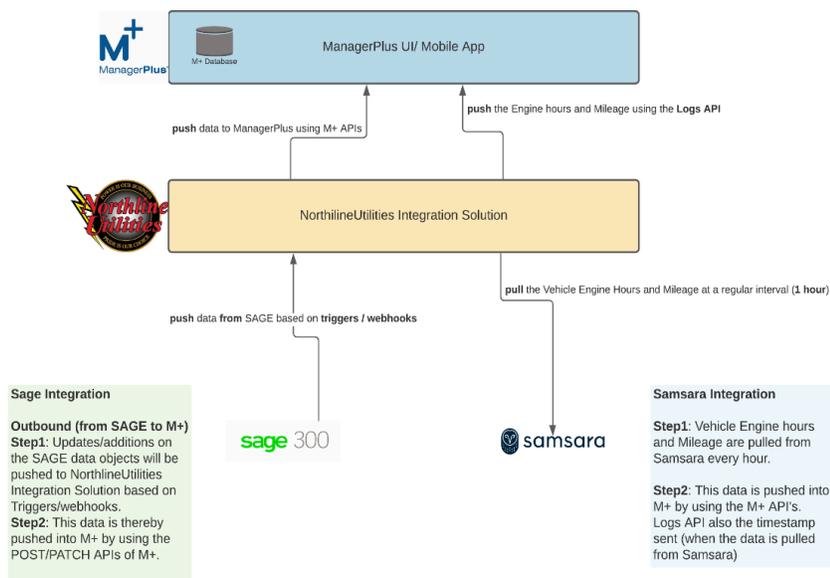
Solution Highlights:

- **Microservices-Driven Architecture:** Developed independent microservices to abstract each system (System API) and separate integration microservices, ensuring modularity, reusability, and scalability.

- **Spring Boot for Microservices Development:** Implemented robust, lightweight microservices using Spring Boot, ensuring high performance and easy deployment.

- **Spring Integration for API and Message Orchestration:** Leveraged Spring Integration to seamlessly integrate Samsara and ManagerPlus via APIs, enabling real-time data transfer of vehicle engine hours and mileage.

- **Spring Batch for ETL and ODBC-Based Integration:** Utilized Spring Batch to extract, transform, and load (ETL) data from Sage via ODBC and synchronize it with ManagerPlus, ensuring seamless financial data consolidation.

- **Asynchronous Processing and Event-Driven Workflow:** Integrated Kafka-based messaging to enable asynchronous communication, ensuring real-time event processing and reducing system dependencies.

- **RESTful APIs for Secure and Scalable Communication:** Designed API gateways for secure access to system data and optimized RESTful endpoints to facilitate external system interactions.

- **File-Based Automation for Document Processing:** Since the target application did not support direct PDF uploads, XTIVIA leveraged RPA with Selenium libraries to build an automated document ingestion solution that picks PDF files from the filesystem and uploads them via the UI, eliminating manual intervention and improving efficiency.

- **Agile and DevOps Practices:** Adopted an iterative, agile development approach with continuous integration and deployment (CI/CD) pipelines to accelerate release cycles and improve code quality.

XTIVIA

High-Level Design of NorthlineUtilities and ManagerPlus Integration Solution

ManagerPlus UI/ Mobile App
M+ Database

push data to ManagerPlus using M+ APIs

push the Engine hours and Mileage using the **Logs API**

NorthilineUtilities Integration Solution

push data **from** SAGE based on **triggers / webhooks**

pull the Vehicle Engine Hours and Mileage at a regular interval (**1 hour**)

Sage Integration

Outbound (from SAGE to M+)
Step1: Updates/additions on the SAGE data objects will be pushed to NorthlineUtilities Integration Solution based on Triggers/webhooks.
Step2: This data is thereby pushed into M+ by using the POST/PATCH APIs of M+.

sage 300

samsara

Samsara Integration

Step1: Vehicle Engine hours and Mileage are pulled from Samsara every hour.

Step2: This data is pushed into M+ by using the M+ API's. Logs API also the timestamp sent (when the data is pulled from Samsara)

BUSINESS RESULT

With XTIVIA's expertise in microservices-based integration and open-source technologies, the client now benefits from:

- **Seamless Real-Time Data Synchronization:** Vehicle telemetry data from Samsara and financial data from Sage are now integrated into ManagerPlus without manual intervention.
- **Future-Ready, Scalable IT Ecosystem:** The modular microservices approach ensures easy onboarding of new integrations with minimal development effort.
- **Operational Efficiency & Cost Savings:** Automating manual processes, including PDF file uploads and data synchronization, has reduced administrative overhead and accelerated decision-making.
- **Enhanced User Experience & Data Accessibility:** Field technicians can instantly access vital backend system data, improving operational responsiveness and service delivery.
- **Improved Compliance & Reporting:** Automated data movement and centralized visibility ensure compliance with industry regulations and enable better reporting capabilities

By modernizing its integration landscape with cutting-edge technologies, XTIVIA has empowered the client to achieve unparalleled efficiency, agility, and digital transformation in their operations.

KEYWORDS

Microservices Architecture, Spring Boot, Spring Integration, Spring Batch, API Integration, RPA with Selenium, Event-Driven Architecture, ODBC Connectivity, Automated Data Synchronization, CI/CD Pipelines, Agile Development, Kafka Messaging, Digital Transformation, RESTful APIs, Open-Source Technologies, Enterprise Data Automation, Electric Utility Integration, Document Processing Automation, System API Abstraction, ManagerPlus Integration, Samsara API Integration, Sage ERP Integration

SOFTWARE

Spring Boot, Spring Integration, Spring Batch, Zuul API Gateway, Apache Kafka, Selenium, ODBC, JSON, Spring Batch, Docker

ABOUT XTIVIA

At XTIVIA, we've provided IT solutions and consulting services for over 30 years. We offer a wide range of services, including technology assessments, IT service and asset management, software development, data analytics, cloud migration, DevSecOps, ERP, and enterprise content management. Our team of experts is dedicated to each discipline, ensuring that our clients receive the best possible service. We've partnered with industry leaders to bring our clients the latest solutions. Through strategic acquisitions, we've acquired talented people who are experts in their industries, passionate about what they do, and committed to providing exceptional service to our clients. Whether you need to improve your IT infrastructure or implement new software solutions, XTIVIA is here to help you achieve your business goals. Contact us today to learn more about our services.XTIVIA has offices in Colorado, New York, New Jersey, Texas, Virginia, and India. www.xtivia.com