

# POS Transformation: Accelerating Retail Success with Microservices and Complex Event Processing

## ORGANIZATION

XTIVIA's client is a prominent supermarket chain operating over 340 stores across the United States and Mexico. With over 100,000 employees, the client serves a diverse customer base, including a specialty organic and fine foods segment. The supermarket is committed to providing accessible locations, superior customer service, a broad product range, and competitive pricing. The client's overarching goal is to enhance customer satisfaction and drive increased referrals, positioning itself as a leader in digital product strategy and delivering innovative customer experiences.

## CHALLENGE

The client's existing Point of Sale (POS) solution was significantly hindering their ability to provide personalized customer service—a critical aspect of their business strategy. Additionally, the solution was limiting their ability to differentiate in-store services in a competitive retail landscape.

### Key issues included:

- **Scalability Issues:** The centralized analytics system struggled to handle peak transaction loads of 70–90 million daily POS events and an average of 1.6 million sales orders per day.
- **Inefficient Cashier Metrics:** The Items Per Minute (IPM) algorithm, designed to measure cashier performance, was inconsistent and unreliable, leading to potential mismanagement of resources.
- **Slow System Performance:** Store and cashier services were sluggish, and the cache engines required up to four hours to refresh during maintenance, contributing to significant delays.
- **Backlog of Strategic Initiatives:** To stay competitive, the client needed to address several priorities:
  - Detect fraudulent transactions in real time.
  - Implement product recommendations to boost sales.
  - Offer digital receipts via mobile and email for convenience.
  - Identify VIP customers and enable real-time notifications to store managers for enhanced service.

The client needed a comprehensive solution to modernize their POS system and streamline operations to meet their customer service and business objectives.

## TECHNICAL SOLUTION

XTIVIA implemented a sophisticated, event-driven Microservice, REST API solution that transformed the client's POS ecosystem and enhanced both in-store and online customer

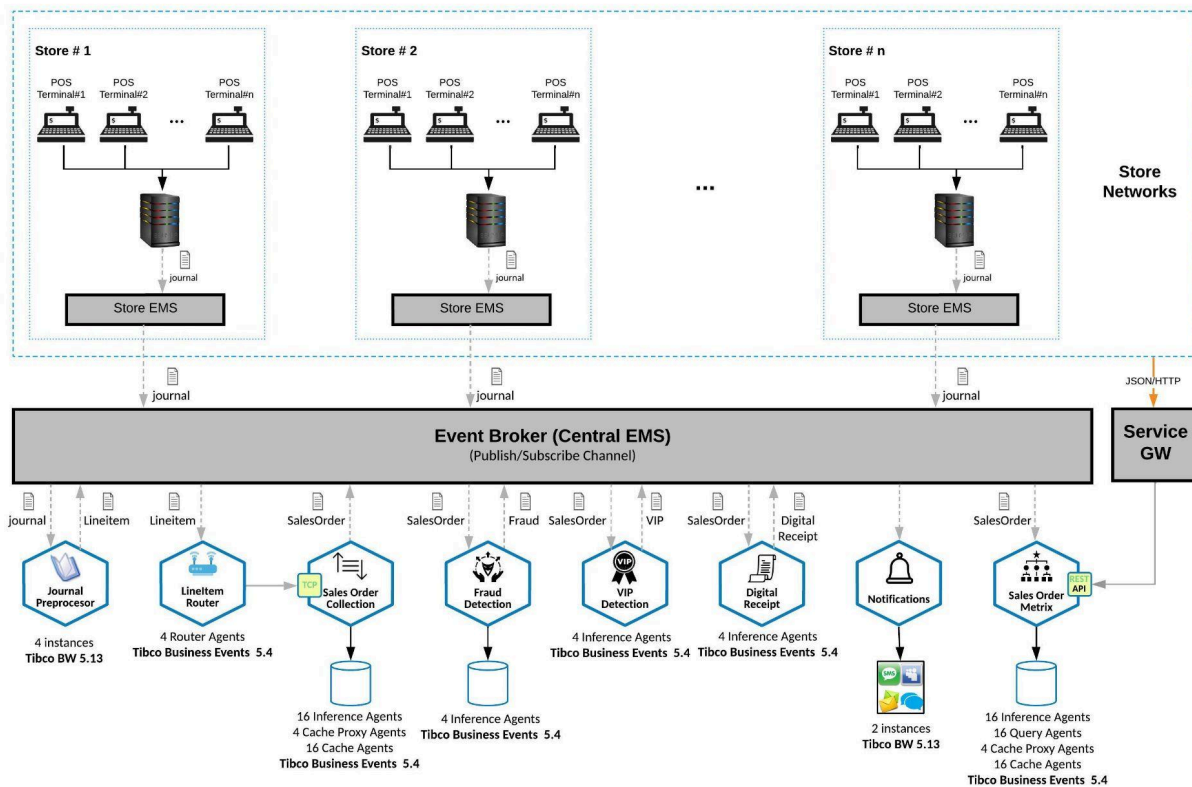
interactions. The solution leveraged TIBCO BusinessWorks and Tibco Business Events ( Complex Event Processing) technologies, enabling a Microservice, REST API architecture for efficient, asynchronous message handling.

### Key components of the solution included:

- **Real-time Event Publishing:** Events are triggered upon scanning items at the POS, enabling centralized data storage for further analytics and processing.
- **Subscription Services:** A single event can be consumed by multiple services, including calculating accurate IPM metrics for cashiers and stores based on centralized business rules.
- **Fraud Detection:** A real-time fraud detection service is activated during card swipes, guided by specific fraud prevention business rules.
- **Product Recommendations:** A recommendation engine suggests complementary products to customers based on their purchases, increasing sales opportunities and enhancing the customer experience.
- **VIP Customer Identification:** A dedicated engine identifies VIP customers and pushes notifications to store managers, ensuring a personalized in-store experience.
- **In-Memory Data Storage:** ActiveSpaces in-memory datastore cluster optimizes system performance, enabling faster data retrieval and processing.

Additional integrations were made to further improve customer experience and operational efficiency:

- **Social Media Integration:** TIBCO BW Plug-in for X(Twitter) enabled seamless customer engagement.
- **Advanced Analytics:** Integration with Splunk via custom Java code provided enhanced monitoring and actionable insights.
- **Weather and CRM Integrations:** TIBCO BW REST and JSON Plug-ins were used to integrate weather data and customer insights from Salesforce Cloud for more personalized service.



## BUSINESS RESULT

By adopting a robust Microservice, REST API and Event Driven Architecture, XTIVIA empowered the client to enhance their POS system's functionality, improve fraud detection, and perform advanced customer data analytics.

### Key outcomes included:

- **Fraud Detection:** The implementation of real-time fraud detection mechanisms helped identify and mitigate fraudulent transactions effectively.
- **Enhanced Customer Service:** Digital notifications and VIP identification led to improved customer service with a personalized touch.
- **Optimized IPM Metrics:** The accuracy of IPM calculations was significantly improved, including critical metrics like Sales, Idle Time, Tender Time, and Total Order Time.
- **Cache Engine Performance:** Cache engine refresh times were reduced by 94%, from four hours to just 15 minutes.

- **Service Response Time:** Store and cashier service response times were optimized, achieving an 85% improvement, reducing response times to just 4 seconds.
- **Rapid Redevelopment:** 95% of the Business Events (BE) application was redeveloped within two weeks, demonstrating the solution's efficiency.
- **System Upgrades:** The BE application was successfully upgraded and migrated from version 5.2.2 to 5.3 and 5.4, ensuring enhanced functionality and compatibility.

## BY THE NUMBERS

500 Locations in the US and Mexico

100,000 Employees

1.6 Million Daily Sales Orders

70–90 Million POS Transactions

## KEYWORDS

Point of Sale (POS) Optimization, Event-Driven Architecture, Microservice, REST API, Complex Event Processing (CEP), TIBCO BusinessWorks, Real-Time Data Processing, Fraud Detection System, Customer Personalization, Digital Transformation, In-Memory Data Store, Microservices, ActiveSpaces Integration, VIP Customer Engagement, Splunk Analytics, Performance Tuning, Oracle 19c, Java 11

## SOFTWARE

*Tibco BusinessEvents, Microservice, REST API, Tibco EMS, Tibco ActiveSpaces, Tibco BusinessWorks, HAWK, Facebook, Twitter, REST, JSON, Splunk*

## 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](http://www.xtivia.com)