

Ensuring Seamless CRM Integration Testing for Business-Critical Applications

ORGANIZATION

Our client is an innovative healthcare organization that provides a diverse range of solutions tailored to meet the needs of distributors and manufacturers. Their primary focus is on enhancing operational efficiency across the healthcare sector. By leveraging advanced technology and industry expertise, they help clients access new markets and products, drive revenue growth, and optimize operating and transaction costs.

The organization supports a broad network of distributors serving healthcare providers across various sectors, including acute care, primary care, long-term care, home care, veterinary, dental, and specialized healthcare markets. By offering tailored solutions, they ensure seamless business operations and improved service delivery for healthcare professionals and organizations.

SYSTEM OVERVIEW

To streamline financial transactions and order processing, the client leveraged several interconnected enterprise systems:

- **P21 (Prophet 21):** An Enterprise Resource Planning (ERP) system used primarily in distribution and supply chain management. P21 facilitates order processing, inventory tracking, and financial transactions, ensuring accurate payment processing and invoicing.
- **Prelude:** Another ERP system designed for distributors and manufacturers, Prelude integrates procurement, sales, and inventory operations, allowing seamless interaction between warehouse management and customer transactions.
- **WMS (Warehouse Management System):** A real-time inventory management system that ensures accurate stock levels, optimized order fulfillment, and efficient warehouse operations.
- **CRM (Customer Relationship Management System):** A platform used for managing customer interactions, order history, and financial transactions. The CRM system integrates with P21 and Prelude, maintaining a single source of truth for payments, orders, and customer data.

How These Systems Interact:

- P21 handles payment processing and ensures transaction accuracy within CRM.
- Prelude integrates order and payment data across WMS and CRM, enabling seamless operations.

- WMS ensures real-time inventory tracking and synchronization with the ERP and CRM systems.
- CRM consolidates all customer interactions, orders, and financial data, providing a centralized view for operational efficiency.

System Interaction Flow:

- **P21 → CRM:** Handles payment processing, ensuring accurate data capture and validation.
- **Prelude → WMS → CRM:** Manages order fulfillment, inventory tracking, and financial reconciliation between systems.

By integrating these business-critical platforms, the client aimed to enhance financial accuracy, streamline order fulfillment, and ensure seamless data synchronization across the enterprise.

CHALLENGE

Despite the robust technology ecosystem, several challenges emerged that required rigorous testing and validation to ensure a smooth integration.

Complexity of System Interactions and Integration Gaps

- The integration between P21, Prelude, WMS, and CRM required real-time data synchronization across multiple platforms.
- Lack of clear visibility into system interactions made it difficult to validate data accuracy and process automation.
- Errors in payment processing could cause misalignments between order fulfillment, invoicing, and financial reconciliation.

Comprehensive and Timely Testing

- The high frequency of application changes required agile testing cycles to keep up with development updates.
- Functional and end-to-end testing had to be repeated across multiple integrations to ensure data consistency.
- Late involvement of the testing team required rapid knowledge transfer and adaptation to existing project timelines.

Cross-Browser and Cross-Platform Compatibility

- The application had to function smoothly across Microsoft Edge, Safari, and Google Chrome.
- Inconsistent rendering and browser-specific issues required rigorous validation across multiple screen resolutions.

User Roles, Security, and Access Controls

- The application had diverse user groups, including order creators, invoice approvers, and payment processors.
- Role-based access restrictions meant that different users had distinct permissions within P21, Prelude, and CRM, adding complexity to test user setup and validation.
- Verifying security policies across systems was critical to ensuring compliance with financial and data protection regulations.

Business Logic and Data Interaction Validation

- Payment processing involved complex business rules, such as handling credit card transactions, bank transfers, and refunds.
- Testing required verifying data consistency across all systems to prevent discrepancies between CRM, P21, and Prelude.

Fraud Prevention & Financial Security Risks

- The system handled high-value transactions, making fraud prevention and data validation critical.
- Inaccurate order processing could lead to financial losses and reputational damage.

Adaptability and Integration with QA Processes

- The testing team was engaged midway through the project, requiring immediate adaptation to existing workflows.
- There was a lack of test automation, requiring the creation of new test scripts and artifacts to accelerate regression testing.

TECHNICAL SOLUTION

Operating within a Scrum framework with two-week sprints, XTIVIA's testing specialists implemented a structured approach for functional, integration, and regression testing.

Integration Testing Approach

To ensure seamless data flow between P21, Prelude, WMS, and CRM, XTIVIA:

- Validated end-to-end payment processing within P21 and CRM, ensuring payment transactions were correctly recorded and reflected in both systems.
- Conducted real-time data integrity checks by comparing API logs, system-generated reports, and transactional records to prevent inconsistencies.

- Implemented automated alerts to flag synchronization failures between systems and prevent missing or duplicate transactions.
- Designed structured test cases that simulated different transaction scenarios, including partial payments, refunds, failed transactions, and multi-payment methods (credit card, bank transfers).

Prelude-WMS-CRM Integration Testing

- Verified seamless data synchronization between warehouse operations and financial transactions.
- Ensured that order fulfillment status updates in WMS were correctly reflected in Prelude and CRM.
- Implemented stress testing to simulate peak traffic (e.g., processing large order volumes during sales cycles) to validate performance under load.

Automated Regression Testing & Cross-Browser Testing

- Developed a reusable regression test suite with over 500 test cases, covering:
 - Payment processing workflows
 - Order fulfillment and inventory updates
 - Role-based access validations
 - UI and API testing
- Automated test execution in Azure DevOps, ensuring tests were run after each new deployment.
- Used Selenium and Postman to automate API and UI testing, reducing manual effort and ensuring faster test cycles.
- Performed compatibility testing across Microsoft Edge, Safari, and Chrome, validating UI consistency and resolving browser-specific issues.

Security & Compliance Validation

- **Role-Based Access Testing:** Verified that users (order creators, invoice approvers, payment processors) had the correct permissions.
- **Data Encryption Checks:** Ensured sensitive payment and customer data were encrypted in transit (TLS 1.3) and at rest (AES-256).
- **Fraud Prevention Validation:** Simulated potential fraudulent activities, ensuring system detected duplicate payments, unauthorized changes, and suspicious transactions.
- **Healthcare Compliance Validation:** Ensured compliance with data protection standards (HIPAA and industry-specific regulatory requirements).

Production Readiness & Deployment Support

- Developed a deployment checklist ensuring all systems were fully validated before go-live.
- Conducted smoke testing after deployment to verify system stability.
- Enabled continuous monitoring with automated health checks to detect and resolve post-deployment issues quickly.

Key Solutions & Best Practices

- **Automated Regression Testing:** Implemented a structured test suite to ensure seamless feature updates.
- **Business Process Validation:** Focused on real-time payment transactions and data accuracy across systems.
- **Security-First Approach:** Strengthened fraud prevention by enforcing strict validation mechanisms.
- **Comprehensive Documentation:** Developed detailed testing artifacts, including test cases and step-by-step validation procedures.
- **Continuous Monitoring & QA Support:** Provided functional guidance and post-deployment validation to ensure ongoing system reliability.

BUSINESS RESULT

XTIVIA's robust testing framework significantly improved the stability, security, and performance of the client's CRM integration. The thorough validation process ensured the system operated seamlessly across all integrated platforms, enabling widespread adoption by the client's diverse customer base.

Key Outcomes:

Operational Efficiency

- Streamlined payment processing workflows, reducing manual intervention and minimizing errors.
- Achieved 99% data accuracy in financial transactions, ensuring precise order-to-cash alignment.

Improved System Reliability

- Validated seamless synchronization between P21, Prelude, WMS, and CRM, eliminating data inconsistencies.

- Significantly reduced post-deployment defects, ensuring a stable, high-performing integration.

Enhanced Security & Compliance

- Strengthened fraud prevention measures, reducing financial risks associated with inaccurate transactions.
- Ensured strict role-based security enforcement, complying with healthcare data protection and financial transaction regulations.

Optimized Customer Experience

- Enhanced cross-browser compatibility, delivering a consistent, seamless user experience across multiple platforms.
- Enabled faster order processing and real-time financial reporting, improving operational visibility and decision-making.

KEYWORDS

Application Integration, System Integration Testing, Regression Testing, Automated Testing, Functional Testing, API Testing, Azure Functions, Azure WebJobs, ReactJS Frontend, Cross-Browser Testing, Postman, Performance Testing, Data Integrity Validation, ERP System Testing, CI/CD Pipeline Testing, Security Testing, Fraud Prevention, Role-Based Access Control (RBAC)

SOFTWARE

Azure DevOps, Microsoft Tools, VMware, Postman, MS SQL, Selenium, JIRA, Power BI

ABOUT XTIVIA

At XTIVIA, we've been providing IT solutions and consulting services for over 30 years with 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. Dedicated to each discipline, ensuring that our clients receive the best possible service. 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. XTIVIA has offices in Colorado, New York, New Jersey, Texas, Virginia, and India. www.xtivia.com