Transforming a Federal Home Loan Bank's Prepayment Fee Engine with AWS Serverless Architecture

The Client

The Client, established as part of the Federal Home Loan Bank System by the US Federal government, is a wholesale bank created to meet community credit needs. As a key player in economic stability and housing finance, the Client provides reliable funding and liquidity solutions to its member financial institutions. The Client plays a vital role in supporting community financial institutions and fostering affordable housing initiatives. The Client members include commercial banks, credit unions, savings institutions, industrial loan companies, insurance companies, and community development financial institutions across the US West Coast.

The Challenge

The Bank faced a critical need to modernize its Prepayment Fee Engine, a core application responsible for calculating advance (loan) prepayment fees. This modernization initiative was deemed time-critical to prevent potential financial losses and meet regulatory deadlines. The existing system posed significant operational risks and business limitations:

Technical Obsolescence

- The application was built on VB6, an unsupported Microsoft technology, creating maintenance and security vulnerabilities.
- Legacy architecture made it difficult to implement new features or adapt to changing business requirements.
- Multiple disparate prepayment calculators existed across different systems, leading to inconsistency and inefficiency.

Operational Risks

- Critical bugs in the calculation algorithm potentially impacted the accuracy of prepayment fee assessments
- Security vulnerabilities created compliance concerns with federal banking regulations
- Fragmented calculation methods across various sources increased the risk of errors and inconsistencies

User Experience Challenges

- The outdated interface hampered user productivity and efficiency
- Lack of centralized parameter management made it difficult to maintain calculation consistency
- Limited visibility into calculation methodologies created challenges for auditing and verification

The Bank needed a solution that would:

- Minimize financial exposure from calculation errors
- Ensure regulatory compliance
- Improve operational efficiency
- Enable future scalability

The Solution

Opteamix collaborated closely with the Bank's technology and business teams to develop a comprehensive modernization strategy that addressed both immediate pain points and long-term scalability needs.

Technical Architecture

- The solution was built on AWS Serverless Architecture, leveraging:
- AWS Lambda for scalable, event-driven computing
- Modern frontend frameworks for an enhanced user interface
- Centralized calculation engine to ensure consistency across operations
- Microservices architecture to enable modular development and maintenance

Implementation Methodology

The project was executed using the SAFe Agile framework that was optimized for global delivery:

- Cross-functional team of 10+ specialists, including Project Managers, Business Analysts, Technical Architects, Development Engineers, and Quality Assurance Specialists that delivered everything Opetamix's India Development Center.
- Dedicated teams focused on specific components - User Interface modernization, core calculation engine development, system architecture implementation, and integration and centralization.
- Synchronized sprint cycles to ensure consistent progress
- Modular development approach to minimize disruption
- Continuous integration and deployment pipeline
- Regular stakeholder feedback incorporation
- Incremental feature rollout to manage risk
- Comprehensive testing strategy including unit testing of calculation algorithms, integration testing of centralized components, user acceptance testing of new interface, and performance testing under various load conditions.

Value Delivered

Opteamix delivered transformative results across multiple dimensions, from operational efficiency to strategic capabilities, as part of this transformation initiative. Through careful implementation and innovative architecture choices, the Bank achieved significant improvements in both technical performance and business outcomes while enabling future business growth through a scalable architecture.

Enhanced Operational Efficiency

- Streamlined business processes through a modernized calculation engine
- Eliminated manual calculations and spreadsheet-based errors
- Achieved 30-40% cost reduction through optimized cloud architecture
- Reduced revenue loss through accurate prepayment fee calculations
- Decreased testing effort with Selenium and Newman-based automation suite
- Minimized IT resource requirements
- Created a flexible platform adaptable to changing regulations

Technical Improvements

- Successfully migrated to AWS Serverless Architecture.
- Achieved 100% system availability through cloud hosting
- Implemented microservices architecture for future scalability
- Established seamless integration with other in-house applications
- Enhanced reporting and analytics capabilities

User Experience & Process Optimization

- Developed an intuitive user interface portal for improved usability
- Centralized all prepayment calculations into a single system
- Accelerated prepayment fee calculations for better customer service
- Implemented automated pipelines for streamlined operations
- Improved calculation accuracy through enhanced algorithms

Through effective project management and technical expertise, Opteamix successfully delivered the modernized system ahead of the planned timeline, enabling the Bank to realize benefits sooner than anticipated.

About Opteamix

Opteamix is an AI-powered technology services company specializing in AI, Application Development, Robotic Process Automation (RPA), DevOps, Enterprise Mobility, Test Automation, and Global Capability Center (GCC) operations. Guided by our higher purpose- “Simplifying Success”-we deliver transformative solutions that help organizations scale efficiently and thrive. Headquartered in Denver, Colorado, we operate a wholly owned delivery center in Bengaluru, India.