

UNIVERSIDAD AUTÓNOMA DE BAJA CALIFORNIA

Facultad de Ciencias Químicas e Ingeniería 2025-2



AxoCred - The Operating System for Intelligent Credit Cycle

Technical Implementation Document

Competition: Crevolution Hackathon 2025

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Executive Summary

AxoCred represents a paradigm shift in credit management technology, transforming from reactive, manual processes to proactive, AI-driven autonomous systems. Our B2B SaaS platform provides financial institutions with a powerful conversational AI agent, "Axo," that embeds directly into their existing applications via a simple SDK. This agent becomes the new, intelligent interface for managing the entire credit lifecycle, powered by our secure API.

The solution addresses critical pain points in Mexico's financial sector, where personal loan delinquency rates have reached 12.57% and operational costs continue to rise. By implementing AxoCred, financial institutions can achieve a 50-70% reduction in operational costs, an 85% improvement in processing efficiency, and reduce average collection times from 120 to 75 days.

Our target market includes *neobanks, credit fintechs, SOFOMs, SOFIPOs, and SOCAPs* seeking competitive advantages through technology innovation and superior customer experience.

To demonstrate the core disruptive power of AxoCred for the Crevolution Hackathon, we have developed a functional prototype (MVP) that showcases our most innovative feature: the autonomous, proactive renegotiation of credit plans through our conversational AI agent, Axo.

The prototype and video pitch is available at: <https://www.axocred.com/>

1. Problem Statement & Market Analysis

Current Market Challenges

The Mexican financial sector faces significant operational challenges:

- **Rising Delinquency Rates:** Personal loan delinquency increased to 12.57% in September 2024
- **High Operational Costs:** Traditional credit management requires extensive manual processes
- **Inefficient Recovery:** Average debt collection cycles extend to 120 days
- **Limited Scalability:** Manual processes cannot scale with growing credit portfolios
- **Regulatory Compliance:** Complex compliance requirements increase operational burden

Market Opportunity

Mexico's debt collection software market reached USD 57.60 million in 2024, with projected growth of 9.50% CAGR through 2033. The fintech sector shows strong adoption of AI technologies, with 965% growth in AI implementation and \$500 million investment in 2022-2023.

Key market drivers include increasing consumer debt and non-performing loans, digital

transformation initiatives in financial services, regulatory requirements for improved transparency and efficiency, and growing demand for automated compliance solutions.

2. Technical Solution Architecture

System Overview

AxoCred employs a cloud-native microservices architecture built on modern technologies and best practices. The system integrates artificial intelligence, natural language processing, and predictive analytics to create an autonomous credit management ecosystem.

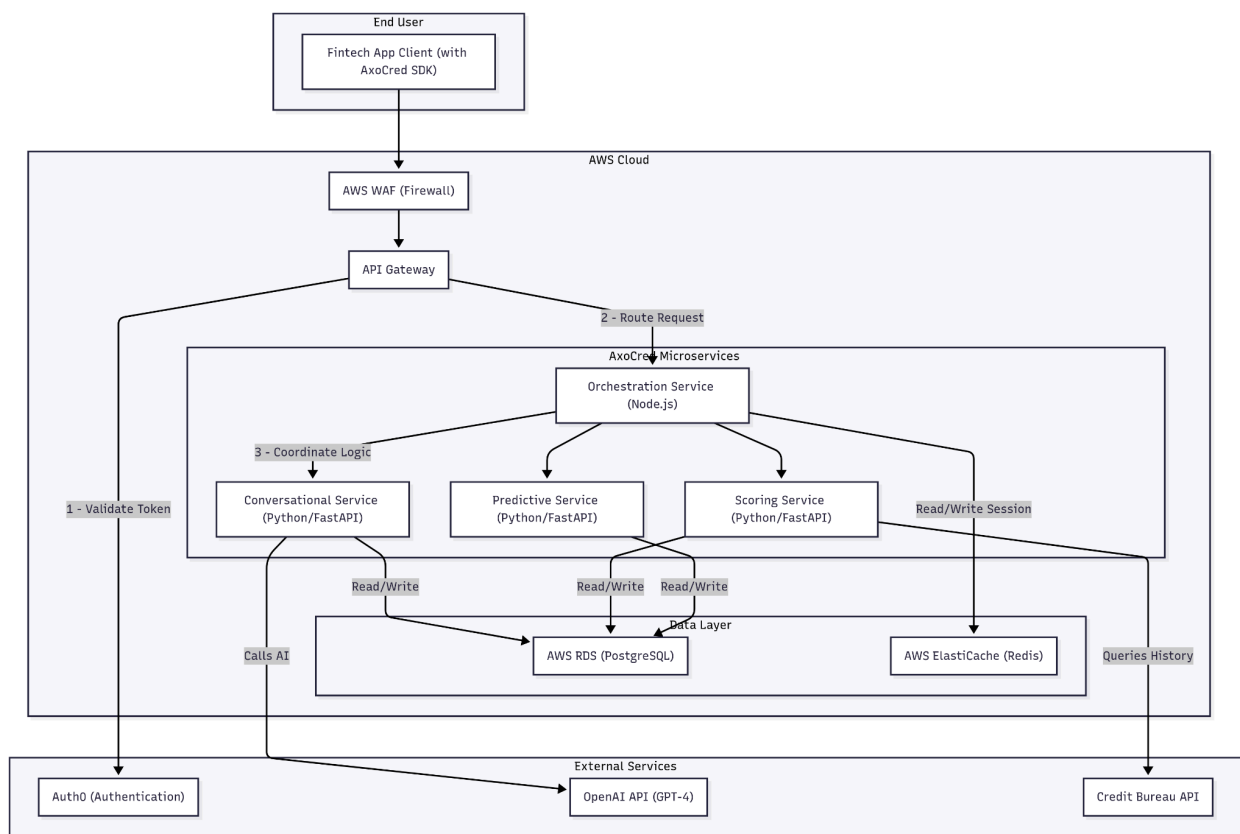


Figure 1: AxoCred's Cloud-Native Microservices Architecture. This diagram illustrates our robust, scalable, and secure backend system

Core Components

2.1 Conversational AI Engine (Axo)

Technology: OpenAI GPT-4, LangChain framework

Functionality: Natural language understanding, context retention, multilingual support

Deployment: 24/7 availability across text and voice channels

Integration: SDK embedding in partner applications

2.2 Intelligent Credit Scoring

Data Sources: Traditional credit bureau, alternative data, behavioral analytics
Algorithms: Machine learning models for dynamic risk assessment
Output: Real-time credit scores and personalized product recommendations
Compliance: Regulatory-compliant scoring methodologies

2.3 Predictive Analytics Engine

Purpose: Early delinquency detection and intervention
Technology: Python-based ML models with real-time data processing
Capabilities: Pattern recognition, risk prediction, automated alerts
Integration: Real-time transaction monitoring and analysis

Security Framework

2.4 Zero-Trust Architecture

Principle: No implicit trust, verify every transaction
Implementation: Microservices with isolated security perimeters
Authentication: OAuth 2.0 with PKCE for API access
Authorization: Role-based access control (RBAC)

2.5 Data Protection

Encryption at Rest: AES-256 encryption for sensitive data
Encryption in Transit: TLS 1.3 for all data transmission
Tokenization: Sensitive financial data tokenization
Data Masking: PII protection in non-production environments

3. Technology Stack

Layer	Technology	Purpose
Frontend	React.js + TypeScript	User interface development with type safety
Frontend	Material-UI	Consistent design system and UI components
Backend	Python FastAPI	High-performance API development
Backend	Node.js	Real-time services and notifications
Backend	Docker + Kubernetes	Containerization and orchestration
AI/ML	OpenAI GPT-4	Conversational AI engine
AI/ML	LangChain	LLM application framework
AI/ML	spaCy/NLTK	Natural language processing
Database	PostgreSQL	Primary transactional database

Database	Redis	Caching and session management
Infrastructure	AWS (ECS/RDS/Lambda)	Cloud hosting and services
Security	Auth0 + AWS WAF	Identity management and firewall
Monitoring	Prometheus + Grafana	System monitoring and metrics

4. Development Timeline

Phase	Duration	Team Size	Key Deliverables
Planning & Architecture	2 weeks	4	System design, database schema
Core Development	12 weeks	6	Backend APIs, frontend app
AI Integration	8 weeks	5	Conversational AI, ML models
Testing & Security	6 weeks	4	Security audit, performance testing
Deployment	4 weeks	3	Production deployment, monitoring
Launch Support	4 weeks	2	Go-live support, documentation

Total Development Time: 36 weeks (9 months)

5. Implementation Budget

The following budget and timeline represent the full-scale, commercial implementation of the AxoCred platform post-hackathon. Our functional prototype, developed in a matter of days, proves that the core of our innovation can be validated rapidly, aligning with the hackathon's spirit of *agile and feasible implementation*.

Detailed cost breakdown in **Mexican Pesos (MXN)**:

5.1 Development Personnel (6 months)

Role	Monthly Salary	Duration	FTE	Total Cost
Tech Lead / Solution Architect	\$50,000	6 months	100%	\$300,000
Senior Backend Developer	\$42,000	6 months	100%	\$252,000
Senior Frontend Developer	\$38,000	4 months	100%	\$152,000
AI/ML Engineer	\$48,000	6 months	100%	\$288,000

DevOps Engineer	\$40,000	3 months	50%	\$60,000
QA Engineer	\$30,000	4 months	75%	\$90,000
UI/UX Designer	\$35,000	2 months	50%	\$35,000
Project Manager	\$45,000	6 months	80%	\$216,000

Subtotal Personnel: \$1,393,000 MXN

5.2 Infrastructure & Cloud Services (12 months)

Service	Monthly Cost	Annual Cost
AWS EC2 instances (production)	\$8,500	\$102,000
AWS RDS (PostgreSQL)	\$4,500	\$54,000
AWS ECS/EKS (containers)	\$3,200	\$38,400
AWS Lambda (serverless)	\$1,800	\$21,600
AWS API Gateway	\$2,000	\$24,000
AWS S3 (storage)	\$800	\$9,600
AWS CloudWatch (monitoring)	\$1,500	\$18,000
Redis Cache (ElastiCache)	\$2,500	\$30,000
Other AWS services	\$2,500	\$30,000

Subtotal Cloud: \$333,600 MXN

5.3 Software & Licenses

Software/Service	Cost (MXN)
OpenAI API (GPT-4) - 12 months	\$72,000
Development Tools & IDEs	\$25,000
Database Licenses	\$18,000
Monitoring & Analytics Tools	\$35,000
Security & SSL Tools	\$12,000
CI/CD Pipeline Tools	\$15,000
Testing Frameworks	\$8,000
Documentation Tools	\$10,000

Subtotal Software: \$195,000 MXN

5.4 Additional Costs

Category	Cost (MXN)
Legal & Compliance Consulting	\$85,000
Security Audit & Penetration Testing	\$45,000
Third-party Integrations (Banking APIs)	\$120,000
Marketing & Business Development	\$60,000
Office Space & Equipment	\$75,000
Training & Certification	\$30,000
Contingency (10%)	\$192,160
Insurance & Legal Setup	\$25,000

Subtotal Additional: \$632,160 MXN

Budget Summary

Category	Cost (MXN)	Percentage
Personnel Development	\$1,393,000	54.5%
Infrastructure Cloud	\$333,600	13.1%
Software & Licenses	\$195,000	7.6%
Additional Costs	\$632,160	24.8%

TOTAL PROJECT COST: \$2,553,760 MXN / \$141,876 USD

6. Expected Benefits & ROI Analysis

Quantified Benefits

- Processing Efficiency: 85% reduction in manual data processing time
- Documentation Automation: 90% automation of compliance documentation
- Resource Optimization: 50-70% reduction in operational costs within first year
- Collection Timeline: Reduction from 120 to 75 days average recovery time
- Contact Efficiency: Same-day initial contact vs 3-5 days traditional method
- Resolution Speed: 85% faster payment plan creation
- Scale Economics: Manage larger portfolios without proportional staff increases

Financial Impact Timeline

Period	Cost Savings	Revenue Increase	Cumulative ROI
Months 1-3	15%	5%	-50%
Months 4-6	35%	15%	20%
Months 7-12	60%	25%	180%
Year 2	70%	35%	350%
Year 3	75%	45%	520%

7. Regulatory Compliance

Mexican Financial Regulations

AxoCred ensures full compliance with Mexican financial regulations including:

- Fintech Law Compliance: Full adherence to Mexican Fintech Law requirements
- API Regulations: Compliance with Banxico Circular 2/2020 for API implementation
- Data Protection: Mexican data protection law compliance

- Open Banking: Integration with open banking standards and requirements

International Standards

- ISO 27001: Information security management system certification
- PCI DSS: Payment card industry data security standards
- SOC 2: Service organization control compliance
- GDPR-Style Privacy: European-standard privacy protection mechanisms

8. Success Metrics & KPIs

Technical Performance

- System Uptime: 99.9% availability target
- Response Time: <200ms API response time
- Processing Volume: Support for 1M+ transactions/day
- AI Accuracy: >95% conversation success rate

Business Impact

- Cost Reduction: 50-70% operational cost savings
- Efficiency Gain: 85% reduction in processing time
- Recovery Improvement: 37% faster debt collection
- Customer Satisfaction: 40% improvement in experience metrics

Financial Returns

- ROI Timeline: Break-even within 14 months
- Revenue Impact: 25-45% revenue increase through improved collections
- Market Share: Capture 5-10% of addressable market within 2 years
- Client Retention: 95%+ client retention rate

9. Risk Assessment & Mitigation

Technical Risks

AI Model Accuracy is mitigated through continuous model training and validation protocols. System Integration challenges are addressed via comprehensive testing and phased rollout. Scalability is

ensured through cloud-native architecture with auto-scaling capabilities. Data Security is protected by multiple security layers and regular audits.

Business Risks

Market Adoption risks are mitigated through extensive pilot programs and gradual expansion. Regulatory Changes are managed via active monitoring and adaptive compliance framework. Competition is addressed through continuous innovation and feature enhancement. Economic Factors are managed with flexible pricing models and cost optimization.

10. Conclusion

AxoCred represents a transformative solution for Mexico's financial sector, addressing critical challenges through innovative AI-powered automation. Our comprehensive approach combines cutting-edge technology with deep understanding of local market needs and regulatory requirements.

The solution offers compelling financial benefits with conservative ROI projections showing 520% return within three years. The technical architecture ensures scalability, security, and regulatory compliance while providing superior user experience through intelligent automation.

Our experienced team, proven development methodology, and realistic implementation timeline position AxoCred for successful market entry and rapid adoption. The competitive advantages and first-mover opportunity in the Mexican market create significant value proposition for both investors and clients.

We are confident that AxoCred will revolutionize credit management in Mexico, providing the foundation for more efficient, cost-effective, and customer-centric financial services.

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