Requirements Engineering Documentation of Loaning Management System for Fanders Microfinance Inc.

Date: September 12, 2025

Project Team:

Gadiano, Noriel S.

Gavino, Kim Joshia

Carillo, John Andrei

Mana, Mark

Gutierrez, Nigel

Agustin, Joshua Vone

Transcript of Interview

Interview Information

Detail	**Information**
Documentation Source	Business process documentation and proposal

Client	Fanders Microfinance Inc.
Owner	John Joseph Carillo
Location	Centro East, Santiago City, Isabela
Interview Method	Document analysis and process observation
Purpose	Gather requirements for Loaning Management System

Interview Summary with Fanders Microfinance Inc.

Date: 06/09/2025

Participants: Business stakeholders and development team

Purpose: Gather requirements for Loaning Management System

Key Findings from Business Process Documentation:

Current Daily Operations:

- "Sa araw araw ang cashier ay gumagawa ng tinatawag na cash blotter kung saan makikita rito ang pag pasok at paglabas ng pera ng isang branches"
- Cashiers create daily cash blotters showing money inflow and outflow for each branch

Collection Process:

- "Mapapansin sa Cash blotter meron itong collection na ito ay nakabatay sa Collection sheet ng bawat account officer"
- Cash blotter collections are based on collection sheets from each account officer
- "Ang Collection sheet ay kailangan I post ng cashier sa tinatawag na Monitoring of loan (Payment and Release)"
- Collection sheets must be posted by cashier to the loan monitoring system

Loan Release Process:

- "Bumalik sa Cash Blotter mapapansin na sa right side may nakalagay rito ang loan release ito ay nakabatay naman sa Summary of Loan Release"
- Cash blotter shows loan releases on the right side based on Summary of Loan Release
- This confirms that clients have received loans from the company

Business Pain Points Identified:

- Excel-based operations creating risks of errors and inefficiencies
- Data integrity issues from accidental deletion/modification
- Imbalanced reports due to Excel errors
- Inefficient backup processes with Google Drive storage limitations
- Manual calculations prone to errors

Interest Calculation Process:

- Question: "Paano makuha ang Interest sa posting ng SLR (Summary of Loan Release)"
- Answer: "Principal X .05 or 5% = answer multiply by 4 months"
- Example provided: "7000*6%=420 *4 months =1680"

Payment Structure:

- Clients pay weekly over 17 weeks (4 months)
- Every payment includes additional insurance and savings
- Total insurance amount: ₱425 (fixed amount until loan is fully paid)
- Savings amount varies based on loan amount

Preface

Document Information

This Requirements Specification document defines the functional and non-functional requirements for the Loaning Management System to be developed for Fanders Microfinance Inc. The document is version 1.0, dated September 12, 2025, prepared for client John Joseph Carillo, owner of Fanders Microfinance Inc., located in Centro East, Santiago City, Isabela.

Expected Readership

This document is intended for **business stakeholders** who need to validate requirements and make approval decisions, requiring knowledge of current business processes. **System developers** will use this for implementation guidance and technical specifications, needing software development experience. **Project managers** will reference this for planning, tracking, and resource allocation with project management expertise. **Quality assurance teams** will develop test cases and validation criteria based on testing methodology knowledge. **System**

administrators will use this for deployment planning and security configuration, requiring IT infrastructure experience.

Version History

Version 0.1 (September 5, 2025): Initial draft created by the development team based on business process analysis and stakeholder interviews. This established the foundation document structure.

Version 0.5 (September 8, 2025): Added detailed functional requirements and expanded technical specifications based on stakeholder feedback and deeper business process analysis.

Version 1.0 (September 12, 2025): Final requirements document with improved organization and comprehensive coverage, incorporating all stakeholder feedback and technical review comments.

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1. Introduction

1.1 System Overview

The Loaning Management System is a comprehensive digital solution designed to replace the current Excel-based loan operations at Fanders Microfinance Inc. The system encompasses loan monitoring, payment processing, accounting functions, and financial reporting capabilities. Primary users include cashiers, account officers, managers, and system administrators, each with role-specific access and functionality.

1.2 Business Need

Fanders Microfinance Inc. currently operates using Excel spreadsheets for all financial operations, creating significant risks and inefficiencies. Manual data entry leads to calculation errors, accidental deletion or modification of critical data affects report accuracy, and imbalanced financial statements compromise business decision-making. The current backup process relies on Google Drive storage, which frequently reaches capacity limits, disrupting smooth operations.

The proposed Loaning Management System addresses these challenges by providing automated loan management with integrated payment processing, eliminating manual calculation errors through built-in business rules, ensuring data integrity through centralized database storage, and implementing secure cloud-based backup solutions that eliminate storage limitations.

1.3 System Functions Summary

The system provides comprehensive **loan management** capabilities, tracking loans from initial application through final payment completion, improving oversight and accuracy. **Payment processing** functions handle weekly payment collection with automatic balance updates, streamlining cash flow management. **Interest calculation** features automate computation using established business rules, eliminating manual calculation errors. **Financial reporting** generates balanced financial statements, providing reliable support for business

decisions. **Cash flow monitoring** offers real-time cash position tracking, enhancing liquidity management.

1.4 Strategic Alignment

The system directly supports key business objectives including **financial accuracy** by eliminating manual calculation errors and ensuring 100% accurate interest calculations. **Operational efficiency** improvements target a 50% reduction in processing time through process automation. **Business growth** support includes scalable operations capable of handling three times the current loan volume. **Risk management** enhancements provide improved data security with 99.9% data availability. **Regulatory compliance** maintains complete audit trails with 100% transaction traceability.

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2. Glossary

Technical Terms

- **Cash Blotter -** refers to the daily record of cash inflows and outflows for each branch, currently maintained manually using Excel spreadsheets.
- **Collection Sheets -** are documents recording client payments collected by account officers, generated in the field and posted by cashiers to the central system.
- **SLR (Summary of Loan Release) -** represents documentation confirming loan disbursement to clients, posted to the monitoring system by cashiers.

- **Account Officer -** is a field-based staff member responsible for client relationships and payment collection, managing assigned clients.
- **Outstanding Balance -** indicates the remaining amount owed by a client after payments, calculated as Total Loan Amount minus Payments Made.

Business Terms

- **Principal -** represents the original loan amount borrowed by the client, serving as the base amount for interest calculations.
- **Interest Rate -** is the monthly charge applied to the loan amount, fixed at 5% per month for all loans.
- **Insurance Fee -** is a mandatory insurance component charged as a fixed amount of ₱425 per loan regardless of the principal amount.
- **Payment Schedule -** defines the weekly payment plan for loan repayment, standard at 17 weeks for all 4-month loans.
- **Loan Term -** specifies the duration of the loan repayment period, standardized at 4 months for all loans.

System Terms

- **Audit Trail -** provides a complete log of all system changes and transactions, required for all financial operations.
- **Role-based Access -** defines user permissions based on job function, including Administrator, Manager, Cashier, and Account Officer roles.

- **Real-time Processing -** ensures immediate system updates upon transaction entry, particularly critical for balance calculations.
- **Backup Retention -** specifies the period for maintaining backup copies, set at a minimum of 30 days with a recommended one-year retention.

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3. User Requirements Definition

3.1 Functional User Requirements

UR-001: Loan Tracking - Users require complete loan lifecycle management from application submission through final completion. This high-priority requirement affects managers and cashiers, addressing the current pain point of manual Excel tracking errors. The business value includes eliminating manual errors and improving loan oversight. Success is measured by the system's ability to accurately record and make accessible all loan data.

UR-002: Payment Processing - The system must handle weekly payment collection with automatic balance updates. This high-priority requirement primarily affects cashiers, solving the current problem of manual posting from collection sheets. Business value includes streamlined workflow and reduced posting errors. Acceptance criteria require that payments are recorded instantly with immediate balance updates.

UR-003: Interest and Fee Calculation - Automated computation following established business rules (5% monthly interest over 4 months) is essential. This high-priority requirement affects cashiers and managers, eliminating current manual calculation errors. Business value includes

ensuring calculation consistency and accuracy. Success requires that system results match manual calculations exactly.

UR-004: Cash Flow Management - A digital equivalent of the current daily cash blotter functionality is needed. This high-priority requirement affects cashiers, addressing the manual cash blotter creation process. Business value provides real-time cash position visibility. Success criteria require that daily cash positions are accurate and timely.

UR-005: Financial Reporting - The system must generate balanced and accurate financial statements, replacing current Excel-based reports. This high-priority requirement affects managers and the business owner, solving Excel-based report imbalances. Business value includes reliable financial statements for decision-making. Success requires reports that are free from the errors currently experienced with Excel.

UR-006: Collection Integration - Seamless processing of account officer collection sheets is required. This medium-priority requirement affects account officers and cashiers, improving the current manual collection posting process. Business value includes maintaining accountability while improving efficiency. Success criteria require that collection data flows without manual re-entry.

UR-007: Loan Release Documentation - Digital processing of Summary of Loan Release (SLR) documents is needed. This medium-priority requirement affects cashiers and managers, addressing current manual SLR posting procedures. Business value ensures that all loan

disbursements are properly documented. Success requires comprehensive documentation of all releases.

UR-008: Data Security and Backup - Secure data storage replacing current Google Drive backup issues is essential. This high-priority requirement affects all users, solving storage limitations and backup failures. Business value includes data protection and business continuity. Success criteria require guaranteed data recovery capabilities.

3.2 Non-Functional User Requirements

Performance requirements specify that response time for all operations must be under 3 seconds, improving user productivity and maintaining operational efficiency. The system must support 10 or more concurrent users simultaneously to handle peak usage periods and support business growth.

Reliability requirements mandate 99.5% system availability during business hours to ensure uninterrupted business operations, critical for daily activities. System recovery time must be under 4 hours to minimize business disruption during any technical issues.

Usability requirements specify that training time for basic system use should be under 4 hours to ensure quick user adoption and minimize business disruption during the transition period.

Security requirements include role-based access control with four distinct user role levels to ensure appropriate data access and protect sensitive financial information.

3.3 Product and Process Standards

Data accuracy standards require that all financial calculations be accurate to the centavo level, implemented through automated validation and mandatory for system approval. **Audit requirements** mandate complete transaction logging for all system activities, verified through audit trail reviews. **Backup standards** specify daily automated backups with 30-day retention, validated through regular backup testing. **Security standards** require encrypted storage of all sensitive data, verified through comprehensive security assessments. **User interface standards** recommend consistent navigation and layout throughout the system, validated through usability testing.

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4. System Architecture

4.1 High-Level Architecture Overview

The system follows a layered architecture approach with five distinct components. The **Presentation Layer** provides user interface and interaction capabilities through a web-based responsive interface, offering high reusability through standard web components. The **Business Logic Layer** contains core system functionality and business rules, implemented through an application server with loan-specific logic offering medium reusability. The **Data Access Layer** handles database operations and data management through a database abstraction layer, providing high reusability with standard CRUD operations. The **Database Layer** manages data storage and persistence using a relational database system with high reusability through standard database design principles. The **Integration Layer** facilitates external system

connections through API and file processing services, offering medium reusability specific to integration requirements.

4.2 System Module Distribution

The **User Management** module handles authentication, authorization, and role management with high priority, depending on the database layer. **Loan Management** provides loan creation, tracking, and status management capabilities with high priority, requiring user management and database dependencies. **Payment Processing** manages payment recording and balance calculation with high priority, depending on loan management and the calculation engine. The **Calculation Engine** performs interest, payment schedule, and balance calculations with high priority, requiring business rules and database access. **Cash Flow Management** handles daily blotter and cash position tracking with high priority, depending on payment processing and reporting systems. The **Reporting System** generates financial reports, analytics, and dashboards with medium priority, requiring access to all modules and the database.

4.3 Architectural Components for Reuse

The **Authentication Module** managing user login and session management offers high reuse potential for other microfinance applications, providing security consistency. The **Calculation Engine** handling financial computations can be reused for different loan products, ensuring calculation accuracy across applications. The **Reporting Framework** for report generation and formatting provides development efficiency benefits for various business reports. The **Audit Trail System** for transaction logging and tracking ensures regulatory

consistency across compliance requirements. The **Database Schema** defining data structure and relationships enables data model reuse for similar financial systems.

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5. System Requirements Specification

5.1 Functional Requirements Detail

Core Loan Management Functions

FR-001: Loan Record Creation - The system must create comprehensive loan records by accepting client information, loan amount, and terms as input. Processing involves generating a unique identifier and validating all data according to business rules. Output includes a complete loan record with tracking number. The business rule requires that each loan must have a unique identifier and complete documentation.

FR-002: Interest Calculation - The system must perform automated interest calculation by accepting principal amount, interest rate (fixed at 5%), and loan term (4 months) as input. Processing applies the formula: Principal × 0.05 × 4 to calculate total interest. Output provides the exact total interest amount. The business rule mandates a fixed 5% monthly rate for all loans, and results must match manual calculations exactly.

FR-003: Payment Schedule Generation - The system generates 17-week payment schedules by accepting principal, calculated interest, and fees as input. Processing divides the total amount by 17 weeks to create the payment plan. Output provides a complete 17-week payment

schedule. The business rule specifies that 4-month loans equal exactly 17 weekly payments with no exceptions.

FR-004: Payment Recording - The system processes weekly client payments by accepting client ID, payment amount, and date as input. Processing updates the outstanding balance and logs the transaction with a timestamp. Output includes payment confirmation and updated balance. The business rule requires that all payments must be recorded with timestamp and complete audit trail.

FR-005: Balance Calculation - The system calculates outstanding balances in real-time by accepting total loan amount and payments made as input. Processing applies the formula: Outstanding Balance = Total Amount - Sum of All Payments. Output provides the current balance owed by the client. The business rule mandates that balance must update immediately upon payment entry.

Cash Management Functions

FR-006: Digital Cash Blotter - The system generates automated daily cash blotters by accepting daily collections, loan releases, and other transactions as input. Processing categorizes and summarizes all cash movements. Output provides a comprehensive daily cash position report. The business rule requires separate tracking of collections and loan releases, integrating data from collection sheets and the SLR system.

FR-007: Collection Processing - The system processes account officer collection data by accepting officer ID, client payments, and collection date as input. Processing validates

payments against client records and aggregates data by officer. Output provides collection summaries for cash blotter integration. The business rule requires that each collection must be traceable to a specific account officer.

FR-008: Loan Release (SLR) System - The system processes loan disbursements by accepting approved loan details, disbursement amount, and client confirmation as input. Processing records the loan release, updates cash position, and generates documentation. Output includes release confirmation and updated cash blotter entry. The business rule mandates that all releases must be approved and documented before cash disbursement.

FR-009: Fee Management - The system manages insurance and savings components by accepting loan details as input. Processing calculates the fixed insurance fee of ₱425 and variable savings amounts. Output provides a complete fee breakdown integrated with the payment schedule. The business rule specifies that insurance is fixed at ₱425 regardless of principal amount.

FR-010: Transaction History - The system maintains complete chronological payment records by accepting all client payments with dates, amounts, and methods as input. Processing stores payment history with full audit trail capabilities. Output provides complete payment history reports per client. The business rule prohibits deletion of payment records, allowing only corrections with proper documentation.

Reporting and Monitoring Functions

FR-011: Client Dashboard - The system provides summary views of client loan status by accepting client loan data, payment history, and current balance as input. Processing calculates status indicators including current, overdue, and completed states. Output displays client dashboard showing loan summary and current status. The business rule requires real-time status updates with payments.

FR-012: Alert System - The system generates alerts for overdue payments by accepting payment schedules, current date, and business rules as input. Processing checks for overdue payments and upcoming due dates. Output provides alert notifications for staff and management. The business rule generates alerts for payments 1 day overdue and 1 week in advance.

5.2 Non-Functional Requirements Specification

Performance Requirements

Response Time - All transaction processing must complete within 3 seconds under normal load conditions with 10 concurrent users, measured through response time monitoring and validated through load testing.

Throughput - The system must handle a minimum of 100 transactions per hour during peak usage periods, tracked through transaction logging and validated through performance testing.

Scalability - The system must support 10 or more simultaneous users during normal operations, verified through load testing and concurrent user session tracking.

Database Performance - All standard database queries must respond within 2 seconds, monitored through database performance tools and validated through query optimization testing.

Reliability Requirements

System Availability - The system must maintain 99.5% uptime during business hours (8 AM - 6 PM), monitored through availability tracking tools and validated through uptime testing.

Data Integrity - All financial transactions must maintain 100% accuracy, protected through rollback mechanisms and validated through comprehensive data validation testing.

Backup Success - Daily backup operations must complete successfully 100% of the time, with failure alerts and verification through automated backup testing.

Recovery Time - Complete system restoration must be achievable within 4 hours following any system failure, supported by disaster recovery plans and validated through recovery testing procedures.

Security Requirements

Access Control - The system must implement role-based permissions with four distinct user roles: Administrator, Manager, Cashier, and Account Officer. Access permissions are validated through comprehensive permission testing and security audits.

Data Encryption - All sensitive data must be encrypted both in storage and transmission, implemented through industry-standard encryption methods and validated through security assessments.

Session Management - User sessions must be secure with appropriate timeout and validation mechanisms, preventing unauthorized access and validated through security testing procedures.

Audit Logging - The system must log 100% of user activities and data changes, maintaining complete audit trails validated through audit log reviews and compliance testing.

5.3 Interface Requirements

User Interface Requirements

The **Login Screen** provides secure authentication with role selection capabilities for all users, designed with standard web accessibility features and responsive design principles.

The **Dashboard** offers role-specific home screens displaying key metrics and navigation options tailored to each user type, implementing responsive design for various devices and screen sizes.

Loan Management Interface provides comprehensive loan lifecycle management capabilities for cashiers and managers, featuring form validation, data entry assistance, and clear workflow guidance.

Payment Entry Interface enables quick payment recording with real-time validation for cashiers, including keyboard shortcuts for efficiency and immediate balance updates.

Reporting Interface allows managers to generate and export various reports, supporting multiple formats including PDF and Excel with print capabilities.

External System Interfaces

Backup System Interface manages daily automated export of database backups to secure cloud storage, including failure notification and retry mechanisms for reliability.

Report Export Interface enables on-demand export of system reports in PDF and Excel formats with format validation and error handling.

Future Banking API Interface designed for potential bidirectional communication with banking systems using JSON/XML formats, including comprehensive API error handling and real-time processing capabilities.

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6. System Models

6.1 Data Flow Models

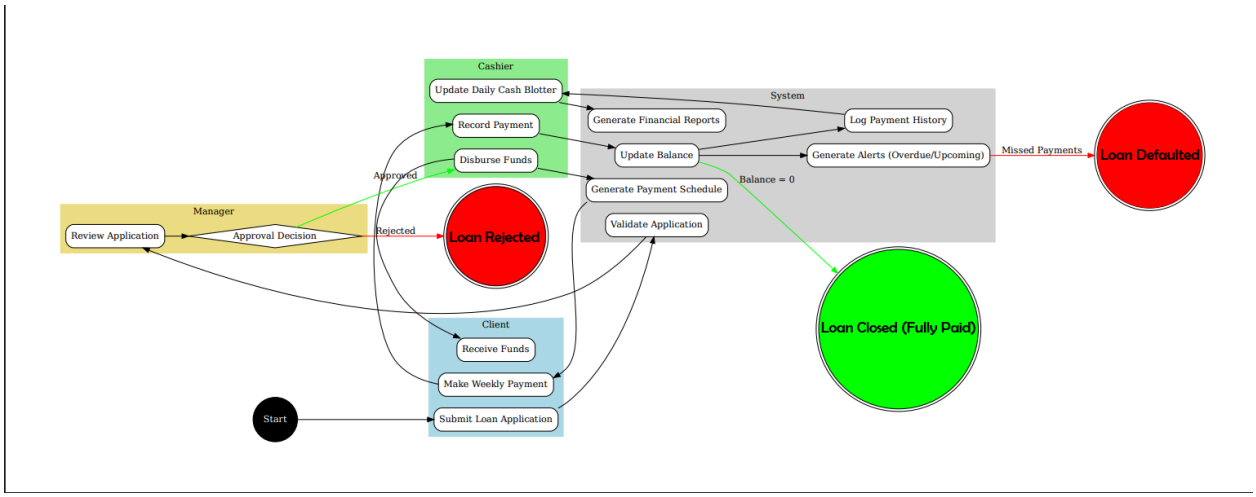
Payment Processing Data Flow

The payment processing workflow begins with **Payment Entry**, where cashiers input client ID, payment amount, and date. The system validates the payment information and creates a payment record, then proceeds to **Balance Update** where the payment amount and current balance are processed to calculate the new outstanding balance. The updated balance triggers

History Update, where the payment record is appended to the client's payment history, maintaining chronological order. The process continues with **Cash Blotter Update**, where payment data is added to the daily cash totals, affecting the branch's cash position. Finally, **Notification Check** evaluates the updated balance against the payment schedule to determine if alerts are needed for overdue or upcoming payments.

Loan Creation Data Flow

The loan creation process starts with **Application Entry**, where client details and loan amount are input and validated according to credit policies, creating an application record. **Interest Calculation** then applies business rules to the principal amount, calculating the total interest using the standard 5% monthly rate over 4 months. **Schedule Generation** takes the total amount including principal, interest, and fees to calculate the 17-week payment schedule with weekly amounts. The **Approval Process** involves management review of the complete application, resulting in approval or rejection status with proper authorization checks. Upon approval, **Disbursement** releases funds to the client, creating a disbursement record and updating the cash blotter.



6.2 Object Models

Core System Objects

The **Client** object contains ID, name, address, contact information, and status attributes, with methods to create, update, and validate client information. Clients have a one-to-many relationship with loans, allowing multiple loans per client over time.

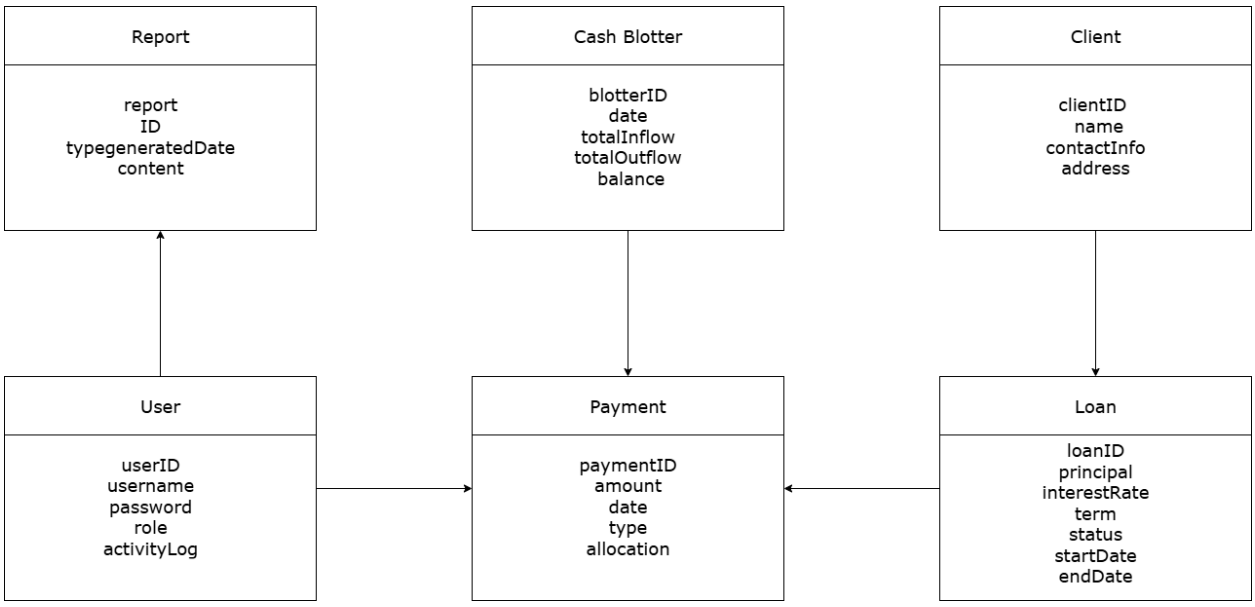
The **Loan** object includes ID, client_id, principal, interest, term, and status attributes, with methods to calculate payments, process approvals, and manage disbursements. Each loan belongs to one client and has many associated payments.

The **Payment** object contains ID, loan_id, amount, date, and method attributes, with methods to record, validate, and process payment transactions. Each payment belongs to one specific loan.

The **CashBlotter** object includes date, opening_balance, collections, and releases attributes, with methods to generate daily summaries, calculate balances, and close daily operations. Cash blotters contain multiple transaction references.

The **User** object contains ID, username, role, and permissions attributes, with methods for authentication and authorization. Users perform multiple transactions, maintaining accountability through audit trails.

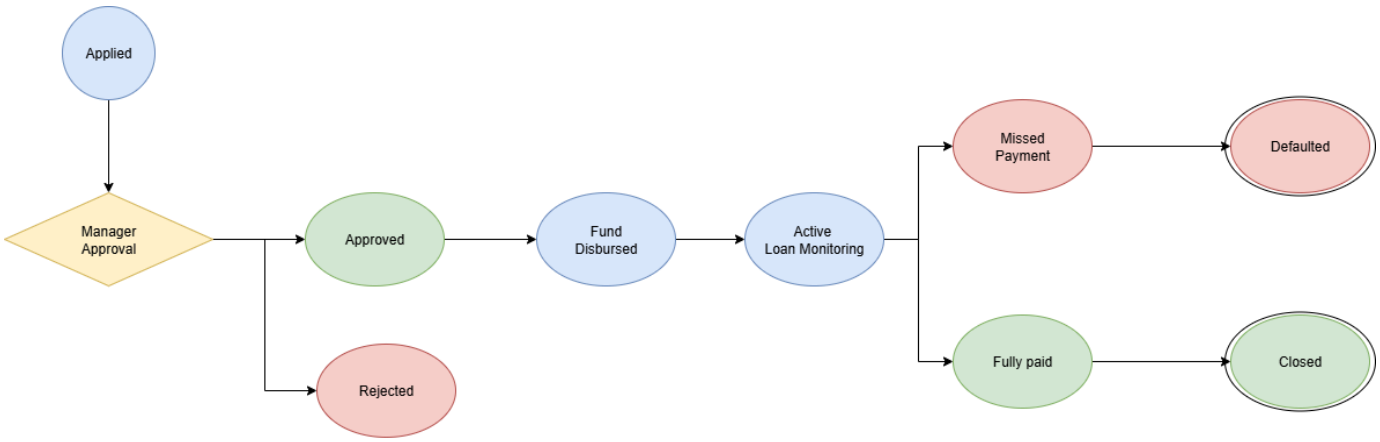
The **Transactions** object contains ID, type, amount, and timestamp with many-to-one relationships to users, estimated at 100,000 records annually including all system activities.



6.3 State Models

Loan Status State Machine

Loans progress through defined states based on specific events and validation criteria. The **Application** state transitions to **Approved** upon receiving management approval with proper authorization, triggering payment schedule generation. **Approved** loans move to **Active** status upon disbursement, requiring cash availability verification and cash blotter updates. **Active** loans remain active with each payment received, or transition to **Completed** upon final payment when balance reaches zero. **Active** loans may transition to **Overdue** status when payment deadlines pass, generating automatic alerts. **Overdue** loans return to **Active** status upon payment receipt and processing. All state transitions require proper validation and trigger appropriate system actions.



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7. System Evolution

7.1 Fundamental Assumptions

The system design assumes a **business model** based on standard 4-month loans at 5% monthly interest rates. Potential changes to variable terms and rates would require major system modifications to accommodate flexible business rules and calculation engines.

User base assumptions include single branch operations with 10 concurrent users. Evolution to multiple branches with 50+ users would necessitate database scaling, performance optimization, and enhanced network infrastructure.

Technology platform assumptions favor web-based systems with local database storage. Future evolution toward cloud-based systems with mobile access would require architectural redesign and enhanced security measures.

Integration needs currently assume standalone system operation. Future banking and accounting system integration would require API development, enhanced security protocols, and data synchronization capabilities.

Regulatory environment assumptions are based on current microfinance regulations. Enhanced compliance requirements would necessitate expanded audit and reporting modules with automated regulatory reporting capabilities.

7.2 Anticipated Hardware Evolution

Server capacity requirements currently specify single server operation with 8GB RAM. Three-year projections include dual server configuration with 16GB RAM for redundancy and performance. Five-year projections anticipate full cloud infrastructure migration with scalable resources.

Storage requirements currently target 100GB local storage capacity. Future needs include 1TB distributed storage within three years and cloud-based storage solutions with automatic scaling within five years.

Network infrastructure currently relies on local networks with basic internet connectivity. Evolution includes high-speed fiber with redundancy within three years and advanced 5G connectivity within five years.

Client devices currently use desktop computers for system access. Short-term evolution includes tablet and laptop compatibility, with long-term vision supporting mobile-primary operations.

7.3 User Need Evolution

Mobility requirements currently support office-based operations. Short-term changes include field officer mobile access capabilities, evolving toward full mobile operations within 3-5 years.

Integration needs currently focus on standalone loan system operation. Short-term development includes banking system integration, progressing toward comprehensive financial ecosystem integration.

Analytics capabilities currently provide basic reporting functionality. Evolution includes predictive analytics development within 1-2 years and AI-driven insights within 3-5 years.

Self-service operations currently require staff-mediated processes. Development toward client self-service portals within 2 years and automated loan processing within 5 years represents significant evolution opportunities.

Compliance tracking currently uses manual processes. Evolution toward automated regulatory reporting within 2 years and real-time compliance monitoring within 5 years addresses regulatory advancement.

7.4 Design Decision Guidelines

Modularity principles currently support monolithic application design with evolution toward microservices architecture and API-first design approaches to support future scalability and integration requirements.

Data architecture currently emphasizes relational database design with future evolution toward hybrid SQL/NoSQL solutions supported by database abstraction layers for flexibility.

User interface design currently targets web-based forms with evolution toward progressive web applications using component-based UI frameworks for enhanced user experience.

Security implementation currently focuses on role-based access control with evolution toward multi-factor authentication and advanced security framework integration.

Scalability approach currently supports vertical scaling with evolution toward horizontal scaling capabilities and cloud-native architecture for enhanced performance and reliability.

8. Appendices

Appendix A: Hardware Requirements

Minimum System Requirements

Server hardware requires dual-core 2.4GHz CPU capacity to handle 10 concurrent users effectively, directly impacting response time and transaction processing capabilities. Memory specification of 8GB RAM supports database operations and caching requirements, significantly affecting query performance and user experience quality. Storage requirements include 500GB SSD capacity for database storage, backups, and system logs, influencing data access speed and backup reliability. Network infrastructure requires 10Mbps broadband connectivity for real-time operations, affecting user interface responsiveness and system usability. Client workstation requirements include modern web browser compatibility and 4GB RAM minimum for effective application access and usability.

Optimal System Configuration

Enhanced server configuration includes quad-core 3.2GHz CPU providing superior performance and future growth support. Memory upgrade to 16GB RAM offers better concurrent user support with scalability buffer for expansion. Storage enhancement to 1TB NVMe SSD provides faster data access with extended capacity for growth. Network upgrade to 50Mbps redundant connection ensures reliability and speed while supporting potential multiple

branch operations. Backup system integration with cloud storage provides enhanced data security and disaster recovery capabilities.

Appendix B: Database Requirements

Logical Data Organization

Clients entity contains ID, personal information, and contact details with one-to-many relationships to loans, estimated at 1,000 initial records growing with business expansion.

Loans entity includes ID, amount, terms, and status information with many-to-one relationships to clients and one-to-many relationships to payments, estimated at 5,000 records annually based on current business volume.

Payments entity contains ID, amount, date, and method with many-to-one relationships to loans, estimated at 85,000 records annually based on 17 payments per loan calculation.

Users entity includes ID, credentials, and role information with one-to-many relationships to transactions, estimated at 10 initial users expanding with business growth.

CashBlotter entity includes date, opening_balance, collections, and releases attributes, with one-to-many relationships to transaction.

Transactions entity contains ID, type, amount, and timestamp with many-to-one relationships to users, estimated at 100,000 records annually including all system activities.

Data Relationships

Client-to-Loan relationships follow one-to-many patterns where one client can have multiple loans with sequential loan allowance according to business rules. Loan-to-Payment relationships maintain one-to-many structure with exactly 17 payments per loan following standard business practices. User-to-Transaction relationships support one-to-many patterns for audit trail requirements and accountability tracking. CashBlotter-to-Transaction relationships contain one-to-many structures supporting daily reconciliation and cash management processes.

Appendix C: Security Specifications

User Role Definitions

Administrator role provides full system access including all functions and user management capabilities, restricted to system configuration activities only. **Manager** role offers management-level access including reports, approvals, and oversight functions without technical configuration capabilities. **Cashier** role supports operational-level access for transactions, payments, and daily operations without system settings access. **Account Officer** role provides field-level access to client data and collection entry, limited to assigned clients only.

Data Encryption Requirements

Client Personal Data requires AES-256 encryption with system-managed keys and role-based decryption access controls. **Financial Transactions** need database encryption with encrypted-at-rest storage and audit-logged access tracking. **User Passwords** utilize Bcrypt

hashing with salt-based security managed through the authentication system. **Backup Data** requires full encryption with separate key storage accessible only to authorized personnel.

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9. Index

Functional Index

Alert and Notification System (Section 5.1, FR-012) represents medium-priority Phase 2 functionality for overdue payment management.

Cash Blotter Generation (Section 5.1, FR-006) represents a high-priority function scheduled for Phase 1 implementation, providing automated daily cash position reporting.

Client Status Dashboard (Section 5.1, FR-011) offers medium-priority Phase 2 capabilities for comprehensive client status monitoring.

Financial Reporting (Section 5.1, FR-013) provides high-priority Phase 2 functionality for comprehensive business reporting.

Interest Calculation (Section 5.1, FR-002) constitutes a high-priority function for Phase 1 implementation, ensuring accurate automated computation of loan interest.

Loan Record Management (Section 5.1, FR-001) serves as a high-priority Phase 1 function, establishing comprehensive loan tracking capabilities.

Payment Processing (Section 5.1, FR-004) functions as a high-priority Phase 1 implementation, enabling efficient payment recording and balance updates.

Payment Schedule Generation (Section 5.1, FR-003) provides high-priority Phase 1 functionality for automated 17-week payment plan creation.

Business Rule Index

Interest Rate (Section 2, FR-002) specifies the critical 5% monthly rate applied to all loans without exception.

Insurance Fee (Section 2, FR-009) defines the critical fixed ₱425 amount required for all loans regardless of principal.

Loan Term (Section 2, FR-003) establishes the critical 4-month standard term for all loan products.

Payment Schedule (Section 2, FR-003) mandates the critical 17 weekly payments structure for all loans.

Requirements Traceability Index

UR-001 Loan Management traces to system requirements FR-001, FR-002, and FR-003 with corresponding test cases TC-001 through TC-015 currently in planning status.

UR-002 Payment Processing connects to FR-004, FR-005, and FR-010 with test cases TC-016 through TC-030 in planned status.

UR-003 Interest Calculation links to FR-002 and FR-009 with test cases TC-031 through TC-040 in planning phase.

UR-004 Cash Flow Management relates to FR-006, FR-007, and FR-008 with test cases TC-041 through TC-055 currently planned for development.