

Product Requirements Document (PRD)

1. Product Overview

Clen 3.0 is a decentralized credit platform that enables users to access programmable credit through NFT spend cards while building a Web3-native credit score. The onboarding process begins with users verifying their identity using a government-issued ID such as a pan card . To ensure user privacy and maintain decentralization, the platform uses Zero-Knowledge (ZK) proofs to validate these identities without storing any raw personal data. This ZK-proof is then anchored on the Ethereum mainnet, creating a secure and tamper-proof identity layer. Simultaneously, users connect their Web3 wallets (like MetaMask or WalletConnect), which become their on-chain financial identity, enabling a seamless and self-sovereign onboarding experience.

Once onboarded, users can purchase NFT-based spend cards denominated in stablecoins (e.g., USDT). For instance, if a user buys a card worth ₹1000 in USDT, they receive a 2x spend limit—₹2000 in total. In addition, a ₹1000 joining bonus is granted, funded from an investment pool backed by early angel investors or bootstrap capital. The user's effective credit on the platform is thus higher than their initial input, encouraging usage and creating a positive loop. This credit is repayable within a set time. If repayment is made on time, the user builds a good credit reputation and becomes eligible for upgraded cards with higher spending limits. Overdue payments incur interest (e.g., 1.5–2% monthly), and defaults beyond 90 days lead to blacklisting and automatic burning of the NFT card. If the card is unused and expires, 80% of the original value is refunded via Clen's native CT tokens.

Repayment history, transaction patterns, and usage behavior are all tracked to compute the user's Web3 CIBIL score—a decentralized alternative to traditional credit scores. This score is calculated based on several factors like timely repayments, transaction diversity, merchant variety, and community endorsements. A sample scoring formula might weigh repayment history (40%), transaction volume (30%), unique merchant interactions (20%), and defaults (-10%). The more a user interacts with the platform responsibly, the higher their score climbs—ranging from 300 to 850+, similar to traditional systems but powered by real-time on-chain activity. Unlike traditional CIBIL scores which are opaque and region-specific, Web3 CIBIL is transparent, globally portable, user-owned, and continuously updated on chain—making it more inclusive for freelancers, gig workers, and underbanked individuals.

As users spend using their NFT cards at merchant partners—across restaurants, shopping outlets, etc.—Clen earns a 12% commission. Of this, 10% is redirected to user incentives such as joining bonuses and cashback, while 2% supports platform operations and growth. This dual incentive model drives both user adoption and business sustainability. Additionally, a small transaction fee (1–1.5%) is levied on every transaction. Users also receive real-time cashback and rewards in their wallet, promoting consistent usage and loyalty.

To power the platform economy, Clen introduces CT tokens (Clen Tokens). These tokens serve multiple roles—rewarding user actions, processing refunds for unused cards, and enabling redemptions via stablecoins, vouchers, or partner marketplaces. CT tokens can also be used to accelerate card upgrades, unlock premium insights, participate in governance, or buy insurance. The tokenomics is designed for long-term sustainability: of the 1 billion CT tokens, 35% are allocated to user rewards, 25% to ecosystem growth, 15% to investors, 15% to the team, and 10% to operations. A portion of platform fees is regularly used to buy back and burn CT tokens to maintain scarcity and value. Tokens inactive for over two years are also burned, and as more merchants accept CT, its utility and demand increase.

Importantly, all transactions on Clen 3.0 are conducted via stablecoins to ensure predictability, avoid crypto volatility, and enable fiat on-ramps/off-ramps for both users and merchants. This stablecoin foundation also makes Clen interoperable across borders and accessible in regions without traditional banking infrastructure.

2. Market Analysis & Problem Statement

2.1 Problem Statement

Primary Problems:

- 1. **Credit Exclusion:** 1.7 billion adults globally lack access to formal credit systems
- 2. **Opaque Scoring:** Traditional credit scoring lacks transparency and is geographically limited
- 3. **High Barriers:** Extensive documentation and lengthy approval processes exclude many users
- 4. **Limited Portability:** Credit scores are not transferable across borders or platforms
- 5. **Web3 Gap:** No native credit infrastructure exists for the growing Web3 ecosystem

Secondary Problems:

- 1. High customer acquisition costs for traditional lenders
- 2. Limited financial data for emerging market users
- 3. Fraud and identity verification challenges in digital-first environments
- 4. Lack of programmable money integration in existing credit systems

2.2 Competitive Analysis

Competitor Strengths Weaknesses Differentiation

Regulatory compliance, capital	High barriers, slow innovation
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UX, speed	Still centralized, limited credit building
DeFi integration	Requires collateral, limited identity

Traditional BanksWeb3-native, global accessibility

Neobanks (Chime, Revolut)Decentralized, tokenized rewards

Web3 Credit
(Aave, Compound)
Credit Building Apps
Uncollateralized, identity based

(Credit Karma)Education, monitoring Doesn't issue creditIssues actual credit products

3. Product Strategy & Positioning

3.1 Product Positioning

"The first decentralized credit platform that transforms your Web3 activity into real-world financial opportunity"

3.2 Unique Value Propositions

- 1. **Privacy-First Credit Building:** ZK-proof identity without compromising personal data
- 2. **2x Spending Power:** Immediate credit enhancement through NFT spend cards
- 3. **Transparent Scoring:** Open-source, auditable credit score algorithms
- 4. **AI-Powered Insights:** Personalized financial guidance through decentralized AI
- 5. **Global Portability:** Credit history that works across borders and platforms
- 6. **Tokenized Rewards:** Programmable incentives that appreciate with platform growth

3.3 Go-to-Market Strategy

- Phase 1: Web3 Community
- Phase 2: Mainstream Expansion
- Phase 3: Enterprise Integration

4. Detailed Product Requirements

4.1 Core Platform Architecture

4.1.1 Multi-Chain Infrastructure Strategy

Ethereum Mainnet Integration:

Primary Use Case: Immutable identity anchoring and high-value NFT storage

Functions:

ZK identity proof verification and storage

Premium NFT cards (Platinum tier \$5,000+)

Governance token staking and voting

Cross-chain bridge contracts

Rationale: Maximum security and decentralization for critical user data and high-value

assets Arbitrum Layer 2 Integration:

Primary Use Case: High-frequency transactions and daily operations

Functions:

Standard NFT card minting (Bronze, Silver, Gold tiers)

Daily transaction processing and settlements

Merchant payment processing

Web3 CIBIL score calculations and updates

Rationale: 90% lower fees than Ethereum with high throughput for user

transactions Base Network Integration:

Primary Use Case: AI agent operations and developer ecosystem

Functions:

Base AgentKit deployment for automated credit decisions

Developer API hosting and management

Real-time fraud detection and risk assessment

Social features and community governance

Rationale: Optimized for AI agents with native tooling and lower operational

costs Base Sepolia (Alternative Testnet):

Primary Use Case: Development and testing environment

Functions:

Feature testing before mainnet deployment

Developer sandbox for API integrations

Beta user onboarding and testing

AI model training and validation

Aethir Decentralized Computing Integration:

Primary Use Case: AI/ML model hosting and processing

Functions:

Llama model inference for credit scoring

Real-time fraud detection algorithms

Spending pattern analysis and recommendations

Large-scale data processing for Web3 CIBIL calculations

Rationale: Decentralized compute ensures no single point of failure for AI

services **4.1.2 Identity & Onboarding Layer**

Functional Requirements:

Multi-jurisdictional ID verification (pan card, SSN, Passport, National

ID) ZK-proof generation for privacy-preserving verification

Biometric liveness detection integration

Wallet connection with social recovery options

KYC/AML compliance framework

Technical Requirements:

Integration with Polygon ID, Worldcoin, or Semaphore ZK

frameworks Support for 50+ government ID types

99.9% uptime for verification services

Sub-30 second verification times

GDPR/CCPA compliant data handling

Success Criteria:

95% successful verification rate

<2% false positive rate

Support for 20+ countries at launch

4.2 Enhanced User Journey & Core Mechanics

4.2.1 Seamless Onboarding Flow

Step 1: Identity Verification

User uploads pan card card, passport, or any government-issued ID
Advanced OCR extracts key information (name, ID number, photo)
Biometric liveness detection ensures user presence
ZK protocol generates privacy-preserving proof without storing raw ID data
Identity proof anchored on Ethereum mainnet for permanence

Step 2: Web3 Wallet Integration

User connects existing wallet (MetaMask, WalletConnect) or creates new one
Multi-signature wallet setup for enhanced security
Social recovery options using trusted contacts or email
Wallet linked to ZK identity proof for seamless verification

Step 3: Initial Verification

Cross-reference ID details with government databases (where available)
Anti-fraud checks using ML models hosted on Aethir
User receives verification status and onboarding completion certificate
Unique Web3 identity created with initial credit score baseline

4.2.2 Revolutionary NFT Spend Card System

Joining Bonus Mechanism:

Every first-time card purchase receives 100% joining bonus
 $\$1,000 \text{ card purchase} \rightarrow \$2,000 \text{ spend limit} + \$1,000 \text{ joining bonus} = \$3,000 \text{ total}$
available
Joining bonuses funded by investor pool and future revenue sharing
Creates immediate utility and user retention

Functional Requirements:

Dynamic NFT generation with unique metadata
Spend limit calculation engine (base 2x multiplier)
Real-time balance tracking and notifications
Card activation/deactivation controls
Upgrade path definition and execution

4.2.3 Intelligent Repayment & Upgrade System

Flexible Repayment Options:

On-time Payment: No interest, CIBIL score boost, upgrade eligibility

Grace Period: 7-day grace with minimal penalty (1% of outstanding)

Extended Payment: 1.5% monthly interest on overdue amounts

Partial Payments: Accepted with prorated interest calculations

Default Management:

60+ days overdue → Account flagged for review

90+ days overdue → Blacklist activation across platform

NFT card automatically burns and becomes

non-transferable Recovery options through restructured payment plans

4.3 Revolutionary Web3 CIBIL Scoring Engine

Score Ranges & Interpretations:

300-450 (Poor): High risk, basic access only

450-550 (Fair): Moderate risk, standard features

550-650 (Good): Low risk, enhanced benefits

650-750 (Very Good): Very low risk, premium features

750-850 (Excellent): Minimal risk, exclusive access

850+ (Elite): Exceptional, governance participation

4.3.1 Superiority Over Traditional CIBIL

Why Web3 CIBIL is Revolutionary:

1. Real-time Updates vs Monthly Reports:

Traditional: Credit scores update monthly with bureau reporting

Web3 CIBIL: Instant score updates with every transaction
on-chain

2. Global Portability vs Geographic Limitations:

Traditional: Credit scores don't transfer across countries

Web3 CIBIL: Universal score accessible anywhere with internet

3. Transparent Algorithm vs Black Box:

Traditional: Scoring methodology is proprietary and

opaque Web3 CIBIL: Open-source algorithm, fully auditable on-chain

4. Comprehensive Data vs Limited Sources:

Traditional: Limited to formal banking and credit activities

Web3 CIBIL: Includes DeFi, P2P, merchant spending, community trust

5. User Ownership vs Institution Control:

Traditional: Users can't directly control or improve their score

Web3 CIBIL: Users own their data and can actively improve scores

6. Privacy Preservation vs Data Exposure:

Traditional: Full financial history stored by centralized bureaus

Web3 CIBIL: ZK proofs enable verification without exposing raw data

4.4 Dual AI Agent Architecture

4.4.1 Llama Models on Aethir Infrastructure

Decentralized Credit Intelligence Engine:

Model Deployment: Fine-tuned Llama 3.1 70B hosted across Aethir's distributed GPU network

Core Functions:

Real-time credit risk assessment using transaction patterns

Spending behavior analysis and budget recommendations

Fraud detection through anomaly recognition

Personalized financial education content generation

Market trend analysis for dynamic limit adjustments

Technical Implementation:

Models run on Aethir's decentralized compute nodes for censorship

resistance API endpoints secured with user consent and privacy controls

Model updates distributed across network for consistency

Inference caching for improved response times

4.4.2 Base AgentKit Integration (Alternative/Complementary)

On-Chain Autonomous Agent System:

Deployment Platform: Base network for cost-effective agent operations

Agent Functions:

- Automated credit approval/denial based on predefined rules
- Smart contract interaction optimization for gas efficiency
- Cross-chain transaction coordination and settlement
- Governance proposal analysis and voting recommendations
- Real-time risk parameter adjustments

Base Sepolia Testing Environment:

- Complete agent testing sandbox for new features
- Safe environment for experimental AI models
- Community developer access for third-party integrations
- Performance benchmarking before mainnet deployment

4.4.3 Hybrid AI Architecture Benefits

Llama + Aethir Advantages:

- Complex reasoning and natural language processing
- Personalized recommendations and insights
- Large-scale data analysis capabilities
- Decentralized and censorship-resistant deployment

Base AgentKit Advantages:

- Native blockchain integration and automation
- Cost-effective for simple rule-based decisions
- Real-time on-chain data processing
- Seamless smart contract interactions

Combined Power:

- Llama handles complex analysis and recommendations
- AgentKit executes automated decisions and blockchain operations
- Users get both intelligent insights and seamless automated experiences

4.5 Advanced Tokenomics & Economic Model

4.5.1 CT Token Multi-Utility Framework

Total Supply: 1 Billion CT Tokens (Fixed Supply)

Distribution Schedule:

User Rewards (35%): 350M tokens over 5 years

Ecosystem Development (25%): 250M tokens for partnerships and

growth **Team & Advisors (15%):** 150M tokens, 4-year vest with 1-year

cliff **Investor Pool Backing (15%):** 150M tokens supporting joining

bonuses **Treasury & Operations (10%):** 100M tokens for platform

development

4.5.2 Revolutionary Token Earning Mechanisms

Transaction-Based Rewards:

0.5% of transaction value in CT tokens for every purchase

Higher multipliers for diverse merchant categories

Bonus rewards for first-time merchant interactions

Milestone & Behavior Rewards:

First Transaction: 100 CT welcome bonus

Monthly Spending Goals: 50-200 CT based on targets

met **On-time Repayment:** 25 CT per successful payment

Referral Success: 500 CT for each friend who makes first

purchase **Web3 CIBIL Improvement:** 10 CT per 10-point score

increase **Anniversary Bonus:** 1,000 CT for yearly platform

loyalty

4.5.3 Enhanced Token Utility & Redemption

Primary Utilities:

1. **Expired Card Refunds:** 80% of unused card value refunded in CT tokens
2. **Fee Payments:** Use CT for transaction fees at 20% discount
3. **Upgrade Accelerators:** Spend CT to unlock tier upgrades early
- 4.

Marketplace Access: Purchase gift cards, vouchers, and exclusive

deals 5. **Staking Rewards:** Stake CT to earn higher transaction

multipliers

Secondary Utilities:

1. **Governance Participation:** Vote on platform changes, new features
2. **Insurance Coverage:** Pay premiums for purchase protection in CT
3. **P2P Transfers:** Send CT to other users for shared expenses
4. **Merchant Discounts:** Exclusive CT-only deals at partner stores
5. **Premium Features:** Access to advanced analytics and AI insights

4.5.4 Sustainable Economics & Value Accrual

Token Burn Mechanisms:

25% of transaction fees used to buy back and burn CT tokens
Expired CT tokens (inactive >2 years) automatically burned
Failed transaction penalties burned to reduce supply

5. Key Features

NFT Spend Cards: Mint cards with validity periods and spending limits
Credit Multiplier: 2x spending power on deposited amount
Joining Bonus: Additional CT tokens as incentive
Credit Scoring: On-chain reputation based on repayment history
Blacklist System: Automatic penalties for defaults
Transaction History: Complete transaction tracking
Spend Analysis: Detailed spending analytics
AI Chatbot: Intelligent customer support

6. Technical Architecture

Technology Stack

Frontend: React.js (Lovable)
Smart Contracts: Solidity
Development: Hardhat (testing) → Multi-chain deployment
Blockchain: Multi-chain (Ethereum,

Arbitrum, Base)

Token Standard: ERC-721 (NFT Cards), ERC-20 (CT

tokens) **7. Clen 3.0 Enhanced Frontend**

Structure

javascript

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Web3 Banking & Lending App Design

7.1 Design Philosophy

Theme: Modern Web3 Banking with Pastel Aesthetics

Color Palette: Soft pastels (lavender, mint green, peach, sky blue,

cream) **Background:** Light, airy backgrounds with subtle gradients

Typography: Clean, friendly fonts with rounded edges

Interactions: Smooth animations, hover effects, and

micro-interactions **Layout:** Card-based design with rounded corners

and soft shadows **Icons:** Outlined style with pastel fills

Buttons: Rounded, gradient backgrounds with gentle hover animations

7.2 Enhanced Component

Architecture 7.2.1 Layout Components

Header.jsx

Functions:

Wallet connection status indicator

Network selector with visual network icons
User profile dropdown with avatar
Navigation menu with active state indicators
Notification bell with unread count

Visual Elements:

Gradient header background (lavender to sky blue)
Floating wallet connection button
Animated logo with subtle bounce
Search bar with rounded edges

Sidebar.jsx

Functions:

Collapsible navigation menu
Active page highlighting
Quick stats preview (credit score, card count)
Theme toggle (light/dark mode)

Visual Elements:

Translucent sidebar with blur effect
Animated icons for each menu item
Progress indicators for credit score
Soft shadows and rounded corners

Footer.jsx

Functions:

Social media links
Help & support access
Terms & privacy links
Platform statistics

7.2.2 Core Pages with Detailed Breakdown

A. Dashboard.jsx

Primary Functions:

Portfolio overview with animated charts
Quick action buttons (mint card, spend, repay)
Recent transactions feed
Credit score ring with smooth animation
Active cards carousel
Rewards balance display

Components:

WelcomeHero - Personalized greeting with user stats
QuickStats - Credit score, total spending, rewards earned
ActiveCardsCarousel - Horizontal scrolling card display
RecentActivity - Timeline of recent transactions
ActionButtons - Large, colorful CTA buttons
CreditScoreRing - Animated circular progress indicator
UpcomingPayments - Next due payments with countdown
AchievementsBadges - Gamified user achievements

Interactive Elements:

Hover animations on cards
Smooth scroll effects
Tooltip explanations
Pull-to-refresh functionality

B. MintCard.jsx

Primary Functions:

Card tier selection with comparison
Deposit amount calculator
Spending limit preview
Joining bonus calculator
Transaction fee estimation

Card customization options

Components:

TierSelector - Interactive tier comparison cards

DepositCalculator - Real-time calculation with sliders

SpendingLimitPreview - Visual representation of 2x

multiplier **JoiningBonusDisplay** - Animated bonus amount

CardPreview - 3D card mockup with customization

TransactionSummary - Breakdown of costs and

benefits **MintingProgress** - Step-by-step progress

indicator **ConfirmationModal** - Final confirmation with details

Interactive Elements:

Range sliders for deposit amounts

3D card flip animations

Real-time calculation updates

Confetti animation on successful mint

C. MyCards.jsx

Primary Functions:

Grid view of owned NFT cards

Individual card details

Card status indicators

Spending history per card

Card management actions

Expiry date tracking

Components:

CardGrid - Responsive grid layout of cards

CardItem - Individual card component with

animations **CardDetailsModal** - Expandable card

information **SpendingChart** - Visual spending

patterns

CardActions - Spend, repay, view history buttons

ExpiryWarning - Countdown for expiring

cards **CardFilters** - Filter by status, tier, etc.

SearchBar - Search cards by ID or date

Interactive Elements:

Card flip animations on hover

Drag-and-drop organization

Swipe gestures for mobile

Progressive image loading

D. CreditProfile.jsx

Primary Functions:

Comprehensive credit score display

Score history trending

Factor breakdown analysis

Improvement suggestions

Credit milestones tracking

Comparison with benchmarks

Components:

CreditScoreGauge - Large animated score gauge

ScoreHistoryChart - Line chart with smooth

animations **FactorBreakdown** - Pie chart of score

components **ImprovementTips** - Personalized

recommendations **CreditMilestones** - Progress

toward next tier

ScoreComparison - Benchmark against other

users **CreditReport** - Detailed credit activity

report

ScoreProjection - Predicted future score

Interactive Elements:

Animated gauge transitions

Hover tooltips on chart points

Expandable tip cards

Progress animations

E. Transactions.jsx

Primary Functions:

Complete transaction history

Advanced filtering options

Transaction categorization

Export functionality

Transaction search

Spending analytics

Components:

TransactionList - Infinite scroll transaction feed

TransactionItem - Individual transaction with

details **FilterPanel** - Advanced filtering controls

SearchBar - Global transaction search

CategoryTags - Visual transaction

categories **SpendingAnalytics** - Charts

and insights

ExportOptions - Download transaction data

TransactionDetails - Expandable transaction
info

Interactive Elements:

Infinite scroll loading

Smooth filter animations

Search highlighting

Category color coding

F. Repayments.jsx

Primary Functions:

Outstanding balance tracking

EMI schedule management

Payment processing

Interest calculation

Payment history

Auto-pay setup

Components:

RepaymentSummary - Overall debt

overview **EMISchedule** - Calendar view of payments

PaymentForm - Quick payment interface

InterestCalculator - Real-time interest

computation **PaymentHistory** - Past payments timeline

AutoPaySetup - Automated payment configuration

OverdueWarnings - Alert system for late payments

PaymentReminders - Upcoming payment notifications

Interactive Elements:

Calendar date picker

Payment amount sliders

Success animations

Progress indicators

G. Rewards.jsx

Primary Functions:

CT token balance display

Cashback history

Redemption options

Loyalty program tracking

Referral system

Reward milestones

Components:

RewardsBalance - Animated token balance

CashbackHistory - Timeline of earned rewards

RedemptionCenter - Various redemption

options **LoyaltyProgress** - Tier progression tracking

ReferralSystem - Invite friends interface

RewardMilestones - Achievement tracking

RedemptionHistory - Past redemptions

SpecialOffers - Limited time reward boosts

Interactive Elements:

Token animation effects

Reward unlock celebrations

Progress bar animations

Share functionality

H. SpendAnalysis.jsx

Primary Functions:

Spending pattern visualization

Category-wise breakdown

Merchant analysis

Budget tracking

Spending predictions

Comparison tools

Components:

SpendingOverview - Monthly/yearly summaries

CategoryBreakdown - Pie chart of spending

categories **MerchantAnalysis** - Top merchants and

frequencies **SpendingTrends** - Line charts showing

patterns **BudgetTracker** - Budget vs actual spending

SpendingPredictions - AI-powered forecasting

ComparisonTools - Period-over-period analysis

SpendingInsights - Personalized recommendations

Interactive Elements:

Interactive charts and graphs

Drill-down capabilities

Date range selectors

Responsive visualizations

I. AIAssistant.jsx

Primary Functions:

Conversational AI interface

Financial advice provision

Query handling

Transaction assistance

Credit improvement tips

Platform guidance

Components:

ChatInterface - Messaging interface with AI

QuickActions - Pre-defined query buttons

FinancialTips - AI-generated advice cards

TransactionHelper - Guided transaction

support **CreditAdvisor** - Personalized credit

guidance **HelpCenter** - FAQ and

documentation

VoiceInput - Speech-to-text capability

ChatHistory - Previous conversation logs

Interactive Elements:

Typing animations

Voice input controls

Animated responses

Quick reply options

J. Profile.jsx

Primary Functions:

User profile management

Security settings

Notification preferences

Account verification

Privacy controls

Support access

Components:

ProfileHeader - User avatar and basic info

SecuritySettings - Password and 2FA

management **NotificationCenter** - Preference controls

VerificationStatus - Identity verification

display **PrivacyControls** - Data sharing

preferences **SupportTickets** - Help request

management **AccountSettings** - General

account preferences **BackupRecovery** -

Wallet backup options

Interactive Elements:

Profile picture upload

Toggle switches for settings

Progress indicators for verification

Confirmation modals

7.3 Navigation Structure

Primary Navigation

Dashboard (Home icon) - Overview and quick

actions **My Cards** (Card icon) - NFT card
management **Transactions** (List icon) - Transaction
history **Credit Score** (Target icon) - Credit profile
Rewards (Gift icon) - CT tokens and cashback
Spend Analysis (Chart icon) - Analytics
dashboard **AI Assistant** (Bot icon) -
Conversational help

Secondary Navigation

Profile (User icon) - Account settings
Repayments (Calendar icon) - Payment
management **Help** (Question icon) - Support center

Quick Actions (Floating Menu)

Mint Card - Primary action button
Quick Spend - Fast spending interface
Pay Now - Quick repayment

7.4 Enhanced Hook Functions

useCards.js

Enhanced Functions:

`fetchUserCards()` - Get all user's NFT cards
`mintNewCard()` - Create new spending card
`updateCardBalance()` - Real-time balance updates
`getCardHistory()` - Individual card transaction
history `setCardNickname()` - Custom card naming
`getCardAnalytics()` - Spending patterns per card
`handleCardExpiry()` - Expiry management
`calculateSpendingLimit()` - Dynamic limit calculation

useCreditScore.js

Enhanced Functions:

`fetchCreditData()` - Complete credit profile
`updateScoreFactors()` - Real-time factor updates

getScoreHistory() - Historical score tracking
calculateImprovementPotential() - Score improvement
projections getScoreMilestones() - Achievement tracking
compareWithBenchmarks() - Peer comparison
generateCreditReport() - Detailed credit analysis
trackScoreChanges() - Real-time score monitoring

useTransactions.js

Enhanced Functions:

fetchTransactionHistory() - Complete transaction
data filterTransactions() - Advanced filtering
searchTransactions() - Text search functionality
categorizeTransactions() - Auto-categorization
calculateSpendingTrends() - Analytics computation
exportTransactionData() - Data export functionality
getMonthlySpending() - Period-based summaries
trackMerchantInteractions() - Merchant analysis

useRewards.js

Enhanced Functions:

fetchRewardsBalance() - CT token balance
getCashbackHistory() - Reward earning history
processRedemption() - Token redemption
calculateLoyaltyProgress() - Tier progression
getReferralRewards() - Referral tracking
getSpecialOffers() - Limited time bonuses
trackRewardMilestones() - Achievement monitoring
estimateRewardPotential() - Future reward
projections

useRepayments.js

Enhanced Functions:

fetchRepaymentSchedule() - EMI calendar

processPayment() - Payment processing
calculateInterest() - Interest computation
getPaymentHistory() - Past payment records
setupAutoPay() - Automated payments
getOverdueAmount() - Outstanding calculations
generatePaymentPlan() - Custom payment
schedules trackPaymentPerformance() - Repayment
analytics

7.5 Interactive Elements &

Animations Micro-Interactions

Card Hover Effects: Gentle lift and glow

Button Press: Smooth scale animation

Loading States: Skeleton screens with shimmer

Success Feedback: Confetti or checkmark

animations **Error Handling:** Gentle shake
animations

Form Validation: Real-time feedback with color

changes Page Transitions

Smooth Routing: Fade in/out transitions

Component Loading: Staggered animation

entry **Modal Appearance:** Scale and fade
effects

Navigation: Sliding panel animations

Data Visualizations

Chart Animations: Progressive data loading

Score Updates: Smooth gauge transitions

Progress Bars: Animated fill effects

Counter Animations: Number counting up/down

7.6 Responsive Design Considerations

Mobile Optimization

Touch-Friendly: Large button targets

Swipe Gestures: Card swiping, navigation

Bottom Navigation: Thumb-friendly positioning

Simplified Layouts: Single-column designs

Progressive Disclosure: Expandable sections

Tablet Adaptation

Split Views: Sidebar + main content

Larger Touch Targets: Optimized for finger interaction

Landscape Orientation: Horizontal card layouts

Multi-Column: Grid-based layouts

Desktop Enhancements

Hover States: Rich interactive feedback

Keyboard Navigation: Full keyboard support

Multi-Panel: Complex dashboard layouts

Advanced Features: Power-user functionality

This enhanced frontend structure provides a comprehensive, user-friendly interface for the Clen 3.0 platform while maintaining the Web3 banking aesthetic with pastel colors and smooth interactions. Each page is designed to be intuitive and engaging while providing powerful functionality for credit management and financial tracking.