Lending and Borrowing: Detailed Design

Version: 1.0
Catalyst Project ID: 1200142

✅ Milestone Acceptance Criteria Checklist

Deliverable Component	Acceptance Criteria	Evidence Type
Indexer Architecture	Clear technical design of the indexer	Section 1 + Diagram
Database Schema	Logical schema for storing lending data	Section 2 + ERD
Smart Contract Interaction	Step-by-step interaction with Liqwid	Section 3
Working Indexer	Indexes at least one protocol (Liqwid integrated)	Section 4 + Screenshots/Video
UI – Lending Aggregator Flow	Token → Results → Transaction Build	Section 5.1 + Screenshots
UI – User Portfolio / Positions Page	Page showing user's active positions	Section 5.2 + Screenshots
UI – Loan Overview Page	Detailed loan terms and positions	Section 5.3 + Screenshots

One note on the acceptance criteria is that instead of Figma we are further along and have a working app so we have included screenshots from the app and a walkthrough video. If anything else is required on this we can add that too.

1. Indexer Architecture

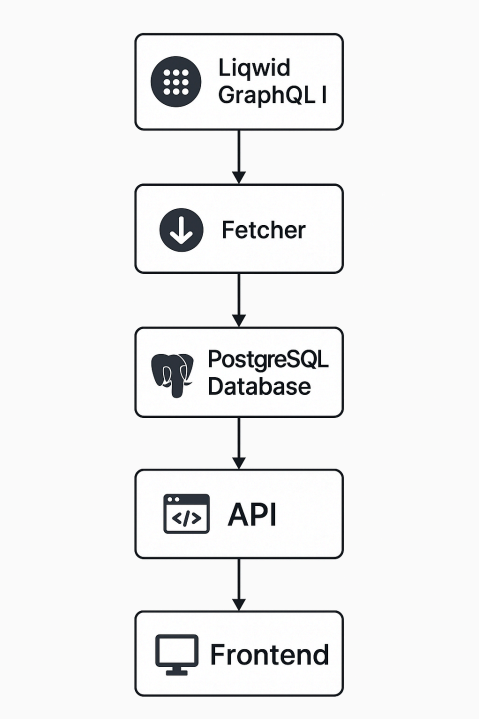
Our indexer system is built around a modular service-based design specifically tailored for integrating Cardano DeFi protocols like Liqwid. The key components include:

- **Liqwid GraphQL API** as the upstream data source
- **Fetcher Service** to poll and retrieve relevant data at defined intervals (every 20s)
- **PostgreSQL Database** to store processed market data, lending stats, and user positions
- **API Layer** (`/api/liqwid/...`) exposing RESTful endpoints to the frontend
- **Frontend UI** (built with Next.js) consuming the API endpoints for live user interaction

Tech Stack:

- Node.js / TypeScript backend (Next.js + `app/api/` structure)
- PostgreSQL database
- Mesh SDK and CIP-30 wallet interface for Cardano wallet and TX signing (not part of indexer)

Architecture for Liqwid Data:



2. Database Schema

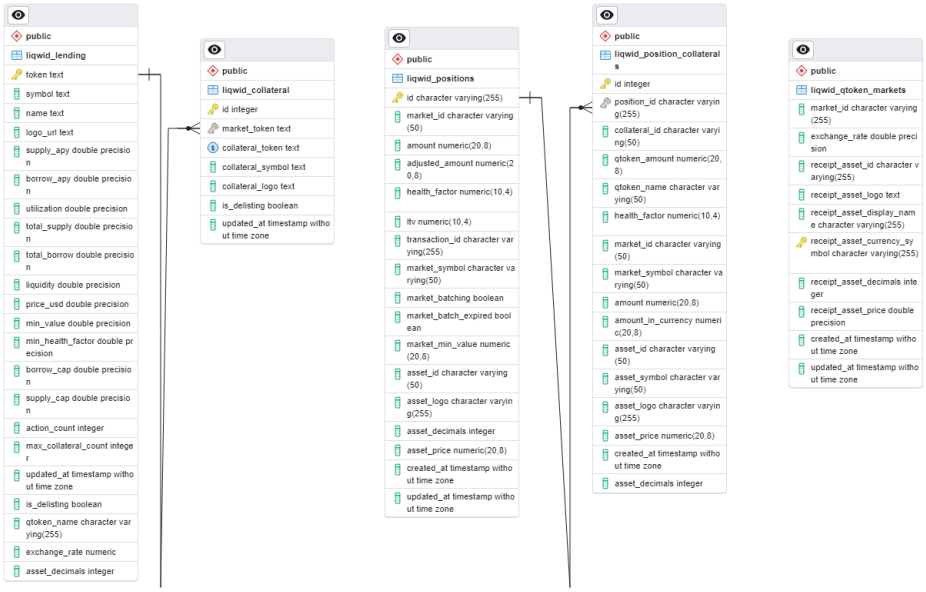
The backend uses a PostgreSQL database with normalized tables mapped directly to protocol data. Below are the core tables powering the Liqwid Finance integration:

📄 Key Tables in Liqwid Schema

Table Name	Purpose
`liqwid_lending`	Core market data: APYs, liquidity, price, thresholds
`liqwid_collateral`	List of valid collateral assets with symbols, metadata
`liqwid_positions`	User positions: supplied/borrowed, health factors
`liqwid_position_collateral`	Per-position collateral breakdown
`liqwid_qtoken_markets`	Metadata about qTokens: exchange rates, decimals

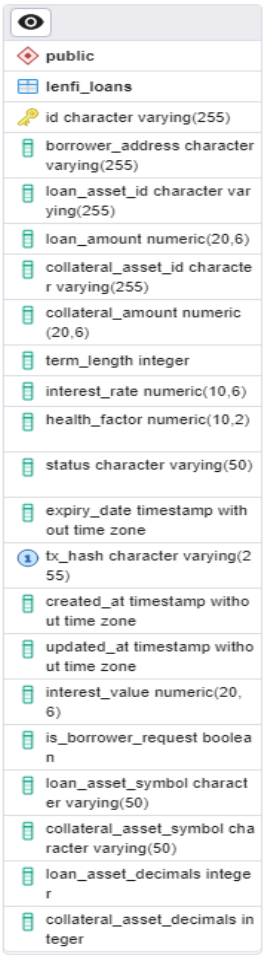
Each table contains precise fields such as:

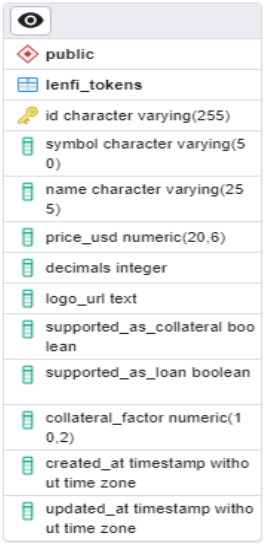
- supply_apy, borrow_apy, utilization in liqwid_lending
- collateral_token_text, is_delisting in liqwid_collateral
- adjusted_amount_numeric, health_factor, transaction_id in liqwid_positions



Each protocol would have its own tables similar to Liqwid with each slightly different depending on the type of protocol. If other protocols that use similar pooled lending to Liqwid are created

on Cardano in the future they would be very similar to the above and there would be some tables that combine both. Below are the tables used for Lenfi P2P.





3. Smart Contract / API Interaction

Liqwid (Integrated Protocol)

With Liqwid we are using their GraphQL to pull the required data and stats on the protocol with regard to available liquidity and opportunities. We also use it to help build the transactions that are submitted to the Liqwid smart contracts.

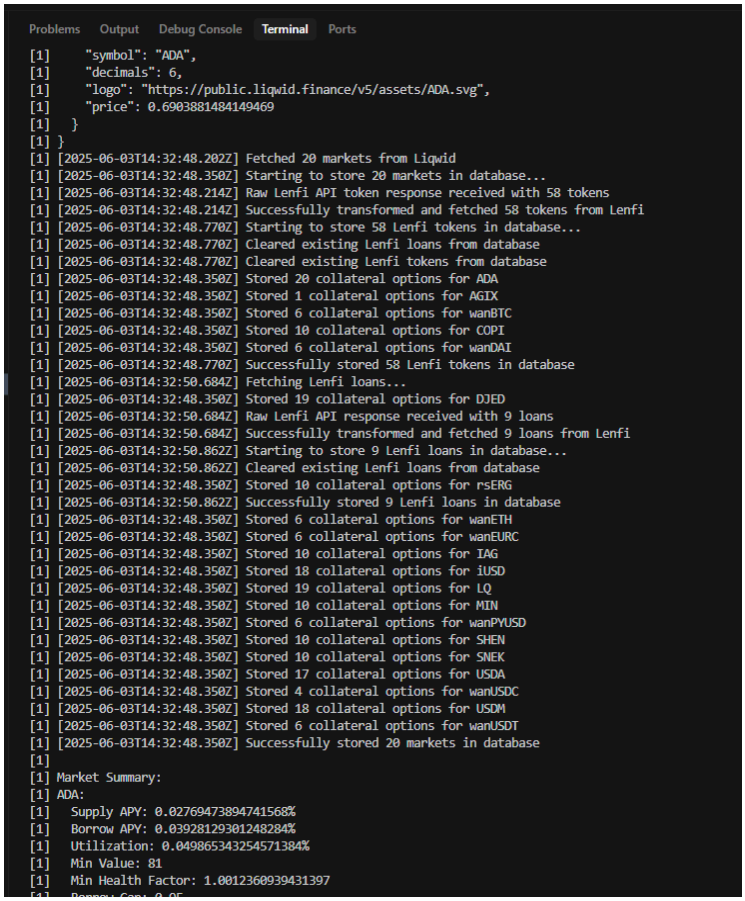
User Flow:

1. User selects token → clicks "Supply" or "Borrow"
2. UI sends params to `/api/liqwid/buildTx`
3. Backend calls Liqwid's transaction builder → receives CBOR
4. CBOR is signed in browser via MeshJS + CIP-30 wallet
5. Signed transaction submitted to Cardano network

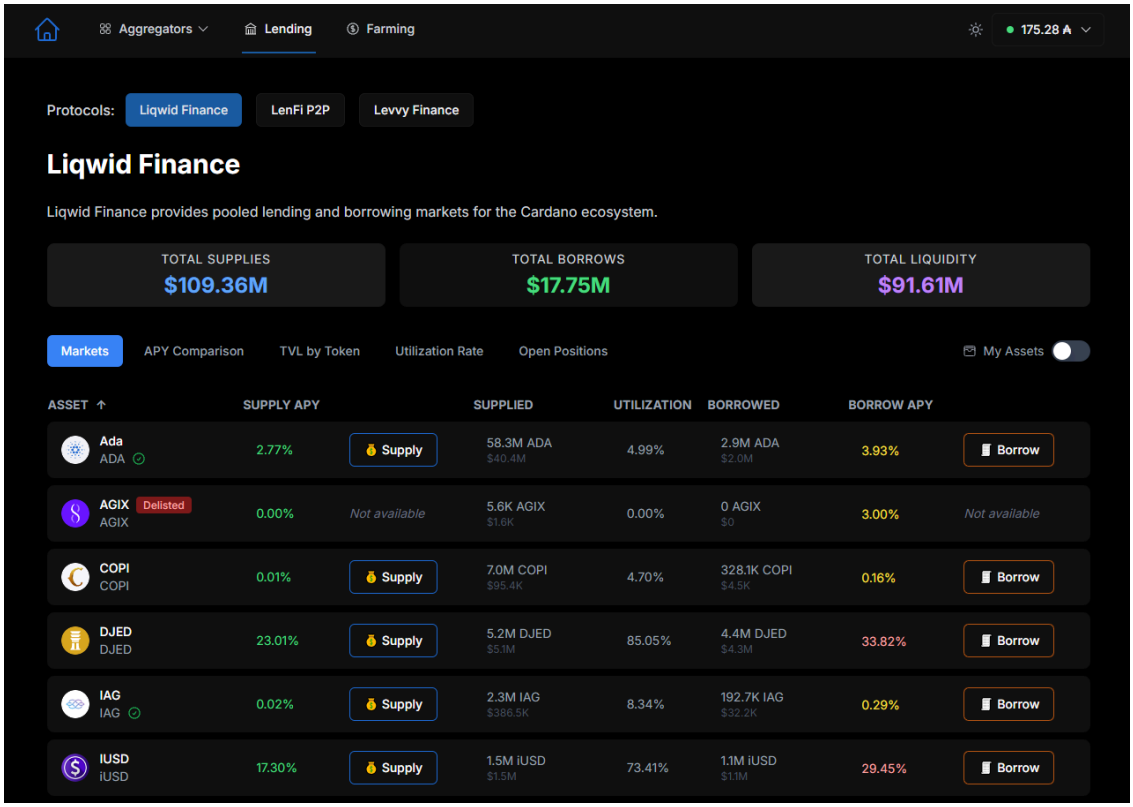
4. Working Indexer Implementation

- ✅ **Liqwid:** Fully live and syncing every 20s
- ✅ **Lenfi V1:** Read-only mode live
- ✅ **Backend:** Express-like API structure inside Next.js
- ✅ **Frontend:** Queries internal API, renders using SWR/fetch

Logs of indexing from Liqwid Finance graphql and storing in our database for fast access and comparisons



Live data from liqwid on the app frontend

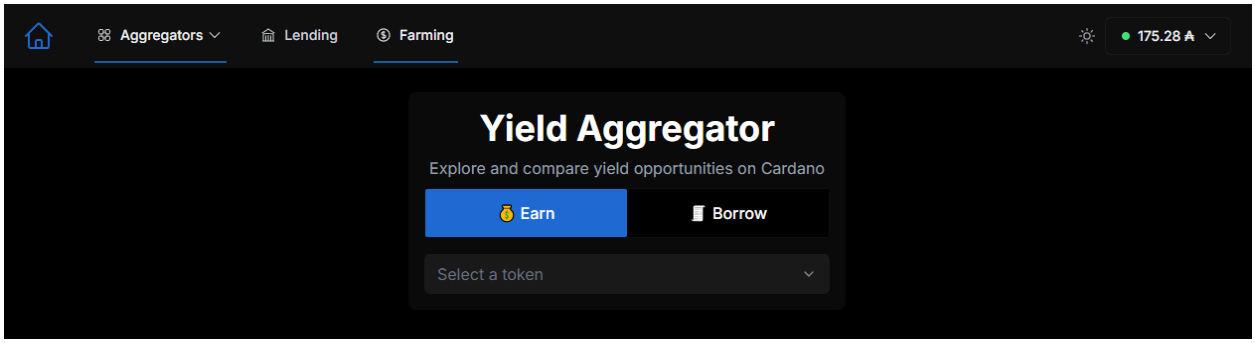


Video walkthrough of the working App - https://youtu.be/E62tq5kPUsA

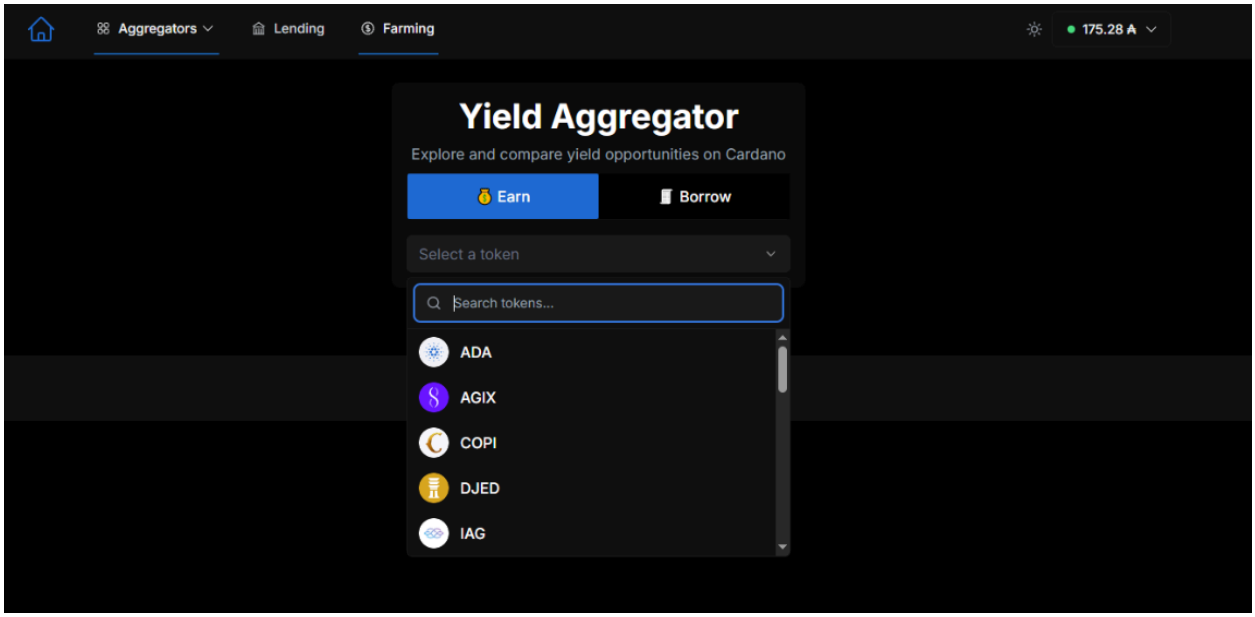
5. UI Designs

5.1 Lending Aggregator Flow

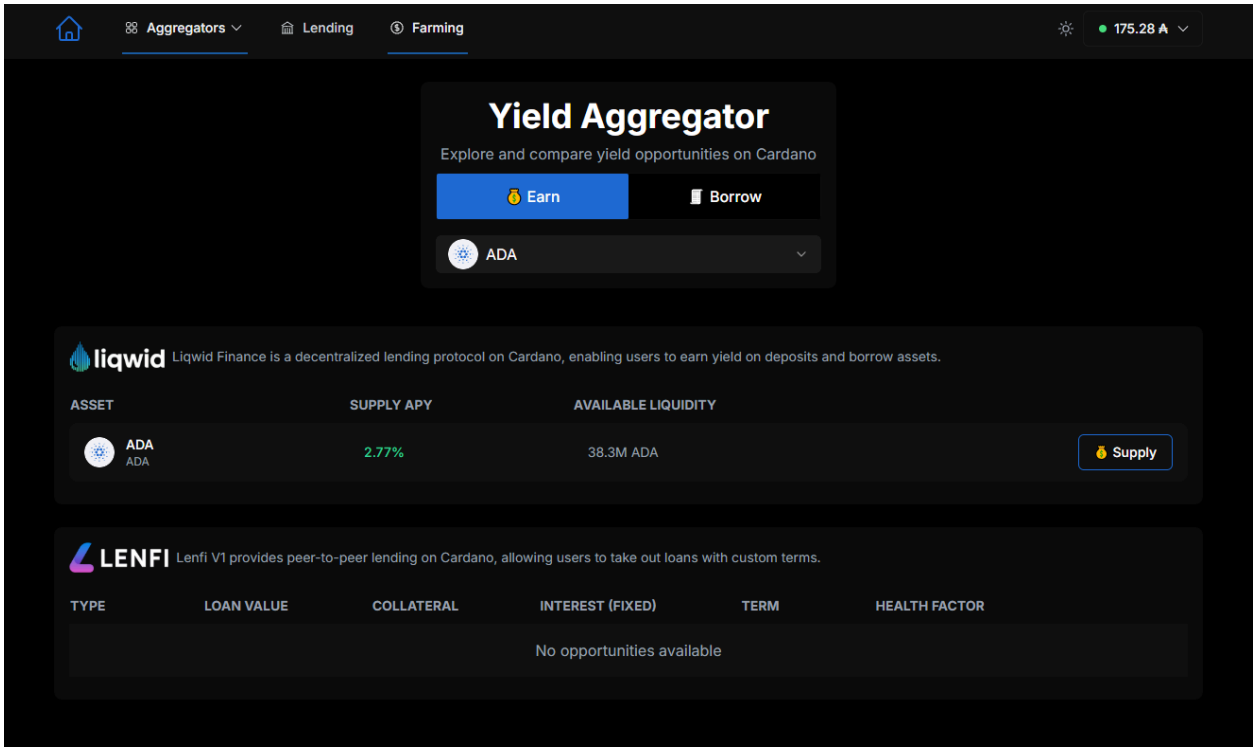
- Toggle between "Earn" and "Borrow"



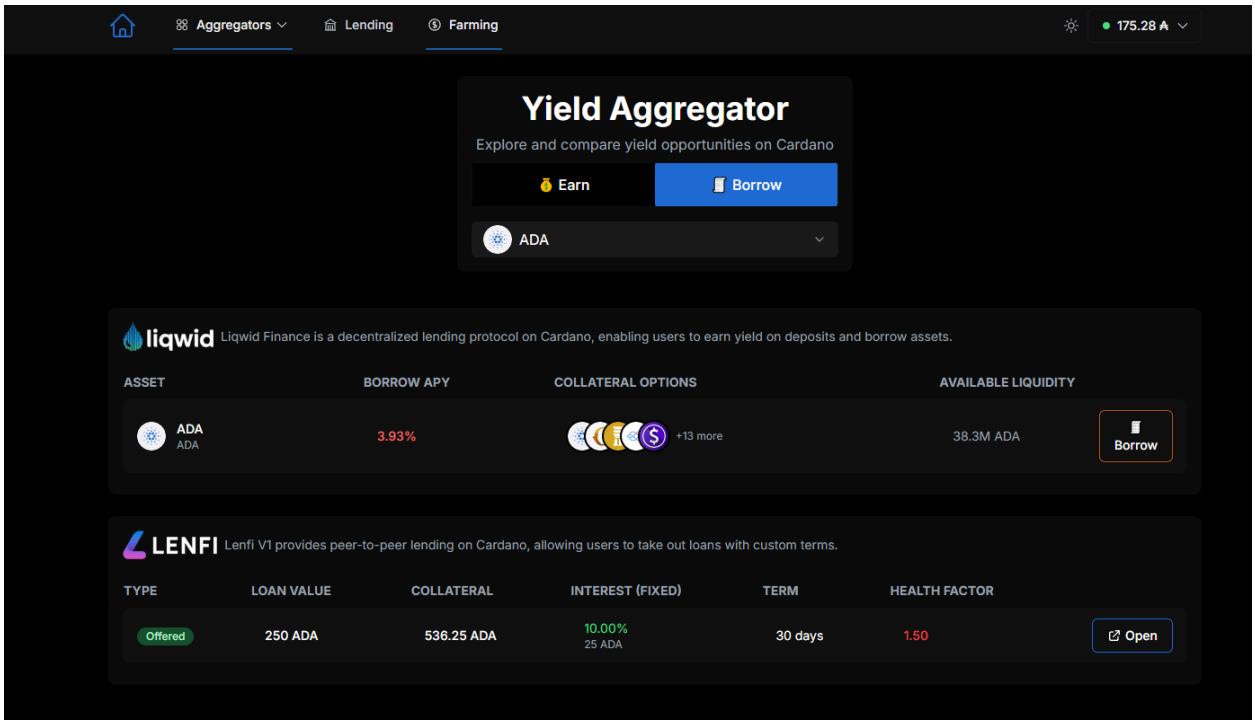
- Select token from dropdown



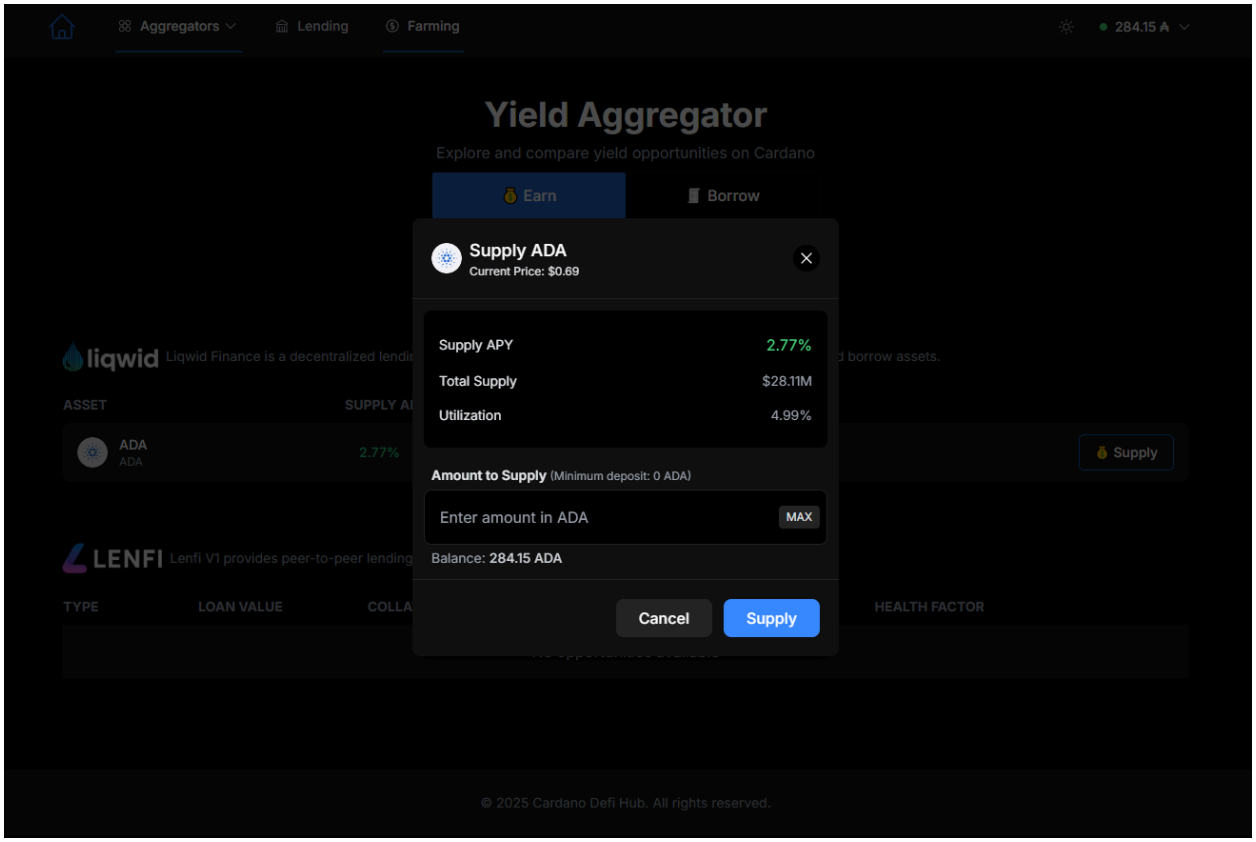
- Aggregated data from Liqwid and Lenfi showing supply opportunities for ADA



- Aggregated data from Liqwid and Lenfi showing borrow opportunities for ADA



From there the user can decide to supply or borrow an asset and below are the modals that they get when they click the supply or borrow button in the screenshots above. They get the same modals if they use the supply or borrow buttons on the liqwid protocol page or the wallet page too.


Aggregators
Lending
Farming
284.15 ₳
Yield Aggregator
Explore and compare yield opportunities on Cardano
Earn
Borrow
Supply ADA
Current Price: $0.69
Supply APY 2.77%
Total Supply $28.11M
Utilization 4.99%
Amount to Supply (Minimum deposit: 0 ADA)
Enter amount in ADA
MAX
Balance: 284.15 ADA
Cancel
Supply
liqwid
ASSET
ADA
Supply
LENFI
TYPE
LOAN VALUE
HEALTH FACTOR
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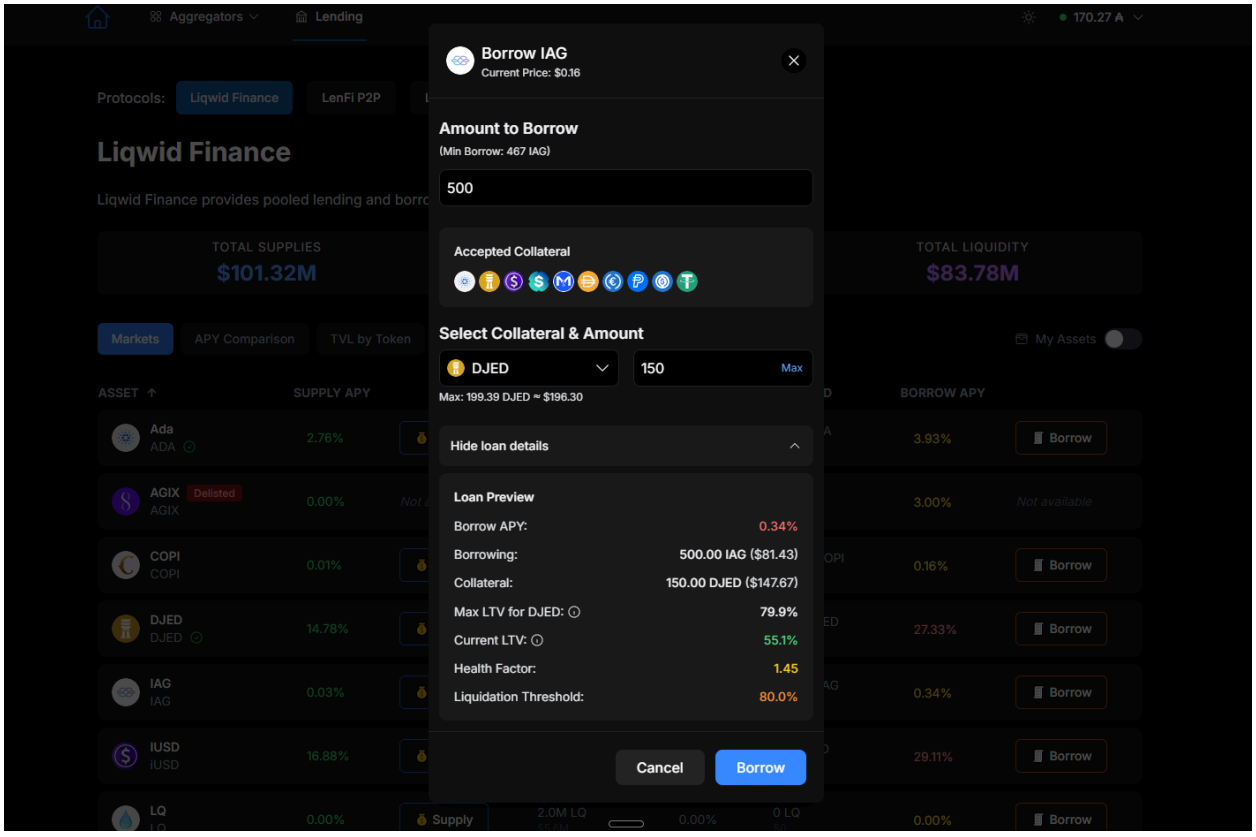
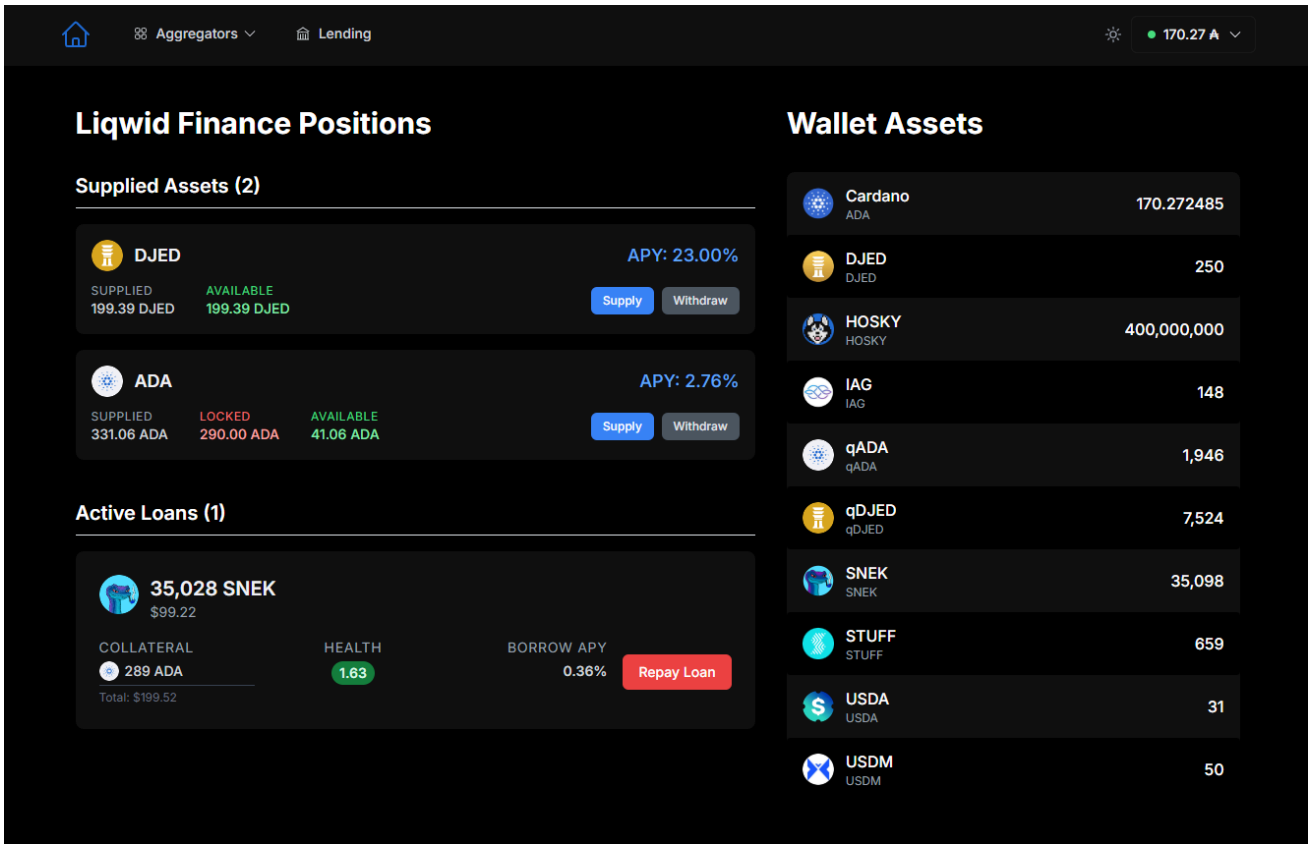

Aggregators
Lending
170.27 ₳
Protocols:
Liqwid Finance
LenFi P2P
Liqwid Finance
TOTAL SUPPLIES
$101.32M
TOTAL LIQUIDITY
$83.78M
Markets
APY Comparison
TVL by Token
My Assets
ASSET
SUPPLY APY
BORROW APY
Borrow IAG
Current Price: $0.16
Amount to Borrow
(Min Borrow: 467 IAG)
500
Accepted Collateral
Select Collateral & Amount
DJED
150
Max
Max: 199.39 DJED ≈ $196.30
Hide loan details
Loan Preview
Borrow APY: 0.34%
Borrowing: 500.00 IAG ($81.43)
Collateral: 150.00 DJED ($147.67)
Max LTV for DJED: 79.9%
Current LTV: 55.1%
Health Factor: 1.45
Liquidation Threshold: 80.0%
Cancel
Borrow

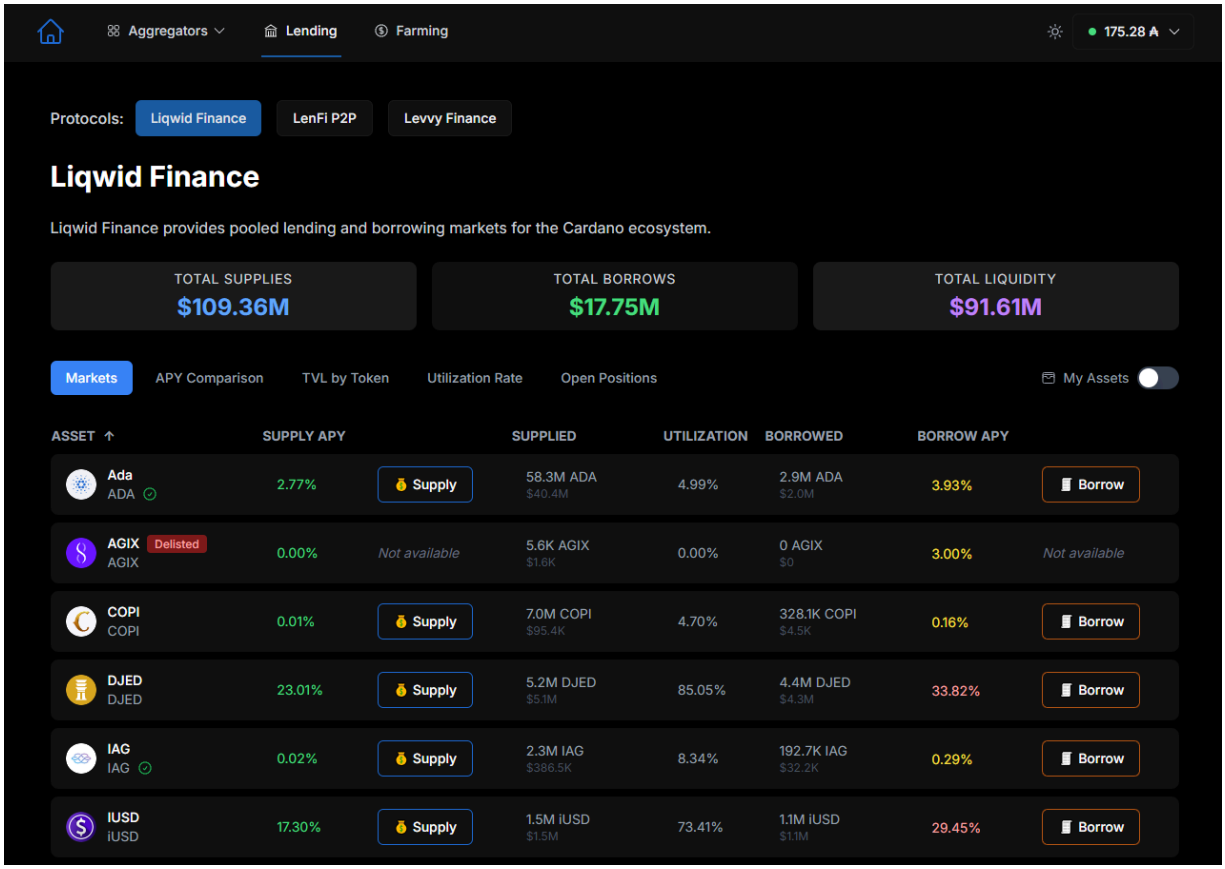
5.2 User Portfolio / Positions Page

- Shows user's supplied assets and active loans.
    - This page checks the users wallet and displays the assets in their wallet as well as open positions in liqwid finance. You can see in the screenshot below this wallet has supplied both ADA and DJED to Liqwid Finance to earn yield and has used some of that ADA as collateral to borrow SNEK.
    - The user can also repay any of their open loans from here or supply more / withdraw in the positions they have supplied assets

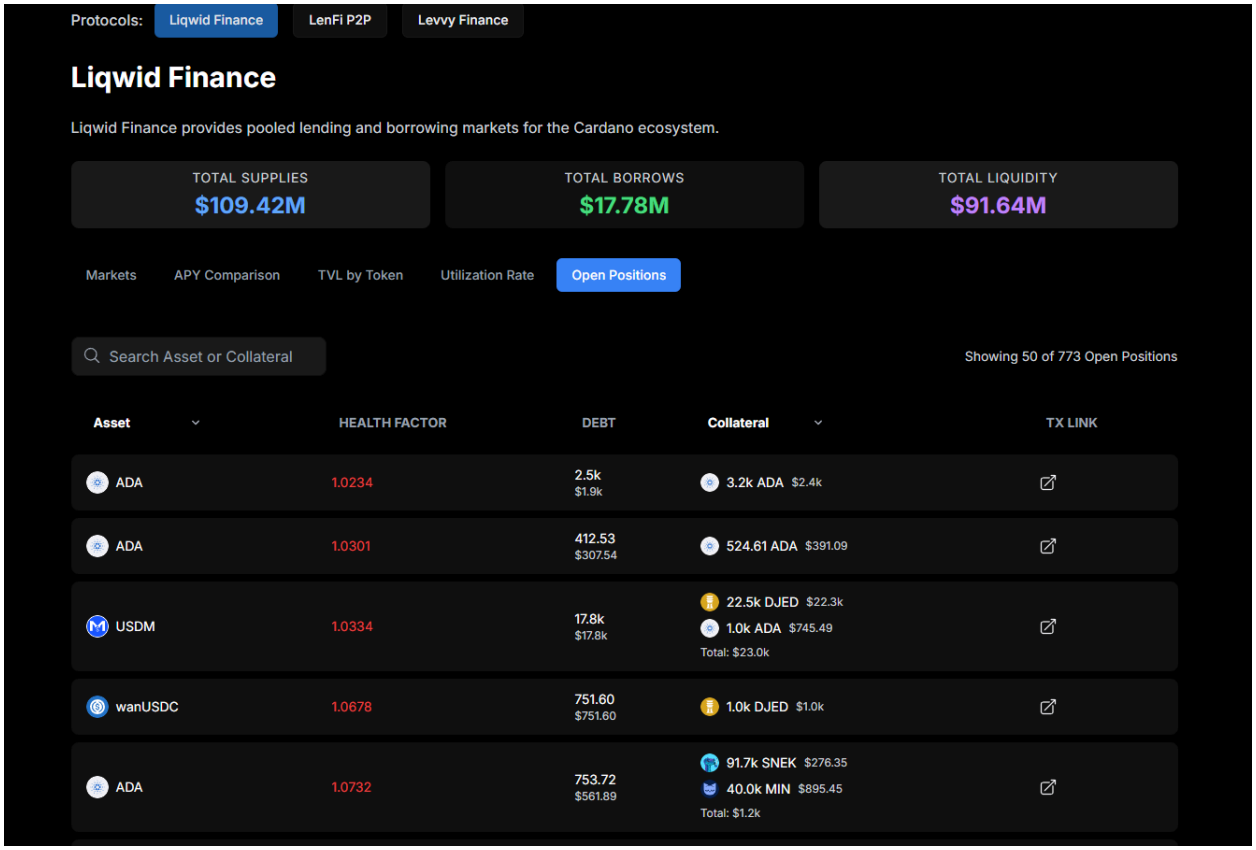


5.3 Active Loan Overview Page

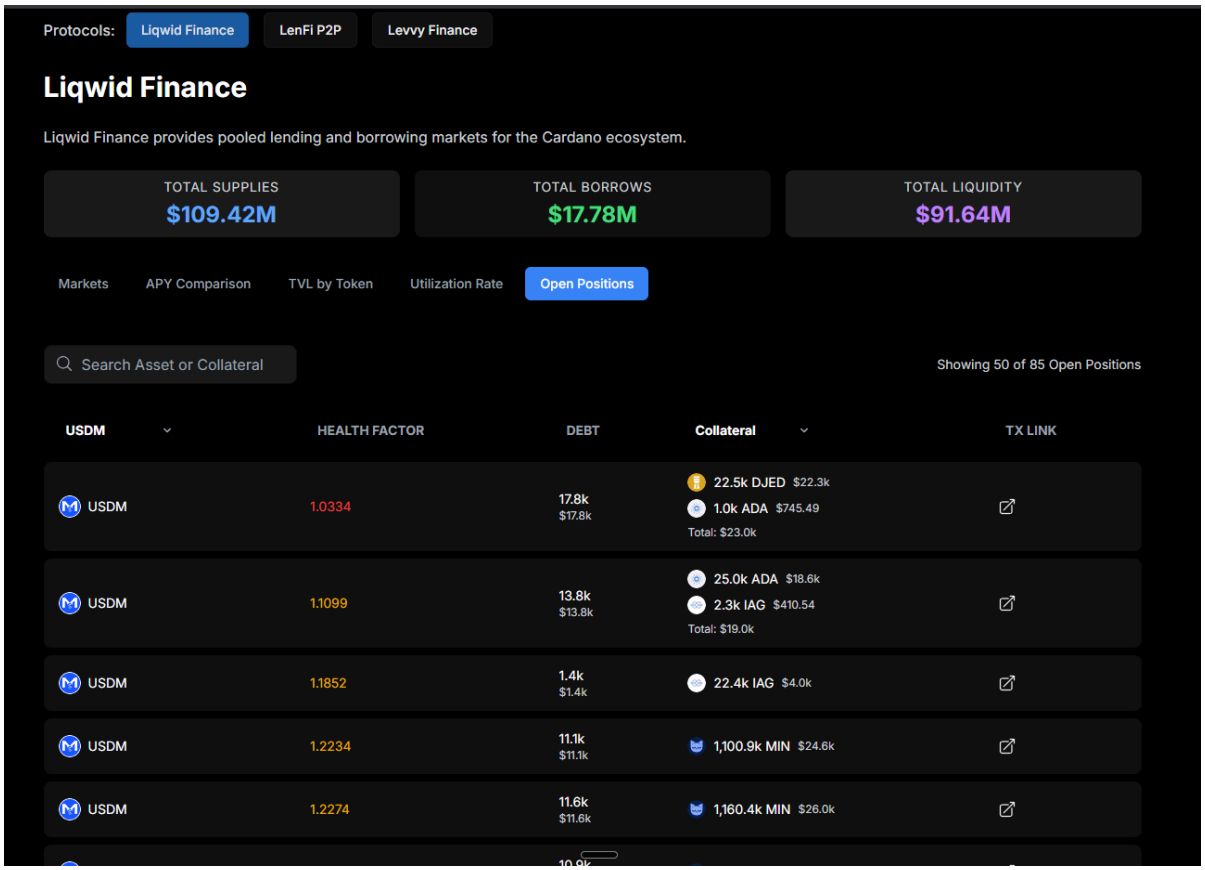
Each protocol also has their own page as you can see with the main Liqwid page below



There are multiple tabs on this page with one to allow the user to see all open positions on Liqwid finance.

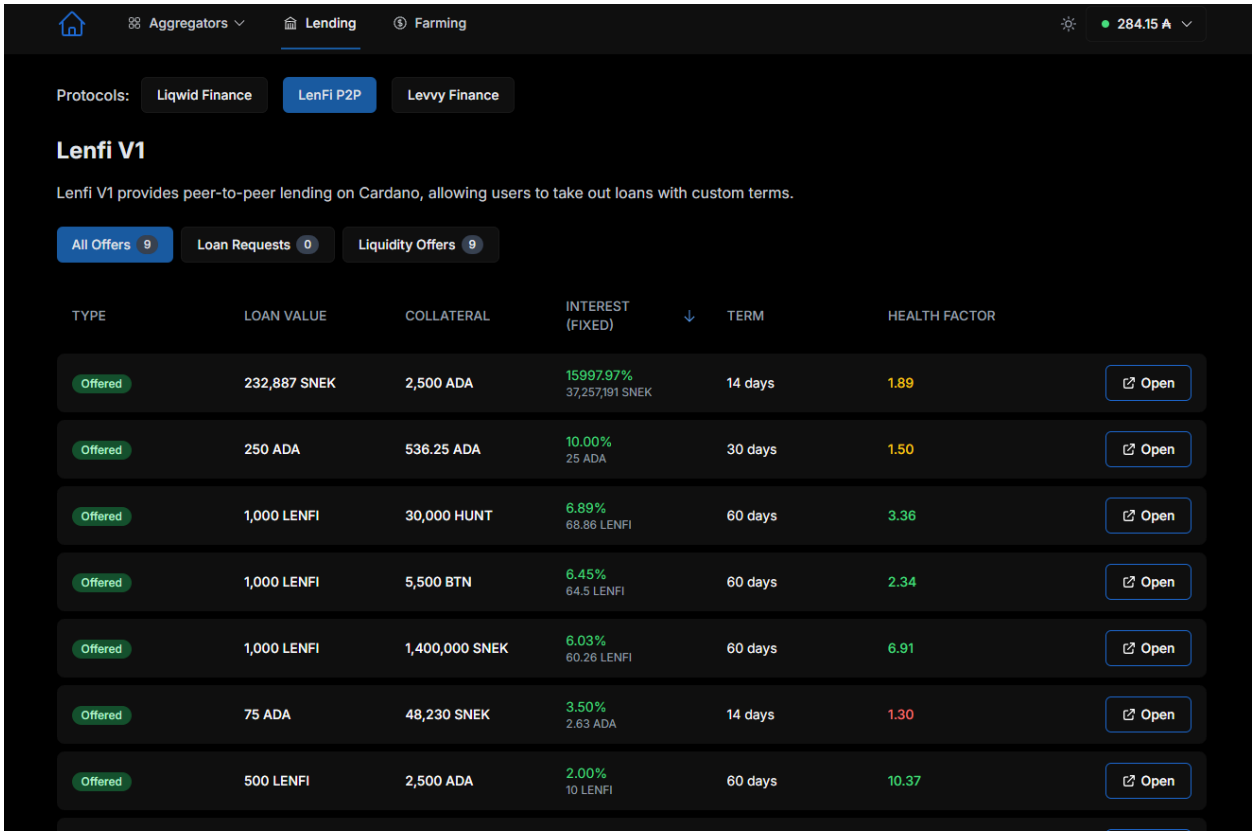


They can also filter by asset or collateral type by clicking on the headers to show the search dropdown



6. Supplement: Lenfi V1 Integration

- Peer-to-peer loan listings from Lenfi V1 are live
- Displayed in the UI with full details: value, collateral, interest, term, health
- Sets foundation for V2 integration using SDK if Lenfi relaunches V2. We are also looking at other protocols for future integrations too.



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7. Conclusion

We feel that milestone 2 deliverables have been fully implemented:

- The indexer is live and functional
- Smart contract / API flow is wired and tested
- Completed UI pages submitted in place of figma as the app is working rather than just a plan and the pages are populated with live protocol data

If anything else is needed we are happy to expand on any section or add anything else that is needed in.