Wallet Risk Scoring from Scratch – Report

Overview

This report outlines the approach and methodology followed to assign a **risk score (0–1000)** to a set of 100 Ethereum wallet addresses, based on their interactions with the **Compound V2/V3 lending protocols**. The process involved collecting on-chain data, engineering meaningful features, and computing a risk score using a rule-based model.

1. Fetch Transaction History

Protocols Queried:

- **Compound V2 (Ethereum)**
  → via: https://api.thegraph.com/subgraphs/name/graphprotocol/compound-v2
- **Compound V3 (Ethereum)**
  Deprecated: The endpoint has been removed
- **Compound V3 (Arbitrum)**
  Used as a fallback subgraph

Result:

- Most wallets **did not have any transaction history** on either Compound V2 or V3 (Arbitrum).
- Responses from Compound V2 returned `null` for the `account` field, indicating no interactions.
- Compound V3 (Ethereum) subgraph is deprecated.
- Arbitrum V3 subgraph is live, but **wallets still showed 0 borrow and 0 collateral**.

Conclusion: Very few wallets had valid DeFi activity on Compound protocols, which limited usable data for feature engineering.

2. Data Preparation

Data Collection Method

- Queried each wallet using GraphQL.
- Extracted the following metrics per token or market:
  - lifetimeSupply
  - lifetimeBorrow
  - supplyBalanceUnderlying
  - borrowBalanceUnderlying
  - totalCollateralValue (V3)
  - totalBorrowValue (V3)

Feature Selection Rationale

Despite limited data, we selected the following features for wallets with valid data:

Feature	Description	Risk Interpretation
total_supplied	Total value lent by the wallet	Higher supply = safer
total_borrowed	Total value borrowed	High borrow = riskier
borrow_to_supply_ratio	Borrow / Supply	>1 means overleveraged
repayment_ratio	Repaid vs borrowed (estimated)	<0.8 indicates bad repayment
average_utilization	Borrow / (Borrow + Supply)	High utilization = risky
liquidations	Liquidation count (not available in V2)	Placeholder = 0

Normalization Method

All numeric features were normalized using **min-max scaling**:

normalized = (value - min) / (max - min)

This ensured fair comparison across wallets regardless of scale differences.

3. Risk Scoring Model

Scoring Method

Each wallet was assigned a **base score of 1000** and penalties were subtracted based on risk factors:

Code

```
score = 1000

if borrow_to_supply_ratio > 1:
    score -= 200

if repayment_ratio < 0.8:
    score -= 150

if average_utilization > 0.9:
    score -= 100

# Liquidations assumed 0 (Compound V2 subgraph doesn't return it)
```

Final score was clamped between 0 and 1000:

```
score = max(0, min(1000, score))
```

Justification of Risk Indicators

Indicator	Justification
Borrow-to-Supply Ratio > 1	Indicates overleveraging, potential liquidation risk
Repayment Ratio < 0.8	Suggests poor debt repayment behavior
High Utilization	Wallet is maximizing its credit line, indicating stress
Liquidations > 0	A wallet with prior liquidations is riskier (not available in this case)

Conclusion

Due to the **inactivity** of most provided wallets on both Compound V2 and V3 protocols, risk scoring was only meaningful for a small subset. A broader DeFi analysis (e.g., Aave, Etherscan event logs) would be necessary for more comprehensive wallet profiling.