RiskLens

AI-Driven Portfolio Intelligence Platform with Blockchain Proof

1. Project Overview

RiskLens is a web-based portfolio intelligence and risk analysis platform designed to help individual investors aggregate multi-asset portfolios, analyze risk and concentration, receive explainable rebalancing recommendations, and cryptographically prove portfolio history using blockchain technology. The system is strictly read-only and does not execute trades or handle user funds.

2. Problem Statement

Investors often spread their investments across multiple asset classes such as stocks, ETFs, mutual funds, cryptocurrencies, and commodities. These investments are usually distributed across different platforms, making it difficult to understand overall portfolio risk, detect overexposure, and make disciplined rebalancing decisions. RiskLens addresses this gap by providing portfolio-level intelligence and transparency.

3. MVP Scope (Frozen)

The MVP supports manual portfolio creation, multi-asset tracking, portfolio risk analysis, diversification scoring, rebalancing recommendations, explainable insights, and blockchain-based portfolio proof. It explicitly excludes trading, broker integrations, automated execution, machine learning model training, and financial advisory guarantees.

4. Target Users

Primary users are individual retail investors with diversified investments. Future users may include financial advisors, analysts, and auditors.

5. System Architecture

RiskLens follows a layered architecture consisting of a web frontend, FastAPI backend, AI intelligence engine, MongoDB database, and a blockchain proof layer. Each layer has clearly defined responsibilities and strict boundaries.

6. Technology Stack

Frontend: Next.js, React, Tailwind CSS, Recharts, Ethers.js Backend: FastAPI (Python), JWT authentication Database: MongoDB AI Layer: Python, Pandas, NumPy (rule-based and statistical logic) Blockchain: Solidity, Polygon/Ethereum testnet, Hardhat APIs: CoinGecko, Yahoo Finance / Alpha Vantage

7. Core Functional Modules

User Authentication, Portfolio Management, Pricing Engine, AI Risk & Allocation Engine, Decision Logging System, and Blockchain Proof Service.

8. End-to-End Flow

When a user updates a portfolio, the backend stores the data, generates a snapshot hash, writes the hash to the blockchain, triggers AI analysis, logs the decision, and returns explainable insights to the frontend.

9. AI Evolution Roadmap

Phase 1 uses deterministic rules and statistics. Phase 2 introduces learning from historical market data. Phase 3 incorporates learning from user decisions, while always keeping humans in control.

10. Security & Ethics

RiskLens is a read-only system with no fund custody, no trade execution, transparent decision logic, explainable AI, and privacy-first data handling.

11. MVP Success Criteria

The MVP is complete when users can add portfolios, view risk and diversification insights, receive rebalancing recommendations, and verify portfolio history on the blockchain.

12. Final Definition

RiskLens is a portfolio intelligence platform that focuses on risk-aware decision support and transparency, rather than trading or speculative prediction.