

Crypto Portfolio Price Tracker with MEV and Arbitrage Detection

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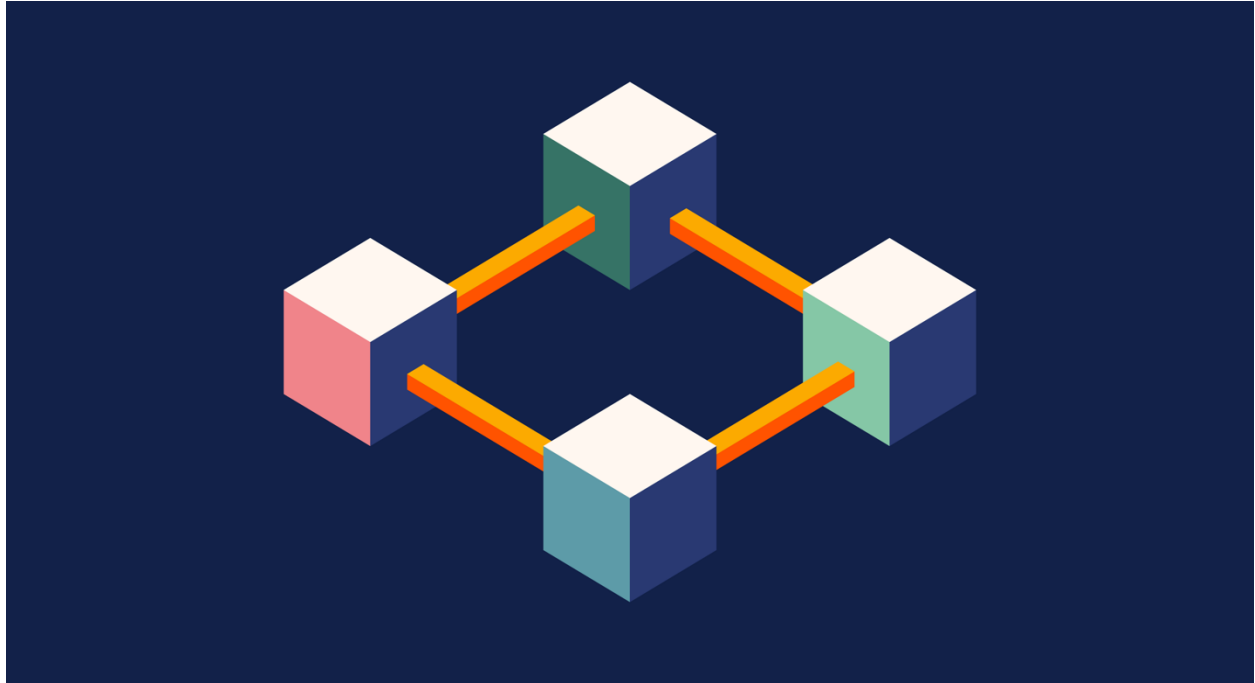


Image from: <https://www.chainalysis.com/blog/what-are-blockchains/>

Abstract

Cryptocurrency markets are highly volatile, and prices often vary between different exchanges, creating opportunities for arbitrage and Maximal Extractable Value (MEV). The goal of this project is to build a **Crypto Portfolio Price Tracker** that fetches real-time crypto prices from multiple exchanges using parallel API requests. Time permitting, the tool will also detect potential arbitrage opportunities and explore ways to optimize the price-fetching process to reduce latency and increase performance. By doing so, I aim to better understand how parallel computing can be applied in finance to find real-time arbitrage and MEV opportunities.

We will use **Python** as the primary programming language, along with **asyncio** and **aiohttp** for parallel API handling. The project will benchmark the sequential versus parallel fetching of prices and optimize the throughput to reduce response time.

Schedule

- **Week of February 5** – Project Proposal Submission
 - **Week of February 12** – Research API endpoints for major exchanges (Binance, Coinbase, Kraken, etc.) and implement basic price-fetching logic.
 - **Week of February 19** – Integrate parallel API requests using **asyncio** and **aiohttp**. Benchmark and compare sequential vs. parallel performance.
 - **Week of February 26** – Software Exploration Milestone: Ensure the tool fetches data from at least three exchanges and build a basic console output to display prices.
 - **Week of March 4** – Add logic for detecting arbitrage opportunities between exchanges.
 - **Week of March 11** – Research MEV detection by monitoring mempool transactions; create a plan for integrating basic MEV functionality.
 - **Week of March 18** – Build a simple real-time dashboard using **Flask** or **Dash** to display prices and arbitrage opportunities.
 - **Week of March 25** – Benchmark dashboard performance and optimize refresh rates.
 - **Week of April 1** – Finalize the MEV detection logic and integrate with the main tool.
 - **Week of April 8** – Perform final optimizations and test scalability.
 - **April 15** – Final Project Submission.
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Part 1: Software Exploration

For the first part of this project, I will explore how to interact with multiple cryptocurrency exchanges using their public APIs. The focus will initially be on **Binance**, **Coinbase**, and **Kraken** for real-time price data as a proof of concept. Later down the line I may switch to markets with more arbitrage opportunities. I will use **Python** with **asyncio** and **aiohttp** for parallel API requests, which will significantly improve performance over sequential requests. I expect the outcome of this step to be a working codebase that can fetch prices from multiple exchanges and display them on the console in real time.

Resources:

- [Binance API Documentation](#)
 - [CoinGecko API Documentation](#)
 - [Kraken API Documentation](#)
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Part 2: Benchmark and Optimization

The code for this project will initially fetch crypto prices sequentially and then be optimized to run in parallel using **asyncio** and **aiohttp**. I will benchmark the response time for fetching data from multiple APIs and optimize the throughput by reducing latency and increasing concurrency. The goal is to achieve at least a **3x speedup** compared to sequential fetching. I will also explore caching and optimizing the refresh rate in the real-time dashboard to further improve performance.

Expected Outcome:

- Demonstrate a significant reduction in response time through parallel API requests.
 - Detect at least one real-time arbitrage opportunity across exchanges.
 - Build a functional real-time dashboard for crypto price tracking and arbitrage detection.
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