Serverless Stock Portfolio Tracker With Real-Time Updates

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1. INTRODUCTION

With the increasing popularity of online stock trading, individuals are investing in financial markets more than ever. However, many **small investors and students** still rely on multiple applications and **manual calculations** to track their investments. This project proposes a Serverless Real-Time Stock Portfolio Tracker that eliminates the need for manual tracking by providing a **centralized**, automated platform built on Amazon Web Services (AWS)

2. PROBLEM STATEMENT

Investors currently face several hurdles that lead to inefficient management:

- **Manual Calculations:** Users often calculate profit and loss manually, which is time-consuming and prone to error.
- **Delayed Updates:** Lack of real-time stock price updates results in delayed financial insights.
- **High Costs:** Many existing solutions require expensive paid subscriptions.
- **Complexity:** Traditional systems often lack scalability and involve complex server management.

3. Technologies & Tools

The stack consists of industry-standard AWS services and web technologies:

- ***Compute:** AWS Lambda for serverless backend processing.*
- ***Database:** Amazon DynamoDB for scalable portfolio storage.*
- ***Storage:** Amazon S3 for hosting the frontend application.*
- ***Monitoring**: Amazon CloudWatch for tracking real-time logs, API Gateway metrics, and system alarms.*
- ***Languages:** Built using HTML, CSS, and JavaScript (React) for a responsive and dynamic user interface.*

4. System Architecture

- **User Layer:** Investors access the system via a web browser.
- **Frontend Layer:** A static UI is hosted on Amazon S3 and delivered globally through CloudFront CDN.
- **API Layer:** Amazon API Gateway manages secure communication between the frontend and backend.
- **Compute Layer:** AWS Lambda functions process business logic, such as updating portfolios and fetching prices.

5. Security & Reliability

Security is integrated at every layer of the architecture:

- ***IAM Roles:** Proper roles and access policies ensure the principle of "Least Privilege".*
- ***API Security:** API Gateway handles secure communication and can include API Key or JWT authentication.*
- ***Data Protection:** Portfolio data is stored securely in DynamoDB with controlled access.*
- ***Secrets Management:** External API keys are managed securely via AWS Secrets Manager.*

6. Aims & Objectives

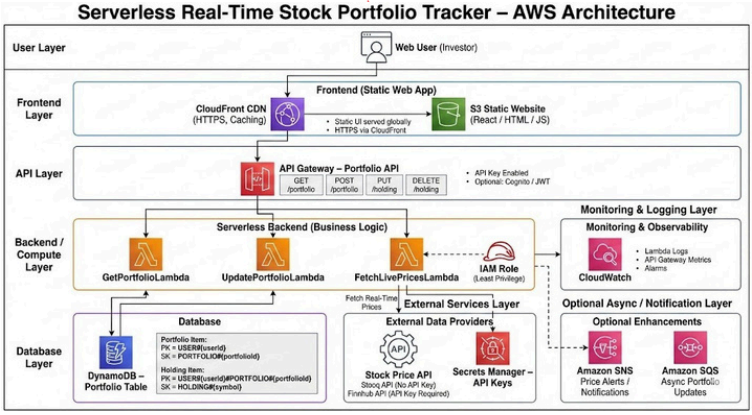
The goal is to implement a secure, cloud-based system for real-time market performance tracking.

- **Centralized Portfolio Management:** Develop a unified web application that allows users to create, view, and manage multiple stock portfolios in a single, secure dashboard.
- **Real-Time Market Integration:** Implement automated data fetching from external stock APIs (such as Finnhub and Stooq) to provide users with instantaneous market price updates.
- **Automated Financial Analytics:** Program backend logic to automatically calculate total investment value, current market value, and real-time Profit & Loss (P&L) metrics.
- **Serverless Compute Efficiency:** Utilize AWS Lambda to execute business logic only when needed, ensuring the system is highly available while maintaining a "pay-as-you-go" cost structure.
- **Standardized API Communication:** Establish a secure communication layer using Amazon API Gateway to manage RESTful requests between the user interface and the backend.

7. Key Features

- ***Fully Serverless Architecture:** Eliminates server management by utilizing AWS managed services, ensuring high availability and fault tolerance.*
- ***Real-Time Stock Updates:** Integrated with external financial APIs to provide live market data and price fluctuations.*
- ***Automated P&L Calculation:** Instantly computes profit and loss metrics based on user purchase history and current market prices.*
- ***Elastic Scalability:** The system automatically scales compute and storage resources to match user demand without manual intervention.*
- ***Pay-as-you-go Cost Model:** Minimizes operational expenses by charging only for the exact resources used during execution.*
- ***Cloud-Native Security:** Implements robust security through IAM roles, API keys, and encrypted database storage.*

Serverless Real-Time Stock Portfolio Tracker – AWS Architecture



CONCLUSION

This project proves that serverless architectures provide a professional, cost-effective foundation for modern financial tools. By integrating AWS Lambda, DynamoDB, and API Gateway, the tracker delivers a secure and scalable platform that bridges the gap between manual tracking and automated management. Ultimately, it empowers small investors with real-time insights through a high-performance, cloud-native solution.

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