

Introduction

The Stock Portfolio Management System (SPMS) is crafted to serve individual investors and financial advisors with an advanced tool for the efficient oversight and administration of stock portfolios. This system is tailored to facilitate the tracking of stock performances, execution of buy and sell transactions, monitoring of dividends and corporate actions, and the analysis of portfolio performance over a period. This document outlines the essence of what the SPMS database aims to achieve and its constituting components.

Objective of the SPMS Database

The primary objective of the SPMS database is to provide a structured and secure environment for storing, retrieving, and managing data related to stock portfolios. It aims to:

- Enable users to have a real-time overview of their investments.
- Facilitate informed decision-making through comprehensive tracking of stock performances and market trends.
- Simplify the management of stock transactions, dividends, and corporate actions.
- Offer analytical tools for assessing the financial health and performance of portfolios.

Components of the SPMS Database

User Management

The system begins with a user management component, essential for identifying and managing the system's users. Each user is uniquely identified, allowing for personalized access to their portfolios. This component stores critical information such as usernames, email addresses, and encrypted passwords.

Portfolio Management

Central to the SPMS is the portfolio management feature, which allows users to create and manage multiple stock portfolios. Each portfolio is uniquely identified and linked to a user, containing details like the portfolio name, creation date, and a brief description. This feature supports the organization and segmentation of investments according to different strategies or objectives.

Stock Tracking

The stock tracking component is key to monitoring the market performance of various stocks within the portfolios. It includes unique identifiers for each stock, alongside details such as ticker symbols, company names, sectors, current prices, and volumes. This functionality is crucial for users to make informed decisions based on the latest market data.

Transaction Management

Transaction management records all buy and sell activities within the portfolios. Each transaction is documented with details on the stock involved, the type of transaction (buy or sell), the quantity of shares, and the price per share at the time of the transaction. This component is vital for tracking the movement of assets within a portfolio.

Dividend and Corporate Actions Tracking

This feature tracks dividends paid by stocks within the portfolio and records any corporate actions (such as splits or mergers) that could affect the holdings. Each record includes the date, the amount (for dividends), and details of the action, ensuring users are informed of factors that may impact their investment value.

Performance Analysis

Finally, the SPMS database includes a component for analyzing the performance of each portfolio. This involves tracking the total value of the portfolio, along with realized and unrealized gains or losses over time. Such analysis is instrumental for assessing the effectiveness of investment strategies and making adjustments as needed.

Conclusion

The SPMS database is designed to be a comprehensive solution for the management of stock portfolios. By integrating various components such as user management, portfolio management, stock tracking, transaction recording, dividend and corporate actions tracking, and performance analysis, it provides users with a powerful tool for informed investment management. The database not only stores critical financial data but also supports the strategic decision-making process, ensuring users can effectively manage and grow their investments.

Nouns

- Users
- Investments
- Performances
- Market trends
- Transactions
- Dividends
- Corporate actions
- Performance
- Portfolios
- Usernames
- Email addresses
- Passwords
- Portfolio name

- Creation date
- Description
- Ticker symbols
- Company names
- Sectors
- Current prices
- Volumes
- Transaction management
- Buy and sell activities
- Type
- Quantity of shares
- Price per share cost
- Dividends
- Corporate actions
- Date
- Amount
- Details
- Total value
- Unrealized gains
- Unrealized losses

Action

- Tracking
- Containing
- Records
- Documented
- Facilitate
- Simplify
- Identity
- Managing
- Stores
- Create
- Linked
- Organization
- Segmentation
- Includes
- Analyzing
- Assessing

Rules

Database Requirements

1. User Management

- Each user must be uniquely identified by a userID.
- Users should be able to register with a Username, Email, and Password.
- Each user can own multiple portfolios but cannot share ownership of a portfolio with another user.

2. Portfolio Management

- Each portfolio is uniquely identified by a portfolioID.
- A portfolio must be associated with one user.
- Portfolios should track the name, creation date, and a brief description.
- A user can have multiple portfolios.

3. Stock Tracking

- Each stock in the system is identified by a unique stockID.
- Stocks are defined by their TickerSymbol, CompanyName, Sector, CurrentPrice, and Volume.
- The system should allow for the monitoring of stock performances over time.

4. Transaction Management

- Transactions are uniquely identified by a transactionID.
- Each transaction is associated with a specific portfolio and stock.
- Transactions record the date, type (buy or sell), quantity of shares, and price per share.

5. Dividend Tracking

- Dividends are identified by a dividendID.
- Each dividend record is linked to a specific stock.
- Dividend records include the payment date and amount per share.

6. Corporate Actions Management

- Corporate actions are identified by an actionID.
- Each action is associated with a stock and includes details such as action type (e.g., split, merger), date, and specifics of the action.

7. Portfolio-Stock Association

- A many-to-many relationship between portfolios and stocks is managed through PortfolioStock records, each with a unique portfolioStockID.
- These records track the quantity of each stock owned in a portfolio.

8. Portfolio Performance Analysis

- Performance metrics for portfolios are identified by a performanceID.
- Performance records include the date, total value, and both unrealized and realized gains/losses.

Redis Addition Problem Requirements Updated for In-Memory Storage:

1. User Session Management: Each active user session is stored with a unique session ID. When a user logs in, their session is added to a hash with a timestamp for session validity checks.
2. Real-time Stock Quotes: The system caches the most recent stock prices and timestamps in a hash, updating them as new prices come in, optimizing for read-intensive operations.
3. Quick Access Portfolio Overview: Users' portfolio summaries are stored in a hash, allowing them to view their portfolio's current value and performance at a glance without querying the entire database.
4. Transaction Queue: Pending transactions are held in a list, providing a queue-like structure that ensures order processing while offering quick updates and retrieval.
5. Performance Leaderboard: A sorted set ranks users by their portfolio values, allowing real-time updates and quick access to top-performing portfolios.