Software Requirements Specification (SRS)

Project: Digital Asset and Cryptocurrency Portfolio Tracker
Version: 1.0
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Revision history

Version	Date	Author	Change summary	Approval
1.0	04-09-2025	Instructor	SRS with diagrams embedded	

Approvals

Role	Name	Signature / Email	Date
Course Coordinator			

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1. Introduction

1.1 Purpose

The purpose of this Software Requirements Specification (SRS) document is to define the functional and non-functional requirements for the Digital Asset and Cryptocurrency Portfolio Tracker. This application is designed to help individual investors and cryptocurrency enthusiasts track their digital assets across multiple exchanges and wallets. It aims to provide real-time price updates, portfolio performance analytics, and personalized investment insights in one unified platform. The document serves as a reference for developers, testers, and stakeholders to ensure that the final product meets user expectations and adheres to defined standards.

1.2 Scope

The Digital Asset and Cryptocurrency Portfolio Tracker will allow users to connect their crypto wallets and exchange accounts through APIs, view real-time prices of multiple digital assets, track historical portfolio performance, and receive basic investment recommendations. The system will also include visualization tools such as graphs and charts for better portfolio analysis. It will focus on user privacy, security, and accuracy of financial data while maintaining a simple, intuitive interface.

The project will integrate external APIs for live price data, support multiple currencies for valuation, and offer both web and mobile access. However, it will not handle actual trading or custodial services; all operations will be strictly read-only for tracking and analytics purposes.

1.3 Audience

This document is intended for:

- **Developers & Designers:** To understand system requirements and design the architecture accordingly.
- **Quality Assurance (QA) Team:** To prepare test plans and validate system functionality.
- **Project Stakeholders & Investors:** To review features, constraints, and project deliverables.

- **Maintenance & Support Teams:** To assist with system monitoring and future enhancements.

1.4 Definitions

- **API (Application Programming Interface):** A set of functions that allows applications to access cryptocurrency exchange or wallet data.
- **Portfolio:** A collection of digital assets owned by the user, including cryptocurrencies and tokens.
- **Real-time Price Monitoring:** Continuous tracking of asset prices with minimal delay.
- **ROI (Return on Investment):** A measure of the profitability of investments.
- **Fiat Currency:** Government-issued currency such as USD, EUR, or INR, used for portfolio valuation.
- **Two-Factor Authentication (2FA):** A security process requiring two forms of verification to access an account.

2. Overall description

2.1 Product Perspective

The Digital Asset and Cryptocurrency Portfolio Tracker will function as a web and mobile application that interacts with multiple cryptocurrency exchanges, wallets, and price data providers through secure APIs. The system will not store user assets but will fetch real-time prices, transaction histories, and portfolio balances for analysis and visualization.

The application will include:

- **Front-end Interface:** A clean, responsive UI for users to view and analyze portfolio data.
- **Back-end Services:** Secure APIs for fetching real-time prices and portfolio data.
- **Data Visualization Layer:** Interactive charts, graphs, and tables for performance tracking.
- **Recommendation Engine:** Basic suggestions based on market trends and historical performance.

2.2 Major Product Functions

Key functionalities include:

- **Real-Time Price Monitoring:** Fetch live prices for major cryptocurrencies from multiple exchanges.
- **Portfolio Tracking:** Aggregate balances from different wallets and exchanges in one view.
- **Historical Performance Analysis:** Provide trend charts, profit/loss summaries, and ROI calculations.
- **Asset Allocation Insights:** Show distribution across assets, currencies, and sectors.
- **Investment Recommendations:** Generate alerts or insights based on price movements and trends.
- **Currency Conversion:** View portfolio value in multiple fiat currencies.
- **Data Export:** Allow users to download performance reports in PDF or CSV format.
- **User Account Management:** Support sign-up, login, and secure data handling.
- **Offline Mode:** Limited capability to view cached data when offline.

2.3 User Roles and Characteristics

- **Individual Investors:** Crypto enthusiasts and retail investors who want to track and analyze their portfolios efficiently.
- **Financial Analysts:** Professionals needing advanced analytics and historical data views.
- **System Administrators:** Responsible for system monitoring, security, and data accuracy.

Users are expected to have basic knowledge of cryptocurrency exchanges and wallets but no advanced technical expertise.

2.4 Operating Environment

- **Platform:** Web application (desktop & mobile browsers) and Android/iOS mobile apps.
- **APIs:** REST APIs for exchange/wallet integration and real-time price feeds.
- **Servers:** Cloud-based hosting with auto-scaling capabilities.
- **Data Storage:** Secure cloud databases for user preferences and historical data.

2.5 Constraints

- **API Rate Limits:** Bound by the data access restrictions of third-party APIs.
- **Data Accuracy:** Dependent on exchange-provided price feeds and uptime.
- **Security Compliance:** Must follow industry standards for handling user credentials and personal data (e.g., encryption, 2FA).
- **Performance:** Real-time updates should not exceed a defined latency threshold (e.g., 2–3 seconds).
- **Cost Limitations:** Free tier users may have limited features compared to premium accounts.

3. External interface requirements

3.1 User Interfaces

The application will provide a **web-based dashboard** and **mobile app interface** with a clean, responsive design. Key features include:

- **Dashboard View:** Displays real-time prices, portfolio balance, profit/loss trends, and asset allocation charts.
- **Interactive Charts:** Price trends, ROI graphs, and asset distribution visualizations.
- **Alerts & Notifications:** Price alerts and portfolio performance notifications via push and email.
- **Dark/Light Modes:** Switchable themes for better usability.
- **Accessibility:** Support for high-contrast mode and screen-reader compatibility for visually impaired users.

3.2 Hardware Interfaces

- **End-User Devices:** Standard smartphones, tablets, or desktops with internet connectivity.
- **Optional Hardware Security Keys:** Users may opt for hardware-based 2FA like YubiKey for enhanced account security.
  No specialized hardware beyond standard computing devices is required.

3.3 Software Interfaces

- **Cryptocurrency Exchange APIs:** REST APIs from Binance, Coinbase, or similar platforms for fetching portfolio and price data.

- **Wallet APIs:** Integration with APIs such as MetaMask, Trust Wallet, or Ledger Live for balance information.
- **Currency Conversion APIs:** For displaying portfolio value in multiple fiat currencies (USD, EUR, INR, etc.).
- **Notification Services:** Email and push notification services for alerts.

3.4 Communications

- **Internet Connectivity:** Required for fetching real-time prices and syncing user data.
- **API Communication:**
  - **Protocol:** HTTPS with TLS 1.2+ encryption.
  - **Authentication:** API keys or OAuth 2.0 for secure integration with exchanges and wallets.
- **Data Sync:** Real-time sync with fallback to periodic updates if connectivity issues occur.

4. System features (detailed)

4.1 Authentication & User Management

Description: Secure user authentication and account handling features.

Req ID	Requirement (shall...)	Type	Priority	Source/Stakeholder	Acceptance Criteria / Test Case Ref	Comments / Dependencies
DAP-F-001	The system shall allow users to create accounts using email and password.	Functional	High	Users/Business	AC-DAP-F-001: Account created successfully. Test: TC-Auth-01	Secure password policy enforced
DAP-F-002	The system shall support login via email/password and OAuth (Google, Apple).	Functional	High	Users/Business	AC-DAP-F-002: Successful login via OAuth. Test: TC-Auth-02	Depends on OAuth APIs
DAP-F-003	The system shall provide two-factor authentication for account security.	Functional	High	Security/Compliance	AC-DAP-F-003: 2FA OTP validated. Test: TC-Auth-03	SMS/Email OTP integration
DAP-F-004	The system	Functional	Medium	Users	AC-DAP-F-004:	Email service dependency

Req ID	Requirement (shall...)	Type	Priority	Source/Stakeholder	Acceptance Criteria / Test Case Ref	Comments / Dependencies
	shall allow password reset via email verification.				Password reset link functional. Test: TC-Auth-04	

4.2 Portfolio Tracking & Management

Description: Fetch and display user portfolio balances from multiple sources.

Req ID	Requirement (shall...)	Type	Priority	Source/Stakeholder	Acceptance Criteria / Test Case Ref	Comments / Dependencies
DAP-F-005	The system shall fetch user portfolio balances via connected exchange APIs.	Functional	High	Users/Business	AC-DAP-F-005: Portfolio synced successfully. Test: TC-Port-01	Requires API keys/OAuth
DAP-F-006	The system shall display portfolio value in multiple fiat currencies.	Functional	Medium	Users	AC-DAP-F-006: Currency conversion accurate. Test: TC-Port-02	Conversion API dependency
DAP-F-007	The system shall maintain cached	Functional	Medium	Users	AC-DAP-F-007: Cached data accessible offline. Test: TC-Port-03	Limited historical data offline

Req ID	Requirement (shall...)	Type	Priority	Source/ Stakeholder	Acceptance Criteria / Test Case Ref	Comments / Dependencies
	data for offline portfolio viewing.					

4.3 Real-Time Price Monitoring

Description: Live tracking of cryptocurrency prices.

Req ID	Requirement (shall...)	Type	Priority	Source/Stakeholder	Acceptance Criteria / Test Case Ref	Comments / Dependencies
DAP-F-008	The system shall fetch live cryptocurrency prices from multiple exchanges.	Functional	High	Users/Business	AC-DAP-F-008: Price feed latency ≤ 2 sec. Test: TC-Price-01	Exchange API rate limits
DAP-F-009	The system shall allow users to search and add specific cryptocurrencies.	Functional	Medium	Users	AC-DAP-F-009: Crypto added to watchlist. Test: TC-Price-02	Watchlist persistence required
DAP-F-010	The system shall update portfolio value automatically when prices change.	Functional	High	Users	AC-DAP-F-010: Auto-update successful. Test: TC-Price-03	Real-time WebSocket or polling mechanism

4.4 Analytics & Reports

Description: Visual analytics, performance metrics, and data export.

Req ID	Requirement (shall...)	Type	Priority	Source/Stakeholder	Acceptance Criteria / Test Case Ref	Comments / Dependencies
DAP-F-011	The system shall generate performance charts for ROI and profit/loss trends.	Functional	High	Users/Business	AC-DAP-F-011: Chart displays correct data. Test: TC-Analytics-01	Visualization library dependency
DAP-F-012	The system shall provide asset allocation breakdown via pie charts.	Functional	Medium	Users	AC-DAP-F-012: Allocation chart correct. Test: TC-Analytics-02	
DAP-F-013	The system shall allow exporting portfolio reports as CSV or PDF.	Functional	Medium	Users	AC-DAP-F-013: File downloaded successfully. Test: TC-Analytics-03	PDF/CSV library integration

4.5 Alerts & Notifications

Description: Alerting users about key portfolio events.

Req ID	Requirement (shall...)	Type	Priority	Source/Stakeholder	Acceptance Criteria / Test Case Ref	Comments / Dependencies
DAP-F-014	The system shall send price alerts when a cryptocurrency hits target price.	Functional	High	Users/Business	AC-DAP-F-014: Alert triggered at threshold. Test: TC-Alert-01	Email/Push notification service dependency
DAP-F-015	The system shall notify users of major portfolio value changes (>5%).	Functional	Medium	Users	AC-DAP-F-015: Alert accuracy verified. Test: TC-Alert-02	User-configurable thresholds required

5. Non-functional requirements (detailed)

Req ID	Requirement	Category	Priority	Acceptance Criteria / Measurement
DAP-NF-001	The system shall update portfolio balances and price data with a latency ≤ 3 seconds under normal load.	Performance	High	95% of updates complete within 3s in test environment.
DAP-NF-002	The system shall provide 99.5% uptime monthly (excluding scheduled maintenance).	Reliability	High	Cloud monitoring logs show ≥ 99.5% uptime.
DAP-NF-003	The system shall encrypt all sensitive user data (API keys, passwords) at rest and in transit.	Security	High	Verified through penetration test and encryption audit.
DAP-NF-004	The system shall support responsive UI design for mobile and desktop users.	Usability	Medium	Verified across Chrome, Firefox, Safari, Android, iOS.
DAP-NF-005	The system shall allow horizontal scaling to handle at least 10,000 concurrent users without degradation.	Scalability	Medium	Load test reports confirm performance under stress.

5.1 Security

5.1.1 Security Objectives

1. Ensure confidentiality and integrity of user credentials, API keys, and portfolio data.

2. Prevent unauthorized access through strong authentication and 2FA.

5.1.2 Security Requirements

Req ID	Requirement (shall...)	Type	Priority	Acceptance criteria / Test case ref
PRJ-SR-001	All API communication shall use HTTPS with TLS 1.2+ encryption.	Security	High	Attempt to connect with HTTP fails. Test: TC-Sec-01
PRJ-SR-002	The system shall store API keys and passwords only in encrypted format (AES-256).	Security	High	Database inspection shows no plaintext credentials. Test: TC-Sec-02
PRJ-SR-003	The system shall enforce multi-factor authentication for user logins.	Security	High	Login attempt without 2FA rejected. Test: TC-Sec-03
PRJ-SR-004	The system shall automatically log out inactive sessions after 15 minutes.	Security	Medium	Idle session auto-terminates. Test: TC-Sec-04
PRJ-SR-005	The system shall record security-related events (login attempts, API key usage) in tamper-proof logs.	Security	High	Audit logs available for review. Test: TC-Sec-05

6. Quality attributes & Acceptance tests

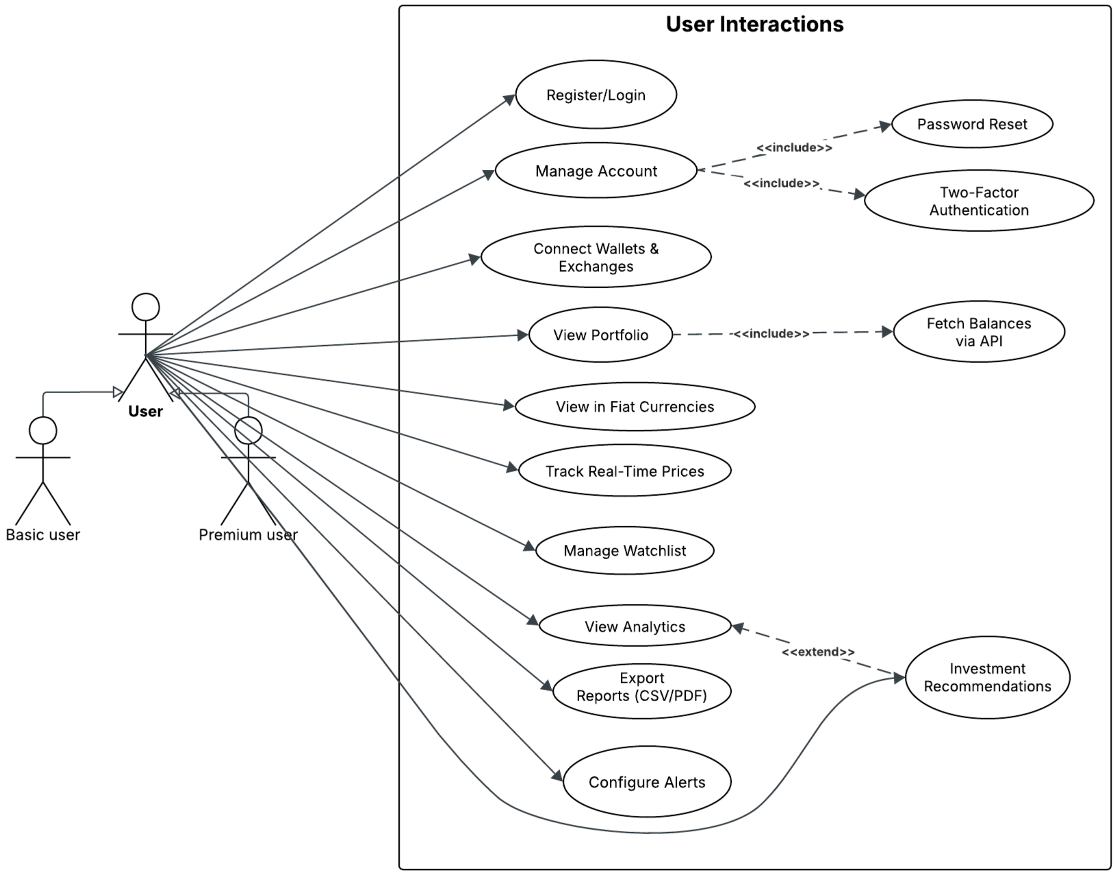
- **Performance**: 90% of portfolio updates complete in ≤3 seconds.
- **Reliability**: System uptime ≥ 99.5% monthly (monitored by cloud provider).
- **Security**: All sensitive data encrypted (AES-256 at rest, TLS 1.2+ in transit).
- **Usability**: Users can access key features within 3 clicks/taps.
- **Maintainability**: Code modularized and documented; new exchange API can be integrated within 2 days.

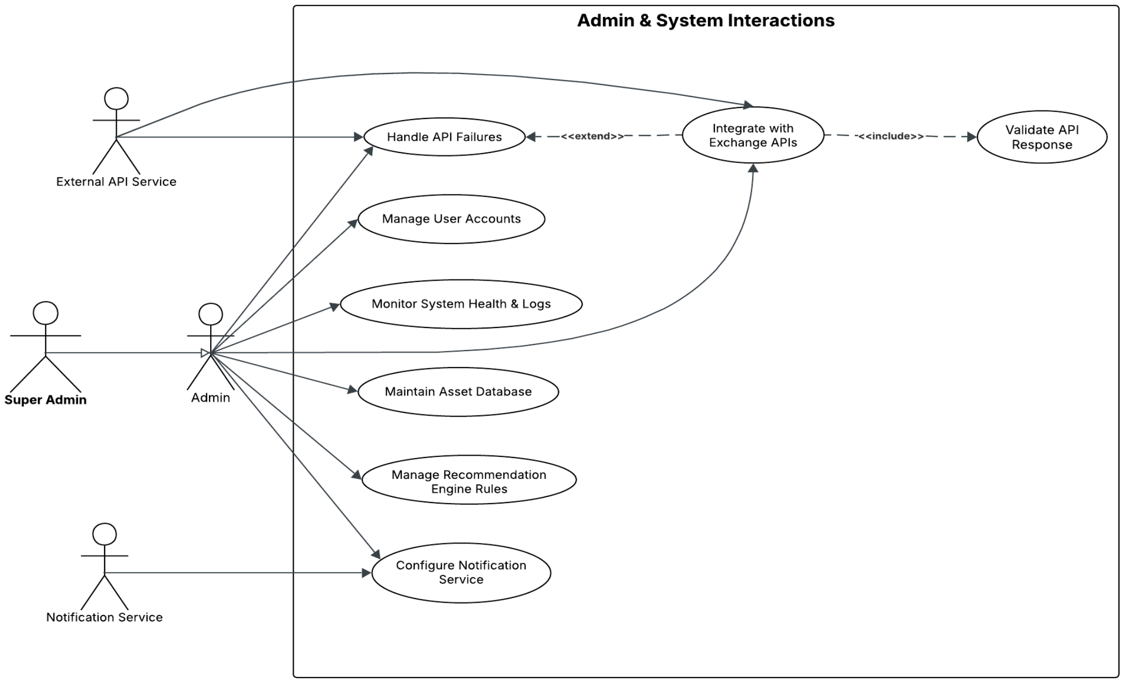
Acceptance tests include:

- **Authentication tests**: Create/login with 2FA, reset password.
- **Portfolio tests**: Fetch balances, show fiat conversions, work offline with cached data.
- **Price feed tests**: Update in ≤ 3s, handle API downtime gracefully.
- **Analytics tests**: Charts show correct ROI, asset allocation, and export works (PDF/CSV).
- **Security tests**: Verify encrypted storage, session timeout, failed login handling.
- **Performance tests**: Load test with 10,000 simulated users.
- **Accessibility tests**: Screen reader and high-contrast mode verification.

7. System models and diagrams

7.1 UML Use-Case diagram





8. Requirements Traceability Matrix(RTM)

Req ID	Short Requirement	Design Spec Ref	Module	Test Case ID	Status (N/P/A)	Comments / Dependencies
DAP-F-001	Create account with email/password	DS-Auth-01	Authentication	TC-Auth-01	N	Password policy enforced
DAP-F-002	Login via email/password & OAuth	DS-Auth-02	Authentication	TC-Auth-02	N	Depends on OAuth APIs
DAP-F-003	Enable two-factor authentication (2FA)	DS-Auth-03	Authentication	TC-Auth-03	N	OTP via SMS/Email
DAP-F-004	Reset password with email verification	DS-Auth-04	Authentication	TC-Auth-04	N	Email service dependency
DAP-F-005	Fetch balances via exchange APIs	DS-Port-01	Portfolio Management	TC-Port-01	N	Requires API keys/OAuth
DAP-F-006	Show portfolio value in multiple currencies	DS-Port-02	Portfolio Management	TC-Port-02	N	Currency conversion API
DAP-F-007	Cache data for offline portfolio view	DS-Port-03	Portfolio Management	TC-Port-03	N	Limited offline data
DAP-F-008	Fetch live crypto prices	DS-Price-01	Price Monitoring	TC-Price-01	N	API rate limits apply
DAP-F-009	Add/search cryptocurrencies to watchlist	DS-Price-02	Price Monitoring	TC-Price-02	N	Watchlist persistence required
DAP-F-010	Auto-update portfolio with price changes	DS-Price-03	Price Monitoring	TC-Price-03	N	WebSocket or polling needed
DAP-F-011	Generate ROI & profit/loss charts	DS-Analytics-01	Analytics & Reports	TC-Analytics-01	N	Visualization library needed

DAP-F-012	Show asset allocation via pie charts	DS-Analytics-02	Analytics & Reports	TC-Analytics-02	N	Visualization library needed
DAP-F-013	Export reports as CSV/PDF	DS-Analytics-03	Analytics & Reports	TC-Analytics-03	N	PDF/CSV libraries required
DAP-F-014	Send price alerts at target levels	DS-Alert-01	Alerts & Notifications	TC-Alert-01	N	Push/Email service required
DAP-F-015	Notify portfolio changes >5%	DS-Alert-02	Alerts & Notifications	TC-Alert-02	N	User-configurable thresholds