**ZenithX Project Documentation**

**Project Name:** ZenithX – Stock Market Analysis & Education App  
**Prepared By:** Team ZenithX  
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**Version:** 1.0

**1. Introduction**

ZenithX is a stock market analysis and education platform designed to provide users with real-time market data, technical and fundamental analysis tools, and educational resources. This document details the system architecture, functionality, and implementation of ZenithX.

**2. System Overview**

**ZenithX** is developed using Flutter and Firebase, integrating stock market APIs and NewsAPI to provide relevant financial insights.

**Key Components:**

* **Frontend:** Flutter (Dart)
* **Backend:** Firebase (Authentication, Firestore, Storage)
* **APIs Used:** Stock Market Data APIs, NewsAPI
* **Security Measures:** Firebase rules for data access

**3. System Architecture**

**3.1 High-Level Architecture**

* **User Interface (UI):** Flutter-based mobile app
* **Authentication Layer:** Firebase Authentication (Email & Google Sign-In)
* **Database Layer:** Firestore for storing user data and stock insights
* **APIs Integration:** Fetching stock data and news from external sources

**3.2 Data Flow**

1. User logs in via Firebase Authentication.
2. App fetches real-time stock data from API.
3. User searches for a stock and views analysis.
4. App stores user preferences in Firestore.

**4. Features & Functionalities**

**4.1 Core Features**

* **Stock Market News:** Displays latest news from NSE, BSE, and NYSE.
* **Technical Analysis:** Moving averages, MACD indicators.
* **Fundamental Analysis:** Company assets, revenue, and financial ratios.
* **Investment Guide:** Stock market basics and strategy tutorials.

**4.2 Advanced Features (Future Enhancements)**

* AI-based stock predictions and alerts.
* Personalized investment recommendations.
* Community forum for discussions.

**5. Database Design**

**5.1 Firestore Collections & Documents**

* **Users Collection**
  + userId: Unique identifier
  + email: User email
  + watchlist: List of tracked stocks
* **Stock Data Collection**
  + stockId: Unique stock identifier
  + companyName: Name of the company
  + priceData: Historical stock prices
* **News Collection**
  + articleId: Unique article identifier
  + headline: News headline
  + source: News provider
  + date: Date of publication

**6. Deployment Guide**

**6.1 Prerequisites**

* Flutter SDK installed
* Firebase project setup with google-services.json
* API keys for stock data and news

**6.2 Steps to Deploy**

1. Clone the ZenithX repository.
2. Add google-services.json to the android/app directory.
3. Configure API keys in .env file.
4. Run flutter pub get to install dependencies.
5. Build and run using flutter run.
6. Generate APK using flutter build apk.
7. Publish to Google Play Store following Google’s guidelines.

**7. Security & Compliance**

* Firebase Authentication with Google & Email Sign-in.
* Firestore security rules ensuring data privacy.
* OTP-based document access for enhanced security.
* Compliance with Play Store policies and privacy regulations.

**8. Testing & Debugging**

**8.1 Testing Approach**

* **Unit Testing:** Widget and API response testing.
* **Integration Testing:** Authentication, stock search, news retrieval.
* **User Testing:** Feedback-driven improvements.
* **Security Testing:** Validation of access controls and encryption.

**8.2 Common Bugs & Fixes**

| **Issue** | **Possible Cause** | **Fix** |
| --- | --- | --- |
| App crashes on login | Firebase config missing | Check google-services.json |
| News not loading | API key incorrect | Verify API key settings |
| OTP verification fails | Firestore rule mismatch | Adjust Firestore security rules |

**9. Conclusion**

ZenithX is a comprehensive stock market analysis and education tool designed to empower investors. With a secure and scalable architecture, real-time market insights, and educational resources, it serves as a valuable asset for both beginners and professionals. Continuous enhancements will further optimize its functionality and user experience.

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