

StockFlow KP

WIN THE DREAM

A Comprehensive Stock Management Solution for Modern Businesses

1. Introduction

StockFlow KP is a powerful, offline-first mobile application built with Flutter to help businesses efficiently manage inventory, sales, customers, and analytics. The system is designed for business officers operating in environments with unreliable internet connectivity, ensuring uninterrupted operations with seamless cloud synchronization.

The application combines modern user experience, strong data integrity, and scalable architecture to support small and medium-sized enterprises, distributors, and multi-tenant business environments.

2. Objectives

The main objectives of StockFlow KP are:

- To provide a reliable **offline-first stock and sales management system**
- To simplify **inventory tracking and sales operations**
- To offer **real-time analytics and reporting** for better decision-making
- To support **multi-language users** across different regions
- To ensure **secure, role-based access** for officers and tenants

3. Key Features

3.1 Inventory Management

- Product creation, update, and deletion (CRUD)
- Category-based product organization
- Real-time stock level tracking
- Batch and quantity control
- Barcode and QR code scanning & generation
- Product image support

3.2 Sales & Point of Sale (POS)

- Fast and intuitive POS interface
- Customer registration and management

- Proforma invoice generation
- Discount and flexible pricing management
- Detailed sales records and history

3.3 Offline-First Capability

- Full application functionality without internet
- Local SQLite database storage
- Automatic background synchronization every 2 minutes
- Smart conflict resolution mechanism
- Pending operations queue for failed syncs

3.4 Analytics & Reporting

- Sales dashboard with real-time insights
- Date-based and category-based filtering
- Top-selling products and categories
- Exportable reports (PDF & Excel)

3.5 Multi-Language Support

- English
- French
- Swahili

This ensures accessibility across multiple regions and users.

3.6 Security & Permissions

- Secure JWT-based authentication
- Role-based access control (RBAC)
- Local data encryption
- Tenant isolation for multi-company usage

4. System Architecture

4.1 Technology Stack

- **Frontend:** Flutter (Dart)
- **Local Database:** SQLite
- **Backend Communication:** REST API
- **State Management:** Provider
- **Networking:** HTTP & Dio
- **Storage:** SharedPreferences & Local File System
- **UI Design:** Material Design 3

4.2 Project Structure

The application follows a clean and modular structure:

- Authentication module
- Localization module
- Officer operations module
- Services layer (API, database, synchronization)
- Utility helpers

This structure improves maintainability, scalability, and testability.

5. Database Design

The local SQLite database includes the following main tables:

- users
- officers
- products
- categories
- stocks
- sales
- sale_items
- customers
- tenant_account

The schema is optimized for offline usage and efficient synchronization with the server.

6. Application Workflow

6.1 User Authentication

- Officer logs in using secure credentials
- JWT token is stored securely for session management

6.2 Product & Stock Management

- Officers add or update products
- Stock quantities are adjusted automatically during sales
- Barcode scanning speeds up product selection

6.3 Sales Processing

- Products are added to cart
- Discounts and customer selection applied
- Sale is saved locally and synced to server

6.4 Synchronization Process

- Local changes are stored immediately
- Background sync runs every 2 minutes when online
- Failed syncs are retried automatically
- Manual sync available in settings

7. Permissions & Requirements

7.1 System Requirements

- Flutter SDK ^3.7.2
- Dart SDK ^3.0.0
- Android or iOS device/emulator

7.2 Application Permissions

- Camera (barcode scanning)
- Storage (images and reports)
- Optional location access

8. Testing Strategy

- Unit testing for services and logic
- Integration testing for workflows
- Code quality checks using `flutter analyze`

9. Deployment

Android

- Release APK generation using Flutter build tools

iOS

- Release build via Xcode on macOS

10. Future Enhancements (Roadmap)

- AI-powered sales and inventory insights
- Multi-store and branch management
- Mobile payment integrations
- Inventory forecasting and demand prediction
- Full public API documentation

11. Conclusion

StockFlow KP is a robust, scalable, and business-friendly stock management solution designed to meet the needs of modern businesses operating in both online and offline environments. With strong architecture, user-centric design, and powerful analytics, it empowers businesses to operate efficiently, make informed decisions, and grow sustainably.

Built with ♥ for modern businesses