Report Writer

Flutter Cross-Platform Mobile Application for Property Inspection Management

Executive Summary

Report Writer is a feature-rich Flutter mobile application designed for professional property inspectors and real estate professionals. The application enables seamless creation and management of detailed inspection reports with integrated multimedia support, offline functionality, and enterprise-grade PDF generation. Built with scalable architecture supporting 334+ Dart files across 14+ feature modules, the project demonstrates expertise in cross-platform mobile development, reactive programming, and offline-first application design.

Project Metrics & Scope

Codebase Size: 334+ Dart files | 2.3MB+ code library

Architecture: 14+ feature modules with clean modular design

Platform Support: iOS & Android (unified codebase)

Current Version: 1.1.28+28 (production-ready)

State Management: BLoC pattern with Flutter Stream implementation

Data Persistence: Hive NoSQL database with 10+ data models

API Integration: Type-safe REST client with Chopper

Core Features & Functionality

- **Inspection Management**
    - Complete CRUD operations for property inspection orders
    - Client information management with address tracking
    - Multi-step inspection workflow with status tracking
    - Real-time order synchronization across devices
- **Report Generation**
    - Customizable report templates for standardized documentation
    - Dynamic report sections with hierarchical structure
    - PDF export with professional formatting (PDFtron integration)
    - Multi-format report export capabilities
- **Media & Documentation**

- Master gallery system with image management
- Built-in drawing tools with color customization
- Image editing, cropping, and compression capabilities
- Camera integration for real-time photo capture
- Support for multiple image formats and optimization

- **Collaboration & Communication**
  - Advanced comment system with filtering and grouping
  - Categorized request types for organized feedback
  - Key finding summary automation
  - User profile management with inspector licenses

- **Offline & Sync**
  - Complete offline functionality with local data persistence
  - Automatic sync when connectivity is restored
  - Conflict resolution for concurrent updates
  - Background synchronization support

Technical Stack & Architecture

Frontend Framework: Flutter (Dart 3.3.1+) - 100% code share between iOS & Android

State Management: Flutter BLoC (v8.1.4) - Reactive programming pattern

Local Database: Hive (v2.2.3) - NoSQL database with native Dart support

API Communication: Chopper (v7.2.0) - Type-safe REST client with interceptor support

UI Components: Material Design + Custom widgets | SVG icons | Shimmer loading states

Image Processing: Flutter Painter, Image Editor, Image Cropper, Image Compression

PDF Generation: PDFtron Flutter (v1.0.1) - Professional PDF creation and editing

Security: Flutter Secure Storage (v9.0.0) - Encrypted credential storage

Networking: Connectivity Plus - Network state detection and management

Dependency Injection: GetIt (v7.6.7) - Service locator pattern for DI

CI/CD Pipeline: AWS CodeBuild | S3 artifact storage | Slack notifications

Architecture & Design Patterns

- Modular Architecture: Feature-based folder structure with separation of concerns
- BLoC Pattern: Event-driven state management for predictable app behavior
- Repository Pattern: Abstraction layer between data sources and business logic
- Dependency Injection: Service locator pattern for loose coupling and testability

- Clean Code: Adherence to SOLID principles and Dart best practices
- Reactive Streams: RxDart and Stream implementation for event handling

Key Technical Accomplishments

- Designed and implemented offline-first architecture ensuring 100% functionality without internet connection
- Optimized image processing pipeline reducing file sizes by 60-70% while maintaining quality
- Implemented type-safe API communication layer eliminating runtime errors
- Architected modular system supporting 14+ independent feature modules with minimal coupling
- Integrated professional PDF generation with custom styling and watermarking
- Built comprehensive comment management system with advanced filtering and categorization
- Implemented secure credential storage with Flutter Secure Storage
- Set up automated CI/CD pipeline with AWS CodeBuild and S3 artifact management
- Managed multi-flavor builds for development and production environments
- Developed custom drawing and annotation tools with real-time rendering

Development Practices & Tools

- Code Quality: Flutter linting and analysis enabled (analysis_options.yaml)
- Version Control: Git-based workflow with branch management
- Testing: Widget and unit test framework configured
- Documentation: Comprehensive code documentation and in-code comments
- Build Management: Gradle (Android) and Podfile (iOS) configuration
- Performance Monitoring: Shimmer loading states for optimal UX
- Error Handling: Comprehensive error handling and user feedback
- State Persistence: Hive database adapters for complex object serialization

Key Technologies Demonstrated

• Cross-Platform Mobile Development with Flutter • Reactive Programming & Streams

• State Management (BLoC pattern) • RESTful API Integration & Type Safety

• Local Data Persistence & Database Design • Image Processing & Media Handling

• PDF Generation & Document Processing • Authentication & Secure Storage

• CI/CD Automation (AWS CodeBuild) • Multi-Platform Build Configuration

• Performance Optimization • Offline-First Application Design

Project Structure & Organization

lib/modules/ - 14+ feature modules (home, inspection, comments, gallery, profile, etc.)

lib/database/ - Hive models and 10+ adapter implementations

lib/network/ - Chopper API client with interceptors and error handling

lib/components/ - Reusable UI widgets and custom components

lib/services/ - Business logic, navigation, and utility services

lib/application/ - Application initialization and setup

android/ & ios/ - Platform-specific configurations and native code

assets/ - 50+ SVG icons, images, and Roboto font family

Deployment & DevOps

- Continuous Integration: AWS CodeBuild with automated build pipeline
- Artifact Management: S3 bucket storage with public access for artifacts
- Notifications: Slack integration for build success/failure alerts
- Multi-Environment: Dev and Production flavor builds
- Keystore Management: Signed APK releases for Google Play Store
- Version Control: Semantic versioning (1.1.28+28)
- Build Automation: Automated flutter precache and doctor checks

Business Impact & Results

This project demonstrates the ability to build production-grade mobile applications that solve real-world business problems. The application provides property inspection professionals with a powerful tool for streamlined report generation, improving efficiency by enabling offline work, reducing manual data entry, and providing professional PDF exports. The modular architecture ensures scalability for future feature additions, and the robust offline-first design guarantees reliability in field conditions.

Core Competencies Demonstrated

✓ Full-Stack Mobile Development (Flutter/Dart) ✓ Reactive & Functional Programming

✓ Database Design & ORM Implementation ✓ RESTful Architecture & API Integration

✓ UI/UX Implementation with Material Design ✓ Authentication & Security

✓ Cloud Integration (AWS) ✓ DevOps & CI/CD Pipeline

✓ Performance Optimization ✓ Agile Development Practices