**Offline & Mobile Access Design Documents**

**Purpose:** To ensure the system functions in low- or no-connectivity environments, which are common in rural or underserved areas.

**Key Elements:**

* **Offline Capabilities:**
  + **Local Data Caching:** Store form data, user credentials, media files on device using secure local storage (e.g., SQLite, IndexedDB, Room)
  + **Indexed Sync Queues:** Queue unsynced records for later transmission, with version control and timestamps
* **Synchronization Protocols:**
  + **Two-Way Sync Logic:** Delta syncs to pull only changed records from server
  + **Conflict Resolution Strategies:** e.g., “last-write wins” or manual reconciliation
  + **Retry & Error Handling:** Exponential backoff, offline alerts, and resume-from-last-state mechanisms
* **UX Wireframes for Offline Mode:**
  + Wireframes or mockups showing:
    - Offline indicators
    - “Sync Now” button or status banners
    - Limited feature access with tooltips explaining offline state
* **Connectivity Detection Mechanism:**
  + Auto-detects connectivity status (GSM/3G/WiFi)
  + Triggers silent or user-driven sync
* **Device Compatibility & OS Support:**
  + Android-first design, responsive layouts for feature phones (USSD/SMS backup if applicable)
  + Progressive Web App (PWA) design if browser-based