**Offline Data Capture & Synchronization Framework**

**Objective:**  
Enable field employees or offline HR officers to input, access, and store data securely on their mobile devices when disconnected from the network, with reliable synchronization once connectivity resumes.

**Detailed Components:**

* **Local Storage Mechanism:**
  + Use of SQLite, Room (Android), or CoreData (iOS) to cache HR data locally in encrypted form.
  + Structuring data into transaction logs for traceability and rollback.
* **Conflict Detection & Resolution Engine:**
  + Timestamp-based record versioning and user-ID tagging to resolve update collisions.
  + Priority rules (e.g., latest update wins, admin override) and audit trails for manual conflict resolution.
* **Background Sync Services:**
  + Triggered via connectivity detection or scheduled intervals (e.g., exponential back-off strategy).
  + Use of WorkManager (Android) and BackgroundTasks (iOS) to queue and resume sync operations.
* **Security Considerations:**
  + Offline encryption using AES-256.
  + Local authentication via biometric lock or passcode before access.
* **User Feedback & Error Handling:**
  + Visual sync status (e.g., pending, synced, failed).
  + Retry options with user notification on sync errors.
  + ng, analytics, and request transformation.