

# SOFTWARE REQUIREMENTS SPECIFICATION (SRS)

## Microplan e-Survey Mobile Application & Web Portal VERSION 2.0 — ENHANCEMENT & UPGRADE

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Prepared For	Scheduled Tribes Development Directorate, Kerala
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# 1. Document Information

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<b>Document Title</b>	Software Requirements Specification — Microplan e-Survey Portal v2.0
<b>Project Name</b>	Microplan e-Survey Mobile Application & Web Portal Enhancement
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<b>Reference Doc</b>	Microplan_esurvey_version_2_requirements.docx (Source Requirements)

## 1.1 Document Revision History

<b>Version</b>	<b>Date</b>	<b>Description</b>	<b>Author</b>
1.0	2018	Initial release of Microplan e-Survey system	ST Development Dept.
2.0	May 2026	Enhanced version with offline support, live MIS, multi-tier logins, unique IDs, and UX improvements	ST Development Dept.

## 2. Executive Summary

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The Scheduled Tribes Development Department of the Government of Kerala operates the Microplan e-Survey system — a digital platform that enables field-level promoters to collect socio-economic, demographic, and infrastructural data from Scheduled Tribes settlements (referred to as 'Unnathies') across the state. The system currently comprises a mobile application (used by ground-level promoters) and a web portal (used by supervisory officers at various hierarchical levels).

Version 1.0 of the system collected data through 167 settlement-level questions and 213 questions at the family and family member level. While operationally functional, the current version presents several critical limitations: lack of offline data collection and synchronisation, restricted search and navigation within the mobile application, limited MIS reporting capabilities, and an insufficient role-based access hierarchy that does not extend to District Collectors or the Directorate level.

This document constitutes the Software Requirements Specification (SRS) for Version 2.0 of the Microplan e-Survey system. It analyses and elaborates the requirements submitted by the Directorate, structures them into functional and non-functional categories, defines user roles, establishes acceptance criteria, and outlines system constraints and assumptions. The Version 2.0 upgrade aims to make the platform fully offline-capable, significantly more user-friendly, and equipped with robust live monitoring and reporting capabilities at all levels of governance.

### **Key Upgrade Objectives**

1. Enable fully offline data collection with seamless network-triggered synchronisation.
2. Revamp the mobile application UX for promoters.
3. Establish complete role-based access from field promoter to Director level.
4. Replace static reports with live, real-time MIS dashboards.
5. Assign unique IDs to every family and family member.
6. Streamline administrative workflows (TEO assignments, family transfers).

## 3. Project Scope

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### 3.1 In-Scope

The following components are within the scope of Version 2.0 development:

- Modification of the existing 167 Unnathi-level survey questions as per Directorate requirements
- Modification of the existing 213 family and family member survey questions
- Offline-first mobile application with local storage and server synchronisation
- Android and iOS mobile application builds
- Enhanced search, navigation, and UX within the mobile application
- Family and individual data viewing, search, and approval workflow on mobile
- Simplification of the TEO Mark web portal for promoter assignment and transfer
- Expansion of Admin login capabilities for Directorate-level users
- New Director-level login with live monitoring and full reporting
- District Collector logins providing live Scheduled Tribes data
- Live MIS reports replacing all existing static reports
- Unique ID generation and display for every family and family member
- Live field data monitoring dashboard for supervisory officers

### 3.2 Out of Scope

The following are explicitly excluded from this version:

- Integration with external government IT systems (e.g., SECC, Aadhaar) — unless separately scoped
- Biometric or facial recognition for identity verification
- Financial transactions or welfare scheme disbursement processing
- Migration or archival of historical data from pre-v1.0 records
- Hardware procurement (mobile devices, servers, network infrastructure)

## 4. Stakeholder Analysis

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The following stakeholders interact with the Microplan e-Survey system in different capacities:

Stakeholder	Role	System Interaction	Primary Concern
Promoter	Field data collector	Mobile App (primary user)	Ease of data entry, offline support
TEO (Tribal Extension Officer)	First-level supervisor	Web Portal & Mobile App	Data review, approval, promoter assignment
PO / TDO (Project Officer / Tribal Development Officer)	Mid-level supervisor	Web Portal	Aggregated data review, approval
Directorate Admin	System-wide administrator	Web Portal (Admin login)	User management, survey configuration, data oversight
Director	Head of Department	Web Portal (Director login)	Live monitoring, full MIS reports
District Collector	District-level authority	Web Portal (DC login)	Live ST community data for their district
IT / Dev Team	System developers & maintainers	Backend & DevOps	System stability, maintainability

## 5. Functional Requirements

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This section details all functional requirements for Version 2.0, grouped by feature domain. Each requirement is assigned a unique ID for traceability.

### 5.1 Survey Question Management

Req. ID	Requirement Description	Details / Notes	Priority
SQM-01	Modify existing 167 Unnathi (settlement) survey questions as directed by the Directorate	Question list, ordering, and field types to be provided by the Directorate before development	High
SQM-02	Modify existing 213 family and family member questions as directed by the Directorate	Includes adding, removing, re-ordering, and changing field types	High
SQM-03	Enforce mandatory field validation on configured questions in the mobile application	Promoter must not be able to submit a survey with empty mandatory fields; display clear error messages	High
SQM-04	Support multiple question types: text, numeric, date, single-select, multi-select, GPS coordinate, and photo capture	All existing question types to be preserved; new types added as per Directorate specifications	Medium
SQM-05	Provide Admin-level UI in the web portal for survey question configuration without code deployment	Changes to questions should reflect in mobile app on next sync	Medium

### 5.2 Offline Data Collection & Synchronisation

This is one of the most critical capability gaps in Version 1.0. Promoters operate in remote tribal settlements with limited or no mobile network coverage. The system must support complete offline functionality.

Req. ID	Requirement Description	Details / Notes	Priority
OFL-01	Enable complete offline data collection including GPS capture without requiring an active internet connection	All form fields, validations, and GPS tagging must work offline	Critical
OFL-02	Automatically save all entered data locally as a draft when the device loses network connectivity	Draft must survive app closure or device restart; no data loss under any circumstance	Critical

Req. ID	Requirement Description	Details / Notes	Priority
OFL-03	Detect network availability and trigger automatic server synchronisation when connectivity is restored	Display sync status clearly; allow manual trigger also; retry on partial failures	Critical
OFL-04	Display a clear draft/pending sync indicator on the promoter's dashboard for all unsynchronised records	Show count of pending records, last sync timestamp, and per-record sync status	High
OFL-05	Prevent duplicate record creation when the same draft is synchronised multiple times (idempotent sync)	Server must de-duplicate based on unique draft ID generated at time of creation	High
OFL-06	Allow promoters to view, edit, and delete draft records before synchronisation	Only unsynchronised drafts may be edited; once synced, editing requires supervisor approval	High
OFL-07	Support bulk synchronisation of multiple draft records in a single network session	Queue-based upload with progress indicator; report success/failure per record after sync	Medium

### 5.3 Mobile Application — User Experience

Req. ID	Requirement Description	Details / Notes	Priority
MOB-01	Redesign the mobile application interface to maximise ease of use for low-tech-literacy promoters	Large touch targets, simple navigation, Malayalam language support, minimal jargon	High
MOB-02	Provide a search bar in each promoter's login to find families by Family ID, head of family name, or any family member's name	Search must work on both locally cached and server-side data	High
MOB-03	Display a list of all families and individuals collected and uploaded by the logged-in promoter, filterable and sortable	Support filter by settlement, date of collection, and sync status	High
MOB-04	Allow officers (TEO/PO/TDO) to view, search, and approve family and individual data through the mobile application	Approval workflow mirrors web portal; push notification on approval/rejection	High
MOB-05	Provide a progress/completion indicator per settlement showing percentage of families surveyed	Visual progress bar; highlight incomplete settlements	Medium

Req. ID	Requirement Description	Details / Notes	Priority
MOB-06	Support both Android (API 26+) and iOS (iOS 14+) platforms with a single codebase or equivalent native builds	App to be available on Google Play Store and Apple App Store	High
MOB-07	Provide in-app help text and tooltips for each survey question	Tooltips should be configurable from the Admin web portal	Low
MOB-08	Support Malayalam and English language toggle within the application	Language preference to be saved per user account	Medium

## 5.4 Role-Based Access & Login Management

Req. ID	Requirement Description	Details / Notes	Priority
RBA-01	Implement a Promoter login with access to: data collection, draft management, sync, and personal data review	Mobile app only; no web portal access	Critical
RBA-02	Implement TEO login with access to: promoter assignment/transfer, data approval, search, and basic reports on the web portal and mobile app	TEO can view all data from promoters under their jurisdiction	Critical
RBA-03	Implement PO/TDO login with access to: data approved by TEOs, search, and MIS reports for their administrative area	Web portal access	High
RBA-04	Implement Directorate Admin login with access to: all survey data approved by TEOs and PO/TDOs, advanced search, user management, settlement management, and report generation	Replaces and expands existing admin login	Critical
RBA-05	Implement a new Director login with access to: full live survey monitoring dashboard, complete state-wide MIS reports, and data approved at all levels	Web portal; read-only with export capability	High
RBA-06	Implement District Collector logins (one per district) with access to: live Scheduled Tribes survey data specific to their district	Web portal; district-scoped data only; read-only	High
RBA-07	All logins must support strong password policies, session timeout, and audit logging of critical actions	Password reset via registered mobile OTP or email	High

## 5.5 Administrative & Settlement Management

Req. ID	Requirement Description	Details / Notes	Priority
ADM-01	Provide Admin login capability to add new settlements (Unnathies) to the system in addition to existing provisions	Support bulk import of settlement data via structured file upload (CSV/Excel)	High
ADM-02	Simplify the TEO Mark web portal interface for assigning promoters to specific ranks and families	Drag-and-drop or simplified form-based assignment; visual map of coverage	High
ADM-03	Provide a streamlined workflow for transferring promoter assignments when a promoter is replaced or transferred	All draft and approved data from the outgoing promoter must remain intact and associated with the new promoter's area	High
ADM-04	Admin to be able to activate/deactivate any user account and view full user activity logs	Deactivation must immediately terminate active sessions	High
ADM-05	Provide Admin access to configure survey question sets, mandatory fields, and question ordering without developer intervention	Version-controlled question sets; cannot delete a question once data has been collected against it	Medium

## 5.6 Unique Identification System

Req. ID	Requirement Description	Details / Notes	Priority
UID-01	Generate and assign a unique, permanent Family ID to every family recorded in the system	Format to be defined by the Directorate; IDs must never be reused even if a family record is deleted	Critical
UID-02	Generate and assign a unique, permanent Member ID to every individual family member recorded in the system	Member ID must encode or link to the parent Family ID for traceability	Critical
UID-03	Display the Unique ID prominently in all views — mobile app, web portal, reports, and printed outputs	IDs must be searchable across all search interfaces	High
UID-04	Unique IDs must be generated server-side upon successful synchronisation (not offline) to guarantee global uniqueness	Temporary local reference IDs may be used pre-sync; replaced by server-assigned IDs post-sync	High

Req. ID	Requirement Description	Details / Notes	Priority
UID-05	Support QR code or barcode generation from Unique IDs for physical documentation or future field use	Optional feature for Phase 2 but architecture should accommodate	Low

## 5.7 MIS Reporting & Live Dashboards

All existing static reports on the web portal must be replaced with live, real-time reports. Report formats will be specified by the Directorate before development begins.

Req. ID	Requirement Description	Details / Notes	Priority
MIS-01	Replace all existing static reports with live, auto-refreshing reports across all login levels	Reports to update without manual refresh; configurable refresh interval	High
MIS-02	Provide a Director-level live monitoring dashboard showing real-time field data collection progress across the state	State-wide, district-wise, and settlement-wise drill-down capability	High
MIS-03	Provide live reports of survey data approved by TEOs and PO/TDOs in Director and Admin logins	Show approval queue sizes, turnaround times, and approval rates by officer	High
MIS-04	Provide live MIS reports accessible in every officer's login scoped to their administrative jurisdiction	Promoter-level reports for TEOs, settlement-level for POs, district-level for DCs, state-level for Director	High
MIS-05	Provide District Collector logins with live district-specific Scheduled Tribes demographic and survey data	Data must be current within 15 minutes; show survey completion percentage per settlement	High
MIS-06	All reports must support export to PDF and Excel formats	Exported reports to carry the government letterhead, report date, and generated-by information	Medium
MIS-07	Reports must include: survey completion rates, approval pending counts, family and member counts, demographic summaries, and data quality metrics	Exact report formats to be finalised with the Directorate	High

## 6. Non-Functional Requirements

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### 6.1 Performance

- The mobile application must load and become interactive within 3 seconds on a mid-range Android device (2 GB RAM, Android 10).
- Server synchronisation for a single-family record (including GPS and 1 photo) must complete within 10 seconds on a 2G/3G connection.
- The web portal must render any live report within 5 seconds for datasets up to 100,000 family records.
- The system must support a minimum of 500 concurrent mobile app users during peak field survey operations.

### 6.2 Availability & Reliability

- The web portal and synchronisation backend must maintain 99.5% uptime during business hours (8 AM to 8 PM IST).
- Scheduled maintenance windows must not exceed 2 hours per week and must be communicated 48 hours in advance.
- Offline data stored on the mobile device must be retained for a minimum of 30 days without synchronisation.
- The system must implement automated daily backups with a recovery point objective (RPO) of 24 hours.

### 6.3 Security

- All data transmission between the mobile app and server must use HTTPS (TLS 1.2 or higher).
- Sensitive personal data (family details, member details) must be encrypted at rest in the mobile device's local storage using AES-256 encryption.
- Role-based access control (RBAC) must ensure no user can access data outside their authorised jurisdiction.
- All login attempts, data approvals, and admin actions must be logged with user ID, timestamp, and IP address.
- The application must comply with applicable Government of India data privacy and IT Act provisions.

### 6.4 Usability

- The mobile application interface must be usable without training by a person with basic smartphone literacy.
- All critical user flows must be completable in no more than 4 taps/steps from the home screen.
- The application must support Malayalam language as the primary language with English as a secondary option.
- Error messages must be displayed in plain language (not technical codes), indicating the exact field or action causing the error.

## 6.5 Maintainability & Scalability

- The system must be built using a documented, modular architecture to allow individual components to be updated independently.
- The database schema must accommodate at least 50 lakh (5 million) individual member records without performance degradation.
- Survey question configuration changes must be deployable without a full application release.
- Comprehensive technical documentation (API documentation, database schema, deployment guide) must be delivered alongside the software.

## 7. System Architecture Overview

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The Microplan e-Survey Version 2.0 system will follow a three-tier architecture comprising a mobile client, a web application client, and a centralised server backend. The architecture must accommodate offline-first mobile operations with eventual consistency synchronisation.

### 7.1 Component Overview

Component	Description	Technology Considerations
Mobile Application	Android & iOS app for promoters and field officers. Offline-first with local SQLite storage and sync engine.	React Native / Flutter with SQLite; background sync service
Web Portal	Multi-role browser-based portal for supervisory officers, admin, Director, and District Collectors.	React / Angular; responsive design; REST/GraphQL API consumption
Application Backend	RESTful API server handling authentication, data storage, sync, unique ID generation, and report generation.	Node.js / Java Spring Boot; JWT authentication; WebSocket for live reports
Database	Relational database for structured survey data; designed for complex queries and reporting.	PostgreSQL with read replica for report queries
File Storage	Storage for GPS attachments, photos, and exported reports.	S3-compatible object storage
Notification Service	Push notification delivery for approval events and sync alerts.	Firebase Cloud Messaging (FCM) for Android; APNs for iOS

### 7.2 Data Flow Summary

1. Promoter enters survey data on mobile app (online or offline).
2. Data is stored locally in encrypted SQLite database with a draft status and local reference ID.
3. Upon network availability, sync service uploads all pending drafts to the backend API.
4. Backend validates data, assigns server-side Unique IDs, and stores in the central database.
5. TEO receives notification for pending approval; reviews and approves/rejects via mobile app or web portal.
6. Approved data becomes available in PO/TDO, Directorate, Director, and DC dashboards in real time.
7. MIS reports are generated dynamically from the central database and presented via live dashboards.

## 8. Constraints & Assumptions

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### 8.1 Constraints

- The Department will provide the final list of modified survey questions (167 settlement-level and 213 family-level) before the development sprint for question modification begins.
- The Directorate will provide the exact report formats required for MIS and live dashboards before the reporting module is designed.
- Development must target Android API 26 (Android 8.0 Oreo) and above, and iOS 14 and above to ensure compatibility with the devices currently in use by promoters.
- The system must operate within the existing IT infrastructure of the Department unless additional infrastructure provisioning is separately approved and budgeted.
- GPS coordinate capture is dependent on the device hardware; the application cannot guarantee GPS accuracy below the device hardware limits.

### 8.2 Assumptions

- Promoters have access to at least one mobile device (Android or iOS) capable of running the updated application.
- Settlements that are permanently without any mobile network coverage will require promoters to travel to a nearby network zone for synchronisation.
- All District Collector offices have access to a computer and internet connection suitable for web portal use.
- A centralised server environment (cloud or government data centre) is available for hosting the backend services.
- User acceptance testing (UAT) will be conducted with actual promoters and officers from at least two districts before the statewide rollout.

## 9. Acceptance Criteria

The following criteria must be satisfied before the system is formally accepted and signed off by the Scheduled Tribes Development Department:

Criterion ID	Acceptance Criterion	Test Type	Owner
AC-01	All modified survey questions (167 + 213) are correctly reflected in the mobile application with mandatory field enforcement working on all designated fields.	UAT	Directorate
AC-02	A promoter can collect complete survey data (settlement + family + members) on a device with no network connectivity, save as draft, and successfully upload all records when connectivity is restored without any data loss.	Field Test + UAT	IT Team + Promoters
AC-03	A family record can be located in the mobile app within 5 seconds using Family ID, head of family name, or member name search.	Performance Test	IT Team
AC-04	TEO can assign promoters to settlements and reassign upon transfer using the simplified web portal workflow in under 5 minutes per promoter.	UAT	TEO Users
AC-05	Director login dashboard displays live survey data with updates reflecting within 15 minutes of field synchronisation.	Integration Test	IT Team
AC-06	All 14 (or more) District Collector logins display live district-specific ST survey data correctly scoped to their district only.	UAT + Security Test	Directorate + IT
AC-07	Every family and every member record in the system has a unique, permanent ID that is visible in the app, web portal, and exported reports.	Data Integrity Test	IT Team
AC-08	All static reports have been replaced by live reports accessible from every applicable login level.	UAT	Directorate
AC-09	The mobile application is available and installable from Google Play Store (Android) and Apple App Store (iOS).	Verification	IT Team
AC-10	No critical (P1) or high (P2) security vulnerabilities are present at the time of go-live as verified by a security audit.	Security Audit	Third Party / IT

## 10. Requirements Traceability Matrix

This matrix maps each source requirement from the Directorate's input document to the corresponding SRS requirement IDs in this specification.

Source Requirement (from Input Document)	SRS Requirement IDs
Modify 167 settlement questions and 213 family/member questions; make questions mandatory in mobile app	SQM-01, SQM-02, SQM-03
Resolve obstacles in collecting and uploading GPS/data from areas without network	OFL-01, OFL-02, OFL-03, OFL-05
Save data as draft without network, upload later when connectivity available	OFL-02, OFL-03, OFL-04, OFL-06, OFL-07
Set up mobile app for hassle-free information collection by promoters	MOB-01, MOB-05, MOB-07, MOB-08
Mobile application available for Android and iOS	MOB-06
Promoter login: view families/members, search by Family ID, head of family, or member name	MOB-02, MOB-03, RBA-01
Provide search options for easy survey use	MOB-02, MOB-03
Officers review and approve family/individual information via web portal and mobile app	MOB-04, RBA-02, RBA-03
Simplify promoter rank/family assignment and transfer in TEO Mark web portal	ADM-02, ADM-03, RBA-02
Expand Admin login: view survey data approved by TEOs, POs/TDOs; add search options	RBA-04, ADM-01, MIS-03
Director login: monitor field data collection and approved data; live reports	RBA-05, MIS-02, MIS-03, MIS-06
Replace static reports with live reports; format to be provided by Directorate	MIS-01, MIS-07
District Collector logins with live Scheduled Tribes survey data	RBA-06, MIS-05
Additional provisions for adding settlements and more in Admin login	ADM-01, ADM-05
Live MIS reports in every officer's login	MIS-04

<b>Source Requirement (from Input Document)</b>	<b>SRS Requirement IDs</b>
Unique ID for every family and every member in the portal	UID-01, UID-02, UID-03, UID-04

## 11. Glossary

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Term / Abbreviation	Definition
Microplan e-Survey	The digital platform of the Scheduled Tribes Development Department for collecting socio-economic and demographic data from ST communities.
Unnathi / Settlement	A Scheduled Tribes habitation/colony; the primary geographical unit of survey.
Promoter	A field-level government worker responsible for conducting house-to-house surveys within assigned settlements using the mobile application.
TEO	Tribal Extension Officer — first-level supervisory officer who reviews and approves data collected by promoters.
PO / TDO	Project Officer / Tribal Development Officer — mid-level supervisory officer above the TEO.
Directorate	The Scheduled Tribes Development Directorate, the apex administrative body overseeing the department.
MIS	Management Information System — structured reports and dashboards used by officers for decision-making.
Offline-first	An application design approach where all core functionality works without internet connectivity, with data synchronised when connectivity is available.
Sync / Synchronisation	The process of uploading locally stored draft survey data from the mobile device to the central server.
Unique ID / Family ID / Member ID	A system-generated permanent identifier assigned to each family and individual member in the survey.
SRS	Software Requirements Specification — this document; a formal description of the software system's intended capabilities and constraints.
UAT	User Acceptance Testing — testing conducted by actual end users to verify the system meets requirements.
RBAC	Role-Based Access Control — a security model that restricts system access based on a user's defined role.