**Business Requirements Document (BRD) for Organisation Management System**

**Document Information**

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**1. Introduction**

**1.1 Purpose**

This Business Requirements Document (BRD) outlines the functional and non-functional requirements for a comprehensive Organisation Management System designed to streamline employee management, onboarding, leave and attendance, performance management, learning management, document management, employee engagement, payroll, project management, cab management, asset management, finance management, collaboration tools, business intelligence, event management, recruitment, and forms/data collection. The system aims to enhance operational efficiency, ensure compliance, and improve employee experience across all organizational levels.

**1.2 Scope**

The Organisation Management System will encompass the following modules:

- Employee Management
- Onboarding
- Leave and Attendance
- Performance Management
- Learning Management
- Document Management
- Employee Engagement
- Payroll Management
- Project Management

- Cab Management
- Asset Management
- Finance Management
- Collaboration and Productivity
- Business Intelligence and Analytics
- Event Management
- Recruitment
- Forms and Data Collection
- Common Features (UI, Integrations, Notifications, Analytics)

The system will support web and mobile platforms, role-based access control (RBAC), multilingual capabilities, and integrations with internal and external systems.

### 1.3 Objectives

- Automate HR processes to reduce manual effort by 70%.
- Ensure 100% compliance with regional labour and tax regulations.
- Provide a self-service portal for employees to manage personal and professional data.
- Enable real-time tracking and reporting for HR, payroll, projects, and assets.
- Enhance employee engagement through surveys, feedback, and communication tools.
- Optimize cab and asset management to reduce costs by 20%.
- Support scalability for 10,000+ employees and 1,000+ vehicles.

## 2. Functional Requirements

### 2.1 Employee Management

#### 2.1.1 Employee Records

- **Data Fields**:
  - **Personal**: Full name, date of birth, gender, marital status, nationality, contact number, email, emergency contacts (name, relationship, phone), current/permanent address, national ID (e.g., SSN, Aadhaar), passport details, profile photo.
  - **Employment**: Employee ID, job title, department, employment type (full-time, part-time, contract, intern), hire date, termination date, reporting manager, salary grade, work location (office, remote, hybrid).

    - **Additional**: Education history (degree, institution, year), certifications (name, issuer, expiry), skills (technical, soft), work experience (previous employers, roles, duration), bank details.
- **Data Management**:
    - Support bulk import/export in CSV, Excel, JSON formats with custom templates.
    - Validate imports for mandatory fields (e.g., employee ID, name) and formats (e.g., email, date).
    - Maintain audit trails: User ID, timestamp, old/new values, change type (create, update, delete).
    - Archive terminated employees' records for 7 years with configurable retention policies.
- **Search and Filtering**:
    - Advanced search by any field (e.g., name, employee ID).
    - Filters for role, department, location, status, custom fields.
    - Saved searches for frequent queries (e.g., "All IT employees in New York").
- **Edge Cases**:
    - Prevent duplicate employee IDs with validation checks.
    - Support multiple addresses (e.g., temporary relocation) with primary designation.

#### 2.1.2 Employee Self-Service

- **Portal Features**:
    - Secure web/mobile app for employees to view/edit personal details.
    - Editable fields: Address, contact number, emergency contacts, bank details, photo.
    - Read-only fields: Employee ID, hire date, salary grade (HR-only).
- **Approval Workflow**:
    - Require HR/manager approval for sensitive updates (e.g., bank details).
    - Notify employees of approval/rejection via email, in-app, push notifications.

  - 48-hour review window for HR, with auto-escalation to senior HR if overdue.
- **Dashboard**:
  - Profile tabs: Personal Info, Employment, Documents, Benefits, Leave Balance.
  - Recent activities (e.g., leave requests, training) with timestamps.
- **Edge Cases**:
  - Handle duplicate updates with conflict resolution.
  - Support offline profile viewing with sync on reconnect.

#### 2.1.3 Employee Classification

- **Dynamic Categories**:
  - Roles: Executive, Manager, Team Member, Contractor, Intern, custom roles.
  - Departments: HR, IT, Sales, Marketing, Operations, Finance, sub-departments.
  - Locations: Office (with ID), remote, hybrid, geolocation tagging.
- **Custom Fields**:
  - Add fields (e.g., "Project Team") with types (text, number, dropdown).
  - Mandatory/optional settings, default values.
- **Reporting**:
  - Classification reports (e.g., "Employees by Department").
  - Charts (e.g., pie chart for department distribution).

#### 2.1.4 Role-Based Access Control (RBAC)

- **Roles and Permissions**:
  - HR Admin: Full access to employee data, configurations.
  - Manager: View/edit team data, approve leaves, assign tasks.
  - Employee: View own data, submit requests, access payslips.
  - Payroll Admin: Access salary, tax, reimbursement data.
  - Transport Manager: Access cab-related data.
  - Asset Manager: Access asset-related data (e.g., assigned assets).

- **Granular Permissions**:
  - Field-level access (e.g., HR edits salary, managers view job title).
  - Action restrictions (view-only, edit, delete) per role.
- **Security**:
  - OAuth 2.0 authentication, JWT session management.
  - Log access attempts with IP and timestamp.
- **Edge Cases**:
  - Resolve role conflicts (e.g., manager and team member) with priority rules.
  - Support temporary role assignments.

### 2.2 Onboarding

#### 2.2.1 Onboarding Workflows

- **Configuration**:
  - Drag-and-drop workflow builder with templates (e.g., "Standard Onboarding").
  - Tasks: Document submission, training, orientation, equipment allocation.
  - Task attributes: Assignee (HR, manager), deadline, priority, dependencies.
- **Progress Tracking**:
  - Real-time checklist for new hires/admins (completed, pending, overdue tasks).
  - Task reassignment for unavailable assignees.
- **Customization**:
  - Role-based workflows (e.g., developers vs. sales).
  - Conditional tasks (e.g., skip equipment for contractors).

#### 2.2.2 Digital Document Submission

- **Supported Formats**:
  - PDFs, JPEG, PNG, scanned documents (max 10 MB).
  - Validate document types (e.g., ID proof) using metadata or AI recognition.

- **E-Signatures**:
  - Custom e-signature module for legally binding agreements.
  - Multi-party signatures (employee, HR, manager).
  - Track status (pending, completed) with audit logs (timestamp, IP).
- **Storage**:
  - Secure cloud storage with AES-256 encryption.
  - Categorize documents (e.g., ID Proofs, Contracts) with tags.

**2.2.3 Automated Notifications**

- **Milestone Alerts**:
  - Notifications for "Welcome Email," "Documents Submitted," "Onboarding Complete."
  - Multilingual templates with dynamic fields (e.g., employee name).
- **Configuration**:
  - Customize triggers, content, channels (email, in-app, push).
  - Schedule reminders for overdue tasks (e.g., 24 hours prior).
- **Edge Cases**:
  - Handle bounced emails with in-app fallback.
  - SMS updates for non-smartphone users.

**2.2.4 Edge Cases**

- Support partial onboarding completion for non-critical tasks.
- Enable re-onboarding for rehires with pre-filled data.

**2.3 Leave and Attendance**

**2.3.1 Leave Policies**

- **Policy Creation**:
  - Leave types: Sick, Vacation, Parental, Unpaid, Sabbatical, Bereavement.
  - Accrual rules: Fixed (12 days/year), accrual-based (1.5 days/month), hybrid.
  - Carryover limits (max 10 days), expiration (end of fiscal year).
- **Customization**:

    - Role-based policies (e.g., executives 20 vacation days).
    - Negative balances with approval workflows.
- **Validation**:
    - Prevent overlapping leave requests.
    - Enforce notice periods (e.g., 7 days for vacation).

#### 2.3.2 Leave Requests

- **Submission**:
    - Web/mobile app fields: Leave type, dates, partial day (e.g., 4 hours), reason, attachments.
    - Calendar view for leave balance, team availability.
- **Validation**:
    - Check balance before submission.
    - Restrict backdated requests (e.g., max 7 days).
- **Edge Cases**:
    - Emergency leave with immediate approval.
    - Cancel approved leaves with manager notification.

#### 2.3.3 Approval Workflow

- **Process**:
    - Route to reporting manager or designated approver.
    - Multi-level approvals (e.g., manager, HR for parental leave).
    - Bulk approval/rejection for multiple requests.
- **Notifications**:
    - Approval/rejection with reasons.
    - Reminders for pending requests (after 48 hours).
- **Edge Cases**:
    - Auto-approve specific leaves (e.g., bereavement).
    - Escalate unapproved requests after configurable period.

#### 2.3.4 Attendance Tracking

- **Methods**:

    - IP-based check-ins: Validate office IP ranges.
    - Custom biometric module: Fingerprint/facial recognition.
    - Geolocation: Check-ins within 500 meters of office.
- **Features**:
    - Log check-in/check-out with timestamps, location.
    - Manual corrections with HR approval.
- **Reports**:
    - Attendance reports with filters: Employee, department, date, type (regular, late, absent).
    - Charts (e.g., bar for late arrivals).
- **Edge Cases**:
    - Offline caching for network failures.
    - Flexible check-ins for remote workers.

**2.3.5 Shift Management**

- **Scheduling**:
    - Shifts with start/end times, breaks, location, overtime rules.
    - Recurring/ad-hoc shifts for flexible work.
- **Features**:
    - Shift swaps with manager approval.
    - Shift assignment notifications (email, in-app, SMS).
- **Validation**:
    - Prevent scheduling conflicts.
    - Comply with labour laws (e.g., 8-hour gap between shifts).

- **Edge Cases**:
    - Split shifts (4 hours morning, 4 hours evening).
    - Temporary shift exemptions for medical reasons.

**2.4 Performance Management**

**2.4.1 Goal Setting**

- **Creation**:
  - SMART goals with fields: Title, description, KPIs (e.g., $10,000/month sales), dates, weightage (30% of score).
  - Cascading goals (team to organizational).
- **Employee Input**:
  - Propose personal goals (e.g., certification).
  - Manager approval required.
- **Tracking**:
  - Progress updates with percentage, comments.
  - Link to project tasks for KPIs.

#### 2.4.2 Performance Reviews

- **Templates**:
  - Custom templates: Self-assessment, manager evaluation, peer feedback.
  - Rating scales (1-5), competency questions, comments.
- **Scheduling**:
  - Monthly/Quarterly/Annual reviews with 7-day reminders.
  - Ad-hoc reviews for promotions.
- **Process**:
  - Self-assessments before manager evaluations.
  - Aggregate scores/comments into reports.
- **Edge Cases**:
  - Mid-cycle reviews for role changes.
  - Incomplete reviews with temporary saves.

#### 2.4.3 360-Degree Feedback

- **Configuration**:
  - Select providers: Peers, subordinates, managers.
  - Custom questions with anonymity options.
- **Collection**:
  - Feedback requests via email/in-app with deadlines.

- Encrypt responses for privacy.

- **Analysis**:
  - Anonymized reports with averages, trends.
  - Highlight discrepancies (manager vs. peer).
- **Edge Cases**:
  - Insufficient feedback (<3 responses) with manager-only fallback.
  - Opt-out for sensitive scenarios.

#### 2.4.4 Performance Reports

- **Generation**:
  - Visual reports: Bar charts for KPIs, line charts for progress.
  - Qualitative feedback summaries, action plans.
- **Export**:
  - PDF, Excel, CSV formats.
  - Secure sharing with HR/managers.
- **Edge Cases**:
  - Missing data with placeholders.
  - Historical comparisons (e.g., Q1 2025 vs. Q1 2024).

### 2.5 Learning Management

#### 2.5.1 Training Courses

- **Creation**:
  - Multimedia courses: Videos (MP4, WebM), PDFs, quizzes, interactive modules.
  - Metadata: Title, description, duration, prerequisites, audience.
- **Assignment**:
  - Auto-assign by role or manual assignment.
  - Completion deadlines, reminders (7 days prior).
- **Validation**:
  - Check prerequisites before access.
  - Restrict to assigned employees.

### 2.5.2 Course Tracking

- **Progress**:
  - Completion percentage, time spent, quiz scores.
  - Progress bars in employee dashboards.
- **Certifications**:
  - Digital certificates with unique IDs, QR codes.
  - Store in employee profiles with expiry tracking.
- **Reports**:
  - Completion rates, average scores, overdue assignments.
  - Charts (e.g., bar for completion by department).

### 2.5.3 Content Management

- **Library**:
  - Searchable library with categories (e.g., Compliance).
  - Version control (e.g., "Safety Training v2.0").
- **Access**:
  - Role/department-based restrictions.
  - Offline access via mobile app.
- **Edge Cases**:
  - Stream large videos (500 MB).
  - Resume partial completions.
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## 2.6 Document Management

### 2.6.1 Centralized Repository

- **Storage**:
  - Cloud database with folder hierarchies, tags.
  - Full-text search with filters (type, date, owner).
- **Search**:
  - Fuzzy search for misspellings (e.g., "contarct" matches "contract").
  - Saved searches for frequent queries.

- **Version Control**:
  - Track versions with diffs, rollback options.
  - Audit logs for changes.

#### 2.6.2 Secure File Sharing

- **Sharing Options**:
  - Share with individuals/teams via secure links.
  - Expiration dates (7 days), access limits (view-only).
- **Permissions**:
  - Role-based access (e.g., HR-only for salary docs).
  - Log access events (view, download, edit).
- **Edge Cases**:
  - Resumable uploads for large files (100 MB).
  - Prevent external link sharing.

#### 2.6.3 E-Signatures

- **Module**:
  - Custom e-signature for contracts/forms.
  - Multi-party, sequential/parallel workflows.
- **Tracking**:
  - Real-time status (pending, completed).
  - Audit trails (signer, timestamp, IP).
- **Edge Cases**:
  - Handle signature failures with manual fallback.
  - Offline signing with delayed sync.

### 2.7 Employee Engagement

#### 2.7.1 Engagement Surveys

- **Creation**:
  - Question types: Multiple-choice, Likert (1-5), open-ended, matrix.
  - Conditional questions (e.g., "If unsatisfied, why?").
- **Distribution**:

  - Email, in-app, anonymous links.
  - Recurring surveys (monthly, quarterly), reminders.
- **Anonymity**:
  - Encrypt responses, no IP tracking.
  - Optional identifiable responses.
- **Edge Cases**:
  - Low response rates with 48-hour reminders.
  - Multilingual surveys.

#### 2.7.2 Engagement Reports

- **Generation**:
  - Visualizations: Pie charts for scores, trend lines.
  - Segment by department, location, role.
- **Analysis**:
  - Highlight trends (e.g., declining IT satisfaction).
  - Actionable insights (e.g., "Increase training").
- **Export**:
  - PDF, Excel, CSV.
  - Secure sharing with HR/leadership.

- **Edge Cases**:
  - Incomplete surveys with partial analysis.
  - Prevent anonymous data leakage.

### 2.8 Payroll Management

#### 2.8.1 Payroll Processing

- **Salary Calculations**:
  - Components: Basic pay, overtime, bonuses, commissions, allowances (travel, housing), deductions (taxes, insurance).
  - Variable pay (e.g., performance bonuses) with rules.
- **Automation**:

- Calculate based on attendance, leave, shift data.
- Overtime rates (1.5x for >8 hours), holiday pay.

- **Validation**:
  - Comply with minimum wage, overtime laws.
  - Flag anomalies (e.g., negative net pay).
- **Edge Cases**:
  - Mid-month hires/terminations with prorated pay.
  - Retroactive adjustments with audit logs.

#### 2.8.2 Salary Structures

- **Configuration**:
  - Hourly, salaried, contract structures.
  - Custom components (e.g., "Night Shift Allowance").
- **Flexibility**:
  - Location-based structures (e.g., high-cost cities).
  - Multi-currency payments.
- **Edge Cases**:
  - Multiple roles (e.g., part-time trainer).
  - One-time payments (e.g., signing bonus).

#### 2.8.3 Payslips

- **Generation**:
  - Detailed payslips: Gross pay, taxes, deductions, net pay, YTD.
  - Company branding, employee details.
- **Delivery**:
  - PDF download via portal.
  - Encrypted email delivery.
- **Edge Cases**:
  - Payslip corrections with versioning.
  - Historical access (7 years).

#### 2.8.4 Payment Processing

- **Methods**:
  - Bank transfers via Razor pay, PayPal, Stripe APIs.
  - Manual payments (e.g., checks) with records.
- **Validation**:
  - Verify bank details (account number, routing).
  - Flag failed transactions with retries.
- **Edge Cases**:
  - Partial payments due to errors.
  - Split payments to multiple accounts.

**2.8.5 Tax Compliance**

- **Tax Calculations**:
  - Regional tax laws (e.g., IRS, Income Tax Act).
  - Progressive brackets, exemptions (e.g., 401(k), Section 80C).
- **Updates**:
  - Manual tax rate updates via admin panel.
  - Support temporary tax changes (e.g., relief exemptions).

- **Edge Cases**:
  - Multi-jurisdiction taxes (e.g., cross-state employees).
  - Expatriates with dual tax treaties.

**2.8.6 Tax Filings**

- **Forms**:
  - Generate W-2, Form 16, TDS certificates.
  - Electronic submission via custom module.
- **Validation**:
  - Validate form data (e.g., correct SSN).
  - Flag discrepancies (e.g., mismatched earnings).
- **Edge Cases**:
  - Late filings with penalty calculations.

- Amended filings with audit trails.

#### 2.8.7 Employee Tax Declarations

- **Submission**:
  - Investment proofs (e.g., mutual funds) via portal.
  - File uploads (PDF, JPEG, 5 MB max).
- **Validation**:
  - Check against tax rules (e.g., ₹1.5 lakh for Section 80C).
  - HR approval for high-value declarations.
- **Edge Cases**:
  - Late submissions with provisional calculations.
  - Multiple declaration cycles.

#### 2.8.8 Tax Reports

- **Generation**:
  - Audit-ready reports: Tax summaries, deductions, compliance.
  - YTD tax data, projections.

- **Export**:
  - PDF, Excel, CSV.
  - Secure sharing with auditors.
- **Edge Cases**:
  - Multi-year tax data for audits.
  - Flag non-compliant employees.

#### 2.8.9 Employee Self-Service

- **Payroll Access**:
  - Portal tabs: Payslips, Tax Forms, YTD Earnings, Reimbursements.
  - Historical data (7 years).
- **Security**:
  - MFA for sensitive data.
  - Log access attempts (timestamp, IP).

- **Edge Cases**:
  - Terminated employees with limited visibility.
  - Proxy access for HR assistance.

#### 2.8.10 Reimbursement Claims

- **Submission**:
  - Claims for travel, medical, equipment with receipts.
  - Multi-currency with conversion rates.
- **Workflow**:
  - Manager/finance approval.
  - Approval/rejection notifications with reasons.
- **Edge Cases**:
  - Partial approvals (e.g., $100 of $150).
  - Recurring claims (e.g., phone allowance).

#### 2.8.11 Loan Tracking

- **Features**:
  - Employer loans: Amount, interest, repayment schedule, balance.
  - Loan status in portal with payment history.
- **Automation**:
  - Auto-deduct repayments from payroll.
  - Notify upcoming repayments (3 days prior).
- **Edge Cases**:
  - Early repayments, loan forgiveness.
  - Loan transfers for terminated employees.

#### 2.8.12 Communication Channel

- **Ticketing System**:
  - Tickets for payroll queries: Subject, description, priority, attachments.
  - SLA tracking (resolve in 24 hours).

- **In-App Chat**:
    - Real-time chat with payroll team.
    - Canned responses for common queries.
- **Edge Cases**:
    - High-priority tickets with auto-escalation.
    - Offline query submission via email.

**2.9 Project Management**

**2.9.1 Project Planning**

- **Project Creation**:
    - Attributes: Name, description, client, budget, start/end dates, currency.
    - Categories (e.g., Internal, Client-Facing).
- **Milestones**:
    - Deliverables, deadlines, budget allocations.
    - Link to client contracts/invoices.
- **Validation**:
    - Prevent overlapping project dates for teams.
    - Align budget with client agreements.

**2.9.2 Task Management**

- **Hierarchy**:
    - Tasks/subtasks with dependencies (e.g., Task B after Task A).
    - Unlimited subtask levels.
- **Assignment**:
    - Assign to individuals/teams with permissions.
    - Due dates, priorities, estimated hours.
- **Edge Cases**:
    - Task reassignment for unavailable employees.
    - Task splitting for large deliverables.

**2.9.3 Gantt Charts**

- **Features**:

- Drag-and-drop timelines with critical paths, dependencies.
- Milestone markers, progress bars.

- **Interactivity**:
  - Teams/Zoom/Cisco Webex/Google Meet (daily, weekly, monthly).
  - Export as PNG, PDF, SVG.
- **Edge Cases**:
  - Large projects (1000+ tasks) with optimized rendering.
  - Partial chart exports for milestones.

#### 2.9.4 Task Tracking

- **Status Updates**:
  - To-Do, In Progress, Done, Blocked, custom statuses.
  - Progress percentage, comments.

- **Custom Fields**:
  - Estimated/actual hours, cost, custom metrics (e.g., "Risk Level").
  - Types: Text, number, date, dropdown.
- **Validation**:
  - Comments for critical transitions (e.g., Blocked).
  - Mandatory fields for completion.

#### 2.9.5 Automation

- **Triggers**:
  - Notifications for status changes, overdue tasks, dependencies met.
  - Auto-assign based on role/availability.
- **Rules**:
  - Custom rules (e.g., "If overdue >3 days, escalate").
  - Conditional logic (e.g., "If high priority, notify lead").
- **Edge Cases**:
  - Automation failures with manual overrides.
  - Bulk status updates.

### 2.9.6 Task Views

- **Views**:
  - Kanban, list, calendar, table.
  - Drag-and-drop reordering in Kanban/list.
- **Filters**:
  - Status, assignee, priority, due date, custom fields.
  - Saved filters (e.g., "My Overdue Tasks").
- **Edge Cases**:
  - Large task lists (10,000+ tasks) with lazy loading.
  - Offline task viewing with sync.

### 2.9.7 Timesheets

- **Logging**:
  - Manual entry or real-time timers (start/pause/stop).
  - Billable/non-billable, overtime categories.
- **Validation**:
  - Daily/weekly hour limits (max 12 hours/day).
  - Flag unassigned hours.
- **Edge Cases**:
  - Retroactive entries with approval.
  - Multi-task logging for multiple projects.

### 2.9.8 Time Tracking Reports

- **Generation**:
  - Filters: Project, client, employee, date.
  - Billable/non-billable hours, overtime, costs.
- **Visualization**:
  - Pie charts for billable vs. non-billable.
  - Alerts for anomalies (e.g., excessive overtime).

- **Edge Cases**:
  - Missing timesheets with reminders.
  - Client-specific export formats.

**2.9.9 Collaboration**

- **Project Feeds**:
  - Real-time feeds for updates, comments, milestones.
  - @mentions for notifications.
- **Attachments**:
  - File uploads (documents, images, 50 MB max).
  - Previews for PDF, JPEG, PNG.

- **Edge Cases**:
  - Large feeds (1000+ updates) with pagination.
  - Offline commenting with sync.

**2.9.10 Communication Tools**

- **In-App Chat**:
  - Group chats, private messaging, read receipts.
  - Rich text, emojis, file sharing.
- **Edge Cases**:
  - High chat volumes with archiving.
  - Chat exports for compliance.

**2.9.11 File Sharing**

- **Features**:
  - Share files with role-based access (e.g., view-only).
  - Version control with diffs, rollback.
- **Security**:
  - AES-256 encryption.
  - Log access events.
- **Edge Cases**:

- Resumable large file uploads.
- Prevent unauthorized sharing.

**2.9.12 Issue Tracking**

- **Issue Logging**:
  - Fields: Title, description, severity (low, medium, critical), priority, assignee, due date.
  - Attachments (screenshots, logs).
- **Categorization**:
  - Types (e.g., Bug, Feature Request).
  - Custom categories (e.g., "Security Issue").
- **Validation**:
  - Mandatory fields (title, description).
  - Prevent duplicates with similarity checks.

**2.9.13 Resolution Tracking**

- **Status**:
  - Open, In Progress, Resolved, Closed, custom statuses.
  - Resolution details (solution, timestamp).
- **History**:
  - Update history (status, comments, assignees).
  - Audit trails for compliance.
- **Edge Cases**:
  - Reopened issues with new workflows.
  - Bulk issue updates.

**2.9.14 Issue Notifications**

- **Alerts**:
  - Notify assignees/reporters on creation, updates, resolution.
  - Escalate unresolved critical issues (24 hours).
- **Configuration**:
  - Customize preferences (e.g., email for critical issues).

    - Team-wide notifications for high-severity.
- **Edge Cases**:
    - Digest emails for notification overload.
    - SMS for urgent issues.

#### 2.9.15 Project Reports

- **Types**:
    - Project status, budget, task completion, resource allocation.
    - Metrics: On-time rate, budget variance, productivity.
- **Visualization**:
    - Burndown charts, pie charts for task status, line charts for budget.
    - Interactive drilldowns.
- **Export**:
    - PDF, Excel, CSV, JSON.
    - Metadata (report date, project name).

#### 2.9.16 Custom Views

- **Filters**:
    - Overdue, high-priority, assignee tasks.
    - AND/OR logic (e.g., "Overdue AND High Priority").
- **Customization**:
    - Saved views (e.g., "My Team's Tasks").
    - Shareable views.
- **Edge Cases**:
    - Large datasets (10,000+ tasks) with optimized queries.
    - Offline report generation.

#### 2.9.17 Project Dashboards

- **Features**:
    - Real-time widgets: Task progress, budget, issues.
    - Drag-and-drop arrangement.

- **Interactivity**:
  - Zoom, filter within widgets.
  - WebSocket updates.
- **Edge Cases**:
  - High loads with lazy loading.
  - Mobile-optimized dashboards.

### 2.10 Cab Management

#### 2.10.1 Scheduling and Booking

- **Employee Booking**:
  - Custom map interface for pickup/drop-off selection.
  - Fields: Date, time, purpose, vehicle type (cab, shuttle).
- **Features**:
  - Recurring bookings with end dates.
  - Available vehicles, ETA, driver details.
- **Validation**:
  - Approved locations within boundaries.
  - Prevent overlapping bookings.
- **Edge Cases**:
  - Last-minute cancellations with notifications.
  - SMS/web bookings for non-smartphone users.

#### 2.10.2 Bulk Scheduling

- **Features**:
  - Manager scheduling via CSV or manual entry.
  - Template-based schedules (e.g., "Morning Shift").
- **Validation**:
  - Vehicle capacity vs. employee count.
  - Shift timing compliance.

- **Edge Cases**:
  - Bulk cancellations (e.g., holidays).
  - Partial scheduling for mixed shifts.

#### 2.10.3 Ad-Hoc Bookings

- **Features**:
  - Bookings within 30 minutes for urgent needs.
  - Prioritize nearby vehicles.
- **Notifications**:
  - Confirmation with driver, vehicle, ETA.
  - Manager alerts for ad-hoc bookings.
- **Edge Cases**:
  - No vehicles with vendor fallback.
  - Manual VIP booking overrides.

#### 2.10.4 Boundary Restrictions

- **Configuration**:
  - Geofenced boundaries (50 km radius).
  - Exceptions for out-of-boundary employees with approval.
- **Validation**:
  - Check addresses during booking.
  - Flag exceptions for review.
- **Edge Cases**:
  - Temporary boundary extensions.
  - Multi-office boundaries.

#### 2.10.5 Route Optimization

- **AI-Powered Routing**:
  - Custom ML for routes based on employee locations, real-time traffic, shift timings, vehicle capacity, fuel.
  - Route Satisfaction Index (RSI) (<10% deviation).
- **Features**:

    - Optimal multi-pickup/drop-off routes.
    - Dynamic recalculation for delays/cancellations.
- **Edge Cases**:
    - Missing GPS with address-based routing.
    - Manual route overrides.

### 2.10.6 Safety Constraints

- **Rules**:
    - No female first pickup/last drop-off (10 PM–6 AM).
    - Group employees by locality.
- **Validation**:
    - Flag non-compliant routes.
    - Minimum passenger counts for females at night.
- **Edge Cases**:
    - Exceptions with marshal escorts.
    - Location-based safety rules.

### 2.10.7 Pickup Predictions

- **Features**:
    - ETAs from historical traffic, weather, speed.
    - SMS/push when cabs within 2 km/5 minutes.
- **Accuracy**:
    - ±5 minutes 95% of time.
    - Real-time ETA updates.
- **Edge Cases**:
    - Inaccurate predictions with fallback notifications.
    - Offline SMS for remote areas.

### 2.10.8 Real-Time Tracking and Alerts

- **Cab Tracking**:
    - GPS tracking via custom module on web/mobile.

- Vehicle details: Driver, number, speed, ETA.
- **Interface**:
  - Interactive map with route, pickup points.
  - Zoom/pan functionality.
- **Edge Cases**:
  - GPS loss with last-known location.
  - Large fleets (1000+ vehicles) with optimized rendering.

#### 2.10.9 Automated Alerts

- **Triggers**:
  - Delays (>15 minutes), over speeding (>80 km/h), stops (>5 minutes), geofencing violations.
  - Email, in-app, SMS to managers/employees.
- **Configuration**:
  - Custom thresholds (e.g., speed by region).
  - Escalation for critical alerts.
- **Edge Cases**:
  - Filter false positives (e.g., traffic stops).
  - Batch alerts for large fleets.

#### 2.10.10 SOS Functionality

- **Features**:
  - SOS button in app, alerts to security/local police.
  - Log events with timestamp, location.
- **Response**:
  - Notify security within 30 seconds.
  - Real-time SOS vehicle tracking.
- **Edge Cases**:
  - Accidental triggers with confirmation prompts.
  - Offline SOS via SMS.

#### 2.10.11 Safe Reach Verification

- **Process**:
  - Three-tier for female employees at night:
    1. Driver confirms via in-cab device.
    2. Employee confirms via app (5 minutes).
    3. Security verifies via call/app.
- **Validation**:
  - Flag incomplete verifications.
  - Store logs for 90 days.
- **Edge Cases**:
  - Non-responsive employees with emergency contact escalation.
  - SMS verification for non-smartphone users.

#### 2.10.12 Safety and Security

- **Marshal Deployment**:
  - Marshals for female employees post-10 PM.
  - Track availability via dashboard.
- **Scheduling**:
  - Auto-allocate via shift management.
  - SMS/in-app marshal notifications.
- **Edge Cases**:
  - Unavailable marshals with security escorts.
  - Ad-hoc marshal requests.

#### 2.10.13 Driver/Vehicle Compliance

- **Validation**:
  - Verify licenses, permits, insurance via custom database.
  - Daily compliance checks.
- **Blocking**:
  - Block non-compliant drivers/vehicles.
  - Compliance history for audits.

- **Edge Cases**:
    - Temporary lapses with grace periods.
    - Manual overrides for critical trips.

#### 2.10.14 In-Cab Verification

- **Features**:
    - Touchscreen password verification at pickup.
    - Digital logs replace paper trip sheets.
- **Security**:
    - AES-256 encryption.
    - Log verification attempts.
- **Edge Cases**:
    - Device failures with manual verification.
    - Multi-employee verification.

#### 2.10.15 Security Command Centre

- **Dashboard**:
    - Real-time vehicle, alert, trip log monitoring.
    - KPIs: On-time arrivals, incidents, compliance.
- **Incident Management**:
    - Log incidents (delays, SOS) with resolution workflows.
    - Escalate critical incidents.
- **Edge Cases**:
    - High alert volumes with prioritization.
    - Offline monitoring with cached sync.

#### 2.10.16 Billing and Invoicing

- **Payments**:
    - Costs by distance, time, vehicle, surcharges (night rates).
    - 2,000+ configurations (city-specific, holidays).
- **Validation**:
    - Verify payment details vs. trip logs (GPS distance).

- Flag discrepancies.

- **Edge Cases**:
  - Partial trips with prorated billing.
  - Multi-currency billing.

#### 2.10.17 Electronic Trip Sheets

- **Generation**:
  - Details: Driver, vehicle, route, distance, cost.
  - One-click vendor invoices.
- **Delivery**:
  - Email or custom API delivery.
  - Store for 7 years.
- **Edge Cases**:
  - Disputed payment sheets with revisions.
  - Batch processing for large fleets.

#### 2.10.18 Cab Management Reports

- **Type**s:
  - Cost efficiency, fleet utilization, compliance, trip summaries.
  - Metrics: Average cost, on-time rate, emissions.
- **Visualization**:
  - Bar charts for costs, pie charts for utilization.
  - Drill-downs (e.g., trips by driver).
- **Edge Cases**:
  - Large datasets (50,000 daily trips) with optimized queries.
- **Historical Comparisons**:
  - Compare with previous periods for trend analysis.

#### 2.10.19 Payroll Integration

- **Features**:
  - Sync travel data for allowances ($10/trip).

- Map to salary components.
- **Validation**:
  - Verify trip data accuracy.
  - Flag missing data.
- **Edge Cases**:
  - Retroactive allowance adjustments.
  - Split allowances for multi-employee trips.

**2.10.20 Fleet Management**

- **Fleet Diversity**:
  - Vehicle Types: Cabs, EVs, shuttles, buses.
  - Details: Type, capacity, fuel, registration, maintenance.
- **Tracking**:
  - Status: Available, in-use, maintenance.
  - Maintenance history with costs.
- **Edge Cases**:
  - Mixed fleets with separate billing.
  - Temporary vehicle additions.

**2.10.21 Optimization**

- **Forecasting**:
  - Supply-demand prediction via shift/historical data.
  - Dynamic vehicle allocation.
- **Utilization**:
  - Minimize idle time with reassignment.
  - Optimize routes for fuel.
- **Edge Cases**:
  - Overcapacity with vendor fallback.
  - Manual overrides for events.

#### 2.10.22 Sustainability

- **Emissions Tracking**:
  - Calculate emissions by fuel, distance.
  - Reports with reduction targets.
- **EV Integration**:
  - Prioritize EVs for eco-routes.
  - Track charging status.
- **Edge Cases**:
  - Missing emissions with estimates.
- **Hybrid vehicles with dual fuel**:
  - Support for hybrid vehicles with separate tracking.

#### 2.10.23 Employee and Admin Features

- **Employee Access**:
  - View co-passengers, live locations, trip history.
  - Custom interface to manage bookings: schedule, modify, cancel.
- **Interface**:
  - Map-based dashboard with ETA updates.
  - Offline access via mobile app with sync.
- **Edge Cases**:
  - Trip modifications during transit.
- **Custom Interface for Temporary Access**:
  - Guest bookings with temporary access for non-employees.

#### 2.10.24 Admin Dashboard

- **Features**:
  - Real-time fleet, driver, compliance insights.
- **Custom controls**:
  - Manual overrides for scheduling/routing.
  - Manage vendors: Add, edit, suspend.
- **Monitoring**:

- Monitor alerts: SOS, delays.
- High alert for critical issues with prioritization.

- **Edge Cases**:
  - High volumes with optimized fetching.
  - Multi-office dashboards.

**2.10.25 Non-Smartphone Support**

- **Features**:
  - SMS: Trip confirmations, ETAs, cancellations.
  - USSD booking (e.g., *123#).
- **Custom Validation**:
  - Mobile Number Verification via SMS OTP for identity.
  - Limit SMS frequency (5/day).
- **Custom Edge Cases**:
  - SMS failures with email fallback.
  - Multilingual SMS for diverse users.

**2.11 Finance Management**

**2.11.1 Accounting**

- **Features**:
  - Double-entry accounting for assets, liabilities, invoices, expenses.
  - Custom interface for recurring payments with schedules.
- **Automation**:
  - Auto-generate payments, payment reminders.
  - Reconcile transactions via bank integration.
- **Custom Validation**:
  - Ensure balanced ledgers.
  - Flag duplicate payments.

- **Edge Cases**:
  - Multi-currency transactions with real-time rates.

- Partial payments with manual adjustments.

### 2.11.2 Payment Integrations

- **Payment Gateways**:
  - PayPal, Stripe for seamless payments.
- **Custom One-time/Recurring Payments**:
  - One-time and recurring payments with secure tokenization.
- **Custom Edge Cases**:
  - Handle API failures with manual entry.
  - Support offline syncing for delayed transactions.

### 2.11.3 Inventory Management

- **Features**:
  - Multi-warehouse stock tracking with real-time updates.
  - Support for barcode scanning.
- **Custom Alerts for**:
  - Low-stock alerts (e.g., 10 units).
  - Overstock notifications for inventory control.
- **Custom Alerts**:
  - Alerts for stock discrepancies with manual reconciliation.
- **Edge Cases**:
  - Stock discrepancies with reconciliation processes.
  - Multi-user access for location-based transfers.

### 2.11.4 Financial Records

- **Reports**:
  - Types: Profit/loss, balance sheets, cash flow, trial balances.
  - KPIs: Revenue, expense ratios, financial health metrics.

- **Visualization**:
  - Line charts for revenue trends, pie charts for expense distribution.
  - Drill-downs by department or financial category.

- **Edge Cases**:
  - Large datasets (100,000 transactions) with optimized query performance.
  - Multi-year financial reports for trend analysis.

**2.12 Asset Management**

**2.12.1 Asset Inventory**

- **Asset Records**:
  - Fields: Asset ID, name, type (e.g., laptop, furniture), category (IT, office equipment), purchase date, cost, vendor, warranty expiry, location, assigned employee/department, serial number, condition (new, used, damaged), depreciation method (e.g., straight-line), useful life (years).
  - Support barcode/QR code generation for physical tagging.
- **Data Management**:
  - Bulk import/export in CSV, Excel, JSON with templates.
  - Validate imports: Mandatory fields (e.g., asset ID, name), unique IDs, valid dates.
  - Audit trails: Track changes (create, update, delete) with user ID, timestamp, old/new values.
  - Archive disposed assets for 7 years with configurable retention periods.
- **Search and Filter**:
  - Search by asset ID, name, type, location, or employee.
  - Filters: Category, condition, warranty status, department, custom fields.
  - Saved searches (e.g., "All laptops in New York office").
- **Edge Cases**:
  - Prevent duplicate asset IDs.
  - Support assets with multiple locations (e.g., shared equipment).

**2.12.2 Assignment**

- **Assignment Process**:
  - Assign assets to employees, departments, or projects via email or web/mobile portal.

- Fields: Assignee, assignment date, expected return date, purpose, condition at assignment.
- Require employee acknowledgment via digital signature.

- **Tracking**:
  - Real-time view of assigned assets in employee/department profiles.
  - Custom History fields for assignments (who, when, condition).
- **Return**:
  - Initiate return process with condition assessment (e.g., functional, damaged).
  - Notify asset managers of returns, flag damages for review.
- **Edge Cases**:
  - Handle unreturned assets (e.g., employee termination) with reminders/escalation.
  - Support temporary assignments for short-term use (e.g., loaner laptops).

**2.12.3 Maintenance**

and Scheduling:

- Create maintenance schedules: Recurring (e.g., annual) or one-time.
- Fields: Asset, maintenance type (preventive, corrective), date, cost, technician, downtime.
- **Repairs**:
  - Log maintenance history: Date, type, cost, notes, documents (e.g., service reports).
  - Initiate repair requests with approval workflows (e.g., manager, finance).
- **Tracking**:
  - Notify asset managers of upcoming/overdue maintenance (7 days prior).
  - Track repair status: In-progress, completed, cost incurred.
- **Edge Cases**:
  - Handle emergency repairs with ad-hoc scheduling.
  - Support assets under warranty with vendor coordination.

### 2.12.4 Depreciation

and Calculation:

- Support depreciation methods: Straight-line, declining balance, units of production.
- Fields: Purchase cost, salvage value, useful life, depreciation start date.
- Auto-calculate monthly/annual depreciation with journal entries.
- **Reporting**:
  - Asset valuation reports: Current book value, accumulated depreciation.
  - Visualize depreciation trends (e.g., line chart over time).
- **Edge Cases**:
  - Handle mid-year asset purchases with prorated depreciation.
  - Support revaluation for appreciating assets (e.g., real estate).

### 2.12.5 Asset Disposal

- **Process**:
  - Initiate disposal with fields: Reason (e.g., obsolete, damaged), method (sale, donation, scrap), date, proceeds (if sold), approval status).
  - Require manager/finance approval for disposals above $500 threshold.
- **Tracking**:
  - Log disposal history with audit trails.
  - Update inventory and finance records post-disposal.
- **Edge Cases**:
  - Handle partial disposals of assets (e.g., sell 10 of 50 chairs).
  - Support disposal of lost/stolen assets with incident reports.

### 2.12.6 Compliance and Features:

- Track compliance with warranty, insurance, regulatory requirements (e.g., IT security for laptops).
- Schedule audits with checklists (e.g., physical verification, condition assessment).
- **Reports**:
  - Compliance reports: Warranty expirations, audit findings.

- Audit trails for all asset transactions (assignment, maintenance, disposal).

- **Edge Cases**:
  - Handle non-compliant assets with remediation workflows.
  - Support multi-location audits with centralized reporting.

#### 2.12.7 Employee Self-Service

- **Features**:
  - View assigned assets, maintenance schedules, and return deadlines in the employee portal.
  - Submit maintenance/repair requests with photos (e.g., damaged laptop).
- **Notifications**:
  - Reminders for return deadlines, upcoming maintenance (3 days prior).
  - Approval/rejection of requests with reasons provided.
- **Edge Cases**:
  - Handle offline requests with sync on reconnect.
  - Support proxy requests for employees without portal access.

### 2.13 Collaboration and Productivity

#### 2.13.1 Unified Email

- **Features**:
  - Shared inboxes with role-based access control.
  - Streams for internal email chat with @mentions for collaboration.
- **Automation**:
  - Auto-sign emails (e.g., "Billing Query").
  - Forward emails to tickets for support tracking.
- **Edge Cases**:
  - High volume email with advanced filtering.
  - Offline access with email synchronization.

#### 2.13.2 Team Messaging

- **Features**:

- Group chats, messaging, private messaging, and channels for team collaboration.
- File sharing with a 50 MB limit per file.

- **Edge Cases**:
  - Large groups (1000+ members) with threaded conversations.
  - Message archiving for compliance and audit purposes.

**2.13.3 File Management**

- **Storage**:
  - Cloud repository with customizable folders, tags, and metadata.
  - Offline access via proprietary sync mechanism.
- **Security**:
  - AES-256 encryption for stored files.
  - Comprehensive logging of access events.
- **Edge Cases**:
  - Bulk uploads with resumable transfer support.
  - File recovery options for accidental deletions.

**2.13.4 Documentation**

- **Editing**:
  - Custom editors for documents, spreadsheets, and presentations with real-time support.
- **Collaboration**:
  - Multi-user editing with change tracking and version history.
  - Real-time notifications for document updates.

- **Edge Cases**:
  - Concurrent edits with automated conflict resolution.
  - Offline editing with synchronization upon reconnection.

**2.14 Business Intelligence and Analytics**

**2.14 Dashboards**

- **Features**:
    - Cross-functional dashboards for HR, finance, projects, payroll, and assets.
    - Widgets displaying KPIs, charts, and alerts in real time.
- **Customization**:
    - Drag-and-drop widget placement for custom layouts.
    - Save templates for user or role-specific dashboards.
- **Edge Cases**:
    - High-volume dashboards with lazy loading for performance.
    - Mobile-optimized layouts for accessibility.

**2.14. Data**

- **Sources**:
    - Integration with internal modules (CRM, payroll, assets).
    - Support for CSV, Excel, JSON file imports.
- **Export**:
    - PDF, Excel, CSV, JSON formats with metadata inclusion.
- **Integration**:
    - Seamless integration with reporting tools for data export.
- **Edge Cases**:
    - Import errors with detailed logs for troubleshooting.
- **Support for Partial Data**:
    - Handling of partial imports with error recovery.

**2. Predictive Analytics**

- **Features**:
    - Custom AI models for turnover prediction, project delays, sales forecasts, and asset maintenance schedules.
    - Actionable insights derived from predictive models.
- **Models**:
    - Train on historical data with monthly updates.

- Support for custom metrics tailored to business needs.

- **Edge Cases**:
  - Missing data with automated imputation techniques.
  - Manual overrides for model predictions.

**2.14 Custom Apps**

- **Customizable**:
  - Custom app builder for creating applications (e.g., expense approval workflows).
  - Integration with HR and other system modules.
- **Customization**:
  - Templates for fields, workflows, and UI components.
  - Custom fields and workflows for flexibility.
- **Features**:
  - Scalable backend for high usage scenarios.
- **Customizable Edge Cases**:
  - Offline functionality with synchronization support.

**2.15 Event Management**

**2.15 Management**

- **Planning**:
  - Events with details: title, description, dates, venues, sessions.
  - Support for registration and ticketing (up to 1000 attendees).

- **Administration**:
  - Support for 5 admins and 15 organizers per event.
  - Speaker management for up to 100 speakers.
- **Features**:
  - Comprehensive event management interface.
- **Edge Cases**:
  - Overbooked events with waitlist management.

- Multi-session events with complex scheduling.

### 2.15 Engagement

- **Features**:
    - Tools: Live polls, chat, and Q&A sessions via app/web interface.
    - Auto generated for session attendance.
- **Interactivity**:
    - Real-time engagement tracking for attendee interactions.
- **Moderator Control**:
    - Moderator controls for managing live sessions.
- **Edge Cases**:
    - High load with WebSocket scaling for large events.
    - Offline engagement tracking with synchronization.

### 2.15 Analytics

- **Reports**:
    - Attendance and engagement reports.
    - Metrics: Session attendance rates, poll scores, feedback analysis.
- **Visualization**:
    - Bar charts for attendance, pie charts for feedback distribution.
- **Drilldowns**:
    - Detailed analysis by session or attendee group.

- **Edge Cases**:
    - Incomplete feedback with partial analysis.
    - Multi-event comparisons for trend analysis.

### 2.16 Recruitment

### 2.16 Job Posting

- **Features**:
    - Custom posting module for job boards with detailed templates.
    - Templates include Title, description, skills, and application questions.

- **Distribution**:
  - Share via email, social media, and career page integration.
  - Track views and applications for performance analysis.
- **Edge Cases**:
  - Reposting jobs with updated details.
  - Internal-only postings for restricted access.

### 2.16 Candidate Tracking

- **Features**:
  - Resume parsing for: Name, contact, skills, experience.
  - Track candidate stages: Applied, Screened, Interviewed, Offered, Hired.
- **Workflows**:
  - Auto-stage transitions based on predefined rules.
  - Notify recruiters of status updates.
- **Edge Cases**:
  - Duplicate applications with merge functionality.
  - Bulk candidate imports from job fairs or events.

### 2.16 Integration

- **HR Module**:
  - Sync hired candidate data to employee records.
  - Map resume fields to employee profile (e.g., skills).
- **Scheduling**:
  - Custom calendar integration for interview scheduling.
  - Auto-generated invites with video conferencing links.
- **Edge Cases**:
  - Candidate withdrawals with status updates.
  - Multi-interviewer scheduling with conflict resolution.

### 2.17 Forms and Data Collection

### 2.17 Form Creation

- **Features**:
    - Drag-and-drop form builder for lead capture, feedback, and surveys.
    - Fields: Text, number, dropdown, checkbox, file upload, payment.
- **Customization**:
    - Templates for common forms (e.g., contact form).
    - Branding with logos and colour schemes.
- **Validation**:
    - Mandatory fields and format validation.
    - Anti-spam measures with CAPTCHA and honeypot fields.
- **Edge Cases**:
    - Bulk submission processing with queuing.
    - Offline form submissions with sync.

**2.17 Payment Integration**

- **Features**:
    - PayPal and Stripe integration for payment collection.
    - Support for one-time and recurring payments with receipts.
- **Security**:
    - PCI-compliant tokenization for payment data.
    - Transaction logging for audit purposes.

- **Edge Cases**:
    - Payment failures with retry notifications.
    - Partial refund processing.

**2.17 Form Management**

- **Features**:
    - Toggle, copy, and format forms (standard or card layouts).
    - Real-time submission analytics with dashboard.
- **Sharing**:
    - Share via links, QR codes, or embedded widgets.

    - Restrict access to specific users or groups.
- **Edge Cases**:
    - High submission volumes with rate limiting.
    - Form versioning for updates.

**3. Common Features**

**3.1 User Interface**

**3.1.1 Responsive Design**

- **Compatibility**:
    - Web: Chrome, Firefox, Safari; Mobile: iOS, Android; Desktop applications.
    - Touch-friendly with gesture support (e.g., swipe).
- **Performance**:
    - <2s load times for all pages.
    - Progressive loading for low-bandwidth environments.
- **Edge Cases**:
    - Device-specific bug fixes.
    - Offline UI with local caching.

**3.1.2 Role-Based Dashboards**

- **Features**:
    - Custom dashboards for HR, payroll, projects, transport, assets, employees.
    - Widgets for KPIs, recent activities, and alerts.
- **Customization**:
    - Drag-and-drop layout configuration.
    - Save dashboards per user or role.
- **Edge Cases**:
    - High widget counts with performance optimization.

  - Multi-role dashboards for users with multiple roles.

#### 3.1.3 Branding and Localization

- **Branding**:
  - Custom themes with logos, colors, and fonts.
  - White labelling for corporate branding.
- **Localization**:
  - Support for 50+ languages (e.g., English, Hindi, Spanish).
  - Auto-detect user language with manual override.
- **Edge Cases**:
  - Right-to-left (RTL) language support (e.g., Arabic, Hebrew).
  - Partial translations with fallback to default language.

### 3.2 Integrations

#### 3.2.1 Internal Syncing

- **Features**:
  - Real-time sync between HR, payroll, projects, transport, and assets.
  - Event-driven architecture using custom Kafka-like system.
- **Validation**:
  - Ensure data consistency (e.g., employee ID across modules).
  - Log sync failures with retry mechanisms.
- **Edge Cases**:
  - Partial syncs with incremental updates.
  - Data reconciliation for conflicts.

#### 3.2.2 External Integrations

- **Payment Gateways**:
  - PayPal, Stripe for secure transactions.
  - Authentication via secure tokens.
- **Edge Cases**:
  - Rate limits with queuing mechanisms.
  - Fallback for API downtime with manual processing.

#### 3.2.3 Data Import/Export

- **Features**:
  - Import from local files (CSV, Excel, JSON).
  - Customizable field mapping and format support.
- **Security**:
  - AES-256 encryption for exported files.
  - Password protection and audit logs.
- **Edge Cases**:
  - Large imports (100,000+ records) with batch processing.
  - Partial exports for specific datasets.

### 3.3 Notifications

#### 3.3.1 Channels

- **Types**:
  - Email, in-app, push notifications, SMS.
  - SMS/USSD for non-smartphone users.
- **Delivery**:
  - <5s delivery for critical alerts.
  - Batch notifications for non-critical updates.
- **Edge Cases**:
  - Delivery failures with retry mechanisms.
  - Offline notifications with queuing.

#### 3.3.2 Configurability

- **Features**:
  - User preferences for channel and frequency.
  - Template-based notifications with dynamic fields.
- **Validation**:
  - Rate limit (10 notifications/hour per user).
  - GDPR compliance for data privacy.
- **Edge Cases**:

- Multilingual notification support.
- Do-not-disturb mode suppression.

### 3.3.3 Real-Time Alerts

- **Features**:
  - Critical event alerts: SOS, deadlines, asset maintenance.
  - Multi-user escalation for unresolved alerts.
- **Performance**:
  - <1s latency for alert delivery.
  - WebSocket-based real-time updates.
- **Edge Cases**:
  - High alert volumes with prioritization.
  - Alert logging for audit purposes.

## 3.4 Analytics

### 3.4.1 Custom Dashboards

- **Features**:
  - Drag-and-drop widget builder for KPIs, charts, tables.
  - Real-time updates via WebSocket.
- **Customization**:
  - Resizable widgets for flexible layouts.
  - Save dashboards per user or role.
- **Edge Cases**:
  - Large dashboards with lazy loading.
  - Mobile-optimized layouts.

### 3.4.2 Reporting

- **Types**:
  - Metrics for HR, payroll, projects, transport, assets.
  - Filters by date, module, user.
- **Export**:
  - PDF, Excel, CSV, JSON formats.

    - Include metadata in exports.
- **Edge Cases**:
    - Large reports with pagination.
    - Scheduled email delivery for reports.

#### 3.4.3 Data Visualization

- **Features**:
    - Interactive charts: Bar, pie, scatter, heatmap.
    - Drill-downs and zooming capabilities.
- **Performance**:
    - Optimized for 500M+ data points.
    - WebGL rendering for complex visualizations.
- **Edge Cases**:
    - Missing data with placeholders.
    - Offline visualization support.

## 4. Non-Functional Requirements

### 4.1 Performance

- System must handle 10,000 concurrent users with <5s response time.
- Large datasets (100,000+ records) processed with batching and lazy loading.
- Real-time updates via WebSocket with <1s latency.

### 4.2 Scalability

- Support horizontal scaling for additional users and modules.
- Handle 50,000 daily cab trips and 1,000+ simultaneous projects.
- Cloud-native architecture for dynamic resource allocation.

### 4.3 Security

- Data encryption: AES-256 for storage, TLS for transmission.
- Authentication: OAuth 2.0, JWT, MFA for sensitive data.
- Audit trails: Log all actions with user ID, timestamp, IP.
- GDPR, HIPAA, PCI-DSS compliance for data privacy and security.

### 4.4 Reliability

- 99.9% uptime with automated failover mechanisms.
- Data backups every 6 hours with 30-day retention.
- Disaster recovery plan with <4-hour recovery time objective (RTO).

### 4.5 Maintainability

- Modular codebase with clear documentation.
- Automated testing covering 90% of critical paths.
- Monthly updates with backward compatibility.

## 5. Assumptions and Constraints

### 5.1 Assumptions

- All employees have access to web or mobile devices for self-service portals.
- Internet connectivity is available for real-time features.
- Third-party integrations (Razor pay, PayPal, Stripe) APIs are stable.
- Historical data is provided in structured formats (CSV, JSON).

### 5.2 Constraints

- Compliance with regional laws must be manually configured.

## 6. Dependencies

- **Internal Dependencies**:
  - Integration with existing CRM, ERP, and LDAP systems.
  - Availability of employee, payroll, and asset data for migration.
- **External Dependencies**:
  - PayPal and Stripe APIs for payment processing.
  - GPS and traffic data providers for cab management.
  - Cloud hosting infrastructure (AWS, Azure) for scalability.

## 7. Risks and Mitigation Strategies

| Risk | Impact | Mitigation |
| --- | --- | --- |
| Data migration errors | High impact | Conduct phased migration with validation checks. |

| | | |
|---|---|---|
| API downtime from third parties | Medium impact | Implement fallback mechanisms (e.g., manual entry). |
| High user adoption resistance | High impact | Provide training sessions and user-friendly UI design. |
| Regulatory changes | Medium impact | Modular compliance updates with legal consultation. |
| Security breaches | Critical impact | Regular security audits and penetration testing. |

### 8. Acceptance Criteria

- **Functional**:
  - All modules (HR, payroll, cab, assets, etc.) meet specified requirements.
  - Successful end-to-end testing of employee self-service, payroll processing, payroll and cab booking.
  - 100% compliance with audit trails and regulatory requirements.

- **Non-Functional**:
  - System achieves <5s response time for 10,000 concurrent users.
  - 99.9% uptime during 3-month pilot phase.
  - Security audit with zero critical vulnerabilities.
- **User Acceptance**:
  - 80% user satisfaction rating from HR and employee feedback surveys.
  - 90% of common tasks completed within 3 clicks.

### 9. Glossary

- **RBAC**: Role-Based Access Control
- **AES-256**: Advanced Encryption Standard with 256-bit key
- **JWT**: JSON Web Token
- **MFA**: Multi-Factor Authentication
- **GDPR**: General Data Protection Regulation
- **HIPAA**: Health Insurance Portability and Accountability Act

- **PCI-DSS**: Payment Card Industry Data Security Standard
- **WebSocket**: Protocol for real-time, two-way communication
- **WebGL**: Web Graphics Library for rendering interactive visualizations

## 10. Appendix

### Appendix A: System Modules

- Diagram of module interactions (HRD, Payroll, Cab, Assets, etc.).
- Data flow between internal and external systems.

### Appendix B: Sample Reports

- Employee Classification Report (Pie Chart)
- Attendance Report (Bar Chart)
- Project Status Report (Burndown Chart)
- Asset Valuation Report (Line Chart)

### Appendix C: Compliance Requirements

- List of applicable laws (IRS, GDPR, Income Tax Act, etc.).
- Audit trail specifications for each module.