# IT Management System - Complete Technical Documentation

## Table of Contents

1. [System Overview](#system-overview)

2. [Database Design](#database-design)

3. [Entity Relationship Diagram](#entity-relationship-diagram)

4. [Enhanced Data Dictionary](#enhanced-data-dictionary)

5. [User Interface Specifications](#user-interface-specifications)

6. [Counter Report Workflow](#counter-report-workflow)

7. [System Architecture](#system-architecture)

8. [Security Model](#security-model)

9. [Integration Guidelines](#integration-guidelines)

10. [Implementation Roadmap](#implementation-roadmap)

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## 1. System Overview

### Project Description

The IT Management System is a comprehensive web-based platform designed to manage IT infrastructure, user accounts, reports, devices, and various organizational processes. The system provides role-based access control, complete audit trails, and modular architecture for seamless integration and expansion.

\*\*Phase 1 Focus\*\*: Counter Reports module with comprehensive POS device tracking and validation.

### Key Features

- \*\*Multi-device web access\*\* with responsive design

- \*\*Role-based permissions\*\* (Admin, Technician, User)

- \*\*Complete audit logging\*\* for compliance

- \*\*Modular application architecture\*\* with customizable dashboard

- \*\*Real-time task management\*\* and notifications

- \*\*Interactive notes and personal dashboard\*\*

- \*\*Comprehensive device and asset tracking\*\*

- \*\*Media-rich counter reporting\*\* with photo/video verification

- \*\*Draft saving\*\* to prevent data loss

- \*\*Approval workflow\*\* for counter information changes

### Technology Stack

- \*\*Frontend\*\*: HTML5, CSS3, JavaScript (responsive web design)

- \*\*Backend\*\*: RESTful API architecture

- \*\*Database\*\*: Relational database (MySQL/PostgreSQL recommended)

- \*\*Authentication\*\*: JWT-based session management

- \*\*Security\*\*: Password hashing, session tokens, audit logging

- \*\*File Storage\*\*: Media storage for photos/videos

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## 2. Database Design

### Design Principles

1. \*\*Normalization\*\*: Follows 3NF principles to eliminate redundancy

2. \*\*Audit Trail\*\*: Complete change tracking on all critical tables

3. \*\*Soft Deletion\*\*: IsActive flags for data integrity

4. \*\*Extensibility\*\*: Modular design for easy expansion

5. \*\*Security\*\*: Encrypted sensitive data and comprehensive access control

6. \*\*Media Integration\*\*: Support for photo/video attachments

7. \*\*Draft Management\*\*: Temporary data storage to prevent loss

### Enhanced Core Entities

#### \*\*User Management & Security\*\*

```sql

User (

UserID, EmpID, ArabicName, EnglishName, Mobile, Email,

PasswordHash, PasswordSalt, LastPasswordChange, MustChangePassword,

FailedLoginAttempts, AccountLockedUntil, ProfilePhoto,

CompanyID, DepartmentID, JobTitle, IsActive,

CreatedOn, CreatedBy, ModifiedOn, ModifiedBy, LastLoginOn

)

Role (

RoleID, RoleName, Description, IsSystemRole,

CanManageUsers, CanManageDevices, CanManageReports, CanManageSystem,

CanApproveChanges, CanManageCounters, IsActive,

CreatedOn, CreatedBy, ModifiedOn, ModifiedBy

)

Permission (

PermissionID, PermissionName, Description, Module,

ResourceType, ActionType, IsActive, CreatedOn, CreatedBy

)

```

#### \*\*Application Management\*\*

```sql

Application (

ApplicationID, ApplicationName, Description, URL, IconType,

IconData, CSSClass, SortOrder, Category, IsActive,

RequiredRole, CreatedOn, CreatedBy, ModifiedOn, ModifiedBy

)

UserNote (

NoteID, UserID, Title, Content, Color, Position,

IsPrivate, CreatedOn, ModifiedOn

)

Task (

TaskID, Title, Description, AssignedToUserID, AssignedByUserID,

Priority, Status, DueDate, CompletedDate,

CreatedOn, ModifiedOn

)

```

#### \*\*Counter Management (New)\*\*

```sql

Counter (

CounterID, CounterNumber, CounterName, SiteID, LocationDetails,

IsActive, InstallationDate, LastMaintenanceDate,

CreatedOn, CreatedBy, ModifiedOn, ModifiedBy

)

CounterDevice (

CounterDeviceID, CounterID, DeviceID, DeviceType,

SerialNumber, Model, Manufacturer, InstallationDate,

IsActive, CreatedOn, CreatedBy, ModifiedOn, ModifiedBy

)

CounterHistory (

HistoryID, CounterID, ChangeType, FieldChanged,

OldValue, NewValue, RequestedByUserID, ApprovedByUserID,

ReportID, RequestedOn, ApprovedOn, Status, Comments

)

```

#### \*\*Enhanced Report Management\*\*

```sql

ReportTemplate (

TemplateID, TemplateName, Description, TemplateVersion,

IsDefault, RequiredFields, OptionalFields, ValidationRules,

MediaRequirements, IsActive, CreatedOn, CreatedBy, ModifiedOn, ModifiedBy

)

Report (

ReportID, ReportName, TemplateID, UserID, SiteID, CounterID,

CreatedOn, SubmittedOn, StatusID, Priority, DueDate,

CompletedOn, ReviewedBy, ReviewedOn, ReviewComments,

ExportedOn, ExportedBy, ExportFormat

)

ReportMedia (

MediaID, ReportID, CounterID, CheckType, MediaType,

FileName, FilePath, FileSize, UploadedOn, UploadedBy

)

```

#### \*\*Enhanced Counter Reporting\*\*

```sql

ReportCounters (

CounterID, ReportID, CounterNumber, SiteID, TemplateVersion,

-- General Status with Media

IsOn, IsOnNote, IsOnMediaID,

-- Power & Physical with Media

ElectricityOn, ElectricityNote,

BeltOn, BeltNote, BeltOnMediaID,

LightOn, LightNote, LightOnMediaID,

-- Network with Media

InternetOn, InternetNote, InternetOnMediaID,

Connection,

-- Display Systems with Media

CustomerDisplayOn, CustomerDisplayNote, CustomerDisplayOnMediaID,

CSDisplayExtendOn, CSDisplayExtendNote, CSDisplayExtendOnMediaID,

-- Scanners with Media

HandScannerOn, HandScannerNote, HandScannerOnMediaID,

TableScannerOn, TableScannerNote, TableScannerOnMediaID,

-- Payment Systems with Media

EFTOn, EFTNote, EFTOnMediaID,

EFTLink, EFTLinkNote, EFTLinkMediaID,

-- Cash Management with Media

CashDrawerOn, CashDrawerNote, CashDrawerOnMediaID,

CashDrawerLink, CashDrawerLinkNote, CashDrawerLinkMediaID,

-- Printer with Media

PrinterOn, PrinterNote, PrinterOnMediaID,

PrinterLinked, PrinterLinkedNote, PrinterLinkedMediaID,

-- Software with Media

LSInstalled, LSInstalledMediaID,

LSOnlineOn, LSOnlineNote, LSOnlineOnMediaID,

LSOfflineOn, LSOfflineNote, LSOfflineOnMediaID,

-- Security with Media

AntivirusOn, AntivirusNote, AntivirusOnMediaID,

AgentOn, AgentNote, AgentOnMediaID,

-- Audit Fields

CreatedOn, CreatedBy, ModifiedOn, ModifiedBy

)

ReportCountersDraft (

DraftID, ReportID, UserID, CounterID, SavedOn, ExpiresOn,

-- All same fields as ReportCounters for draft saving

[Same fields as ReportCounters]

)

```

---

## 3. Entity Relationship Diagram

```mermaid

erDiagram

%% User Management

User {

int UserID PK

string EmpID

string ArabicName

string EnglishName

string Mobile

string Email

string PasswordHash

string PasswordSalt

datetime LastPasswordChange

boolean MustChangePassword

int FailedLoginAttempts

datetime AccountLockedUntil

string ProfilePhoto

int CompanyID FK

int DepartmentID FK

string JobTitle

boolean IsActive

datetime CreatedOn

int CreatedBy

datetime ModifiedOn

int ModifiedBy

datetime LastLoginOn

}

Role {

int RoleID PK

string RoleName

string Description

boolean IsSystemRole

boolean CanManageUsers

boolean CanManageDevices

boolean CanManageReports

boolean CanManageSystem

boolean CanApproveChanges

boolean CanManageCounters

boolean IsActive

datetime CreatedOn

int CreatedBy

datetime ModifiedOn

int ModifiedBy

}

Permission {

int PermissionID PK

string PermissionName

string Description

string Module

string ResourceType

string ActionType

boolean IsActive

datetime CreatedOn

int CreatedBy

}

Company {

int CompanyID PK

string CompanyName

string CompanyCode

string ContactInfo

boolean IsActive

datetime CreatedOn

int CreatedBy

datetime ModifiedOn

int ModifiedBy

}

Department {

int DepartmentID PK

string DepartmentName

string DepartmentCode

int CompanyID FK

int ManagerUserID FK

boolean IsActive

datetime CreatedOn

int CreatedBy

datetime ModifiedOn

int ModifiedBy

}

%% Application Management

Application {

int ApplicationID PK

string ApplicationName

string Description

string URL

string IconType

text IconData

string CSSClass

int SortOrder

string Category

boolean IsActive

string RequiredRole

datetime CreatedOn

int CreatedBy

datetime ModifiedOn

int ModifiedBy

}

UserNote {

int NoteID PK

int UserID FK

string Title

text Content

string Color

int Position

boolean IsPrivate

datetime CreatedOn

datetime ModifiedOn

}

Task {

int TaskID PK

string Title

text Description

int AssignedToUserID FK

int AssignedByUserID FK

string Priority

string Status

datetime DueDate

datetime CompletedDate

datetime CreatedOn

datetime ModifiedOn

}

%% Location Management

Site {

int SiteID PK

string SiteCode

string SiteName

string Address

string City

string Region

string Country

int CompanyID FK

int ManagerUserID FK

boolean IsActive

datetime CreatedOn

int CreatedBy

datetime ModifiedOn

int ModifiedBy

}

%% Counter Management

Counter {

int CounterID PK

string CounterNumber

string CounterName

int SiteID FK

string LocationDetails

boolean IsActive

datetime InstallationDate

datetime LastMaintenanceDate

datetime CreatedOn

int CreatedBy

datetime ModifiedOn

int ModifiedBy

}

CounterDevice {

int CounterDeviceID PK

int CounterID FK

int DeviceID FK

string DeviceType

string SerialNumber

string Model

string Manufacturer

datetime InstallationDate

boolean IsActive

datetime CreatedOn

int CreatedBy

datetime ModifiedOn

int ModifiedBy

}

CounterHistory {

int HistoryID PK

int CounterID FK

string ChangeType

string FieldChanged

text OldValue

text NewValue

int RequestedByUserID FK

int ApprovedByUserID FK

int ReportID FK

datetime RequestedOn

datetime ApprovedOn

string Status

text Comments

}

%% Report Management

ReportTemplate {

int TemplateID PK

string TemplateName

text Description

string TemplateVersion

boolean IsDefault

text RequiredFields

text OptionalFields

text ValidationRules

text MediaRequirements

boolean IsActive

datetime CreatedOn

int CreatedBy

datetime ModifiedOn

int ModifiedBy

}

Report {

int ReportID PK

string ReportName

int TemplateID FK

int UserID FK

int SiteID FK

int CounterID FK

datetime CreatedOn

datetime SubmittedOn

int StatusID FK

string Priority

datetime DueDate

datetime CompletedOn

int ReviewedBy FK

datetime ReviewedOn

text ReviewComments

datetime ExportedOn

int ExportedBy FK

string ExportFormat

}

ReportMedia {

int MediaID PK

int ReportID FK

int CounterID FK

string CheckType

string MediaType

string FileName

string FilePath

bigint FileSize

datetime UploadedOn

int UploadedBy FK

}

ReportCounters {

int CounterID PK

int ReportID FK

string CounterNumber

int SiteID FK

string TemplateVersion

boolean IsOn

text IsOnNote

int IsOnMediaID FK

boolean ElectricityOn

text ElectricityNote

boolean BeltOn

text BeltNote

int BeltOnMediaID FK

boolean LightOn

text LightNote

int LightOnMediaID FK

boolean InternetOn

text InternetNote

int InternetOnMediaID FK

string Connection

boolean CustomerDisplayOn

text CustomerDisplayNote

int CustomerDisplayOnMediaID FK

boolean CSDisplayExtendOn

text CSDisplayExtendNote

int CSDisplayExtendOnMediaID FK

boolean HandScannerOn

text HandScannerNote

int HandScannerOnMediaID FK

boolean TableScannerOn

text TableScannerNote

int TableScannerOnMediaID FK

boolean EFTOn

text EFTNote

int EFTOnMediaID FK

string EFTLink

text EFTLinkNote

int EFTLinkMediaID FK

boolean CashDrawerOn

text CashDrawerNote

int CashDrawerOnMediaID FK

string CashDrawerLink

text CashDrawerLinkNote

int CashDrawerLinkMediaID FK

boolean PrinterOn

text PrinterNote

int PrinterOnMediaID FK

boolean PrinterLinked

text PrinterLinkedNote

int PrinterLinkedMediaID FK

boolean LSInstalled

int LSInstalledMediaID FK

boolean LSOnlineOn

text LSOnlineNote

int LSOnlineOnMediaID FK

boolean LSOfflineOn

text LSOfflineNote

int LSOfflineOnMediaID FK

boolean AntivirusOn

text AntivirusNote

int AntivirusOnMediaID FK

boolean AgentOn

text AgentNote

int AgentOnMediaID FK

datetime CreatedOn

int CreatedBy

datetime ModifiedOn

int ModifiedBy

}

%% Junction Tables

UserRole {

int UserRoleID PK

int UserID FK

int RoleID FK

int AssignedBy FK

datetime AssignedOn

datetime ExpiresOn

boolean IsActive

datetime CreatedOn

int ModifiedBy

datetime ModifiedOn

}

RolePermission {

int RolePermissionID PK

int RoleID FK

int PermissionID FK

int GrantedBy FK

datetime GrantedOn

boolean IsActive

}

UserSite {

int UserSiteID PK

int UserID FK

int SiteID FK

string AccessLevel

boolean CanManageDevices

boolean CanCreateReports

int AssignedBy FK

datetime AssignedOn

datetime ExpiresOn

boolean IsActive

}

%% Relationships

Company ||--o{ Department : "has"

Company ||--o{ Site : "operates"

Department ||--o{ User : "employs"

Site ||--o{ Counter : "contains"

Counter ||--o{ CounterDevice : "has"

Counter ||--o{ CounterHistory : "tracks"

Counter ||--o{ Report : "generates"

User ||--o{ UserRole : "assigned"

Role ||--o{ UserRole : "grants"

Role ||--o{ RolePermission : "has"

Permission ||--o{ RolePermission : "granted\_by"

User ||--o{ UserSite : "accesses"

Site ||--o{ UserSite : "accessed\_by"

User ||--o{ Report : "creates"

User ||--o{ Task : "assigned\_to"

User ||--o{ Task : "assigned\_by"

User ||--o{ UserNote : "owns"

ReportTemplate ||--o{ Report : "uses"

Report ||--o{ ReportMedia : "contains"

Report ||--o{ ReportCounters : "has"

ReportMedia ||--o{ ReportCounters : "referenced\_by"

```

---

## 4. Enhanced Data Dictionary

### Media Integration Fields

All counter check items that require visual verification include:

- \*\*MediaID Fields\*\*: Reference to uploaded photos/videos

- \*\*Note Fields\*\*: Required only when the corresponding check fails

- \*\*Validation Logic\*\*: Conditional requirements based on status

### Counter Report Validation Rules

1. \*\*General Status Check\*\*: If `IsOn = FALSE`, all other fields become optional

2. \*\*Note Requirements\*\*: Notes mandatory when any check returns `FALSE`

3. \*\*Media Requirements\*\*: Photos/videos required for specific verification points

4. \*\*Draft Persistence\*\*: All data saved to draft table during form completion

5. \*\*Approval Workflow\*\*: Counter information changes require admin approval

---

## 5. User Interface Specifications

### Landing Page (Sign-In)

```

┌─────────────────────────────────────────────────────────┐

│ LOGIN SCREEN │

│ │

│ [COMPANY LOGO] │

│ │

│ ┌─────────────────────────┐ │

│ │ Email/Username │ │

│ └─────────────────────────┘ │

│ ┌─────────────────────────┐ │

│ │ Password │ │

│ └─────────────────────────┘ │

│ │

│ [SIGN IN BUTTON] │

│ │

│ Remember Me Forgot Password? │

└─────────────────────────────────────────────────────────┘

```

### Main Dashboard Layout

```

┌─────────────────────────────────────────────────────────────────────────────┐

│ [LOGO] Home Personal Services Platforms Tools Media Welcome, User [👤▼] │

├─────────────────────────────────────────────────────────────────────────────┤

│ ┌─────────┐ ┌─────────────────────────────────────────────┐ ┌─────────────┐ │

│ │ TASKS │ │ SEARCH BAR │ │ NOTES │ │

│ │ │ └─────────────────────────────────────────────┘ │ │ │

│ │ Task 1 │ │ [+] Add Note│ │

│ │ Task 2 │ ┌─────┐ ┌─────┐ ┌─────┐ ┌─────┐ ┌─────┐ │ ┌─────────────┤ │

│ │ Task 3 │ │📋 │ │📊 │ │💻 │ │💳 │ │🛒 │ │ │ Note 1 │ │

│ │ Task 4 │ │Req. │ │Rep. │ │Asset│ │Loans│ │Purch│ │ │ Note 2 │ │

│ │ Task 5 │ └─────┘ └─────┘ └─────┘ └─────┘ └─────┘ │ │ Note 3 │ │

│ │ │ │ │ │ │

│ │ [More] │ ┌─────┐ ┌─────┐ ┌─────┐ ┌─────┐ ┌─────┐ │ └─────────────┤ │

│ └─────────┘ │🔧 │ │📁 │ │❗ │ │📄 │ │⚙️ │ └─────────────┘ │

│ │Solu.│ │Proj.│ │Prob.│ │Cont.│ │Admin│ │

│ └─────┘ └─────┘ └─────┘ └─────┘ └─────┘ │

│ │

│ ┌─────┐ ┌─────┐ ┌─────┐ ┌─────┐ ┌─────┐ │

│ │🎧 │ │🖥️ │ │📡 │ │🛡️ │ │💾 │ │

│ │Serv.│ │Desk.│ │Unifi│ │Eset │ │Syno.│ │

│ └─────┘ └─────┘ └─────┘ └─────┘ └─────┘ │

├─────────────────────────────────────────────────────────────────────────────┤

│ FOOTER │

└─────────────────────────────────────────────────────────────────────────────┘

```

### Counter Report Workflow Pages

#### Page 1: Site Selection

```

┌─────────────────────────────────────────────────────────┐

│ Reports > Counter Reports > Site Selection │

├─────────────────────────────────────────────────────────┤

│ │

│ Select Site for Counter Report │

│ │

│ ┌─────────────────────────────────────────────────┐ │

│ │ Site Dropdown ▼ │ │

│ └─────────────────────────────────────────────────┘ │

│ │

│ [CONTINUE] │

│ │

└─────────────────────────────────────────────────────────┘

```

#### Page 2: Counter Selection

```

┌─────────────────────────────────────────────────────────┐

│ Reports > Counter Reports > Counter Selection │

├─────────────────────────────────────────────────────────┤

│ │

│ Select Counter for Report (Site: ABC) │

│ │

│ ┌─────────────────────────────────────────────────┐ │

│ │ Counter Dropdown ▼ │ │

│ └─────────────────────────────────────────────────┘ │

│ │

│ [CONTINUE] │

│ │

└─────────────────────────────────────────────────────────┘

```

#### Page 3: Counter Information Verification

```

┌─────────────────────────────────────────────────────────────────────────────┐

│ Reports > Counter Reports > Information Verification │

├─────────────────────────────────────────────────────────────────────────────┤

│ │

│ Counter Information Verification │

│ Counter: POS-001, Site: ABC │

│ │

│ ┌─────────────────────────────────────────────────────────────────────────┐ │

│ │ Connected Devices: │ │

│ │ ✓ Computer: DELL-ABC-001 (Serial: DL123456) │ │

│ │ ✓ Customer Display: EPSON-CD-001 (Serial: EP789012) │ │

│ │ ✓ Printer: HP-PRT-001 (Serial: HP345678) │ │

│ │ ✓ Hand Scanner: SYMBOL-HS-001 (Serial: SY901234) │ │

│ │ ✓ Table Scanner: DATALOGIC-TS-001 (Serial: DL567890) │ │

│ │ ✓ Cash Drawer: APG-CD-001 (Serial: AP123789) │ │

│ │ ✓ EFT Machine: INGENICO-EFT-001 (Serial: IN456123) │ │

│ └─────────────────────────────────────────────────────────────────────────┘ │

│ │

│ [VERIFY CORRECT] [REQUEST CHANGES] [CONTINUE TO CHECKS] │

│ │

└─────────────────────────────────────────────────────────────────────────────┘

```

#### Page 4: Counter Checks (Main Report Form)

```

┌─────────────────────────────────────────────────────────────────────────────┐

│ Reports > Counter Reports > Counter Checks │

├─────────────────────────────────────────────────────────────────────────────┤

│ │

│ Counter Report Checklist │

│ Counter: POS-001, Site: ABC │

│ │

│ ┌─────────────────────────────────────────────────────────────────────────┐ │

│ │ 1. General Status │ │

│ │ Counter Is On: ☑ Yes ☐ No [📷 Upload Photo] [📹 Upload Video] │ │

│ │ Notes: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ │ │

│ │ │ │

│ │ 2. Power & Physical │ │

│ │ Electricity On: ☑ Yes ☐ No │ │

│ │ Notes: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ │ │

│ │ │ │

│ │ Belt On: ☑ Yes ☐ No [📷 Upload Photo] [📹 Upload Video] │ │

│ │ Notes: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ │ │

│ │ │ │

│ │ Light On: ☑ Yes ☐ No [📷 Upload Photo] [📹 Upload Video] │ │

│ │ Notes: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ │ │

│ │ │ │

│ │ 3. Network & Connectivity │ │

│ │ Internet On: ☑ Yes ☐ No [📷 Upload Photo] [📹 Upload Video] │ │

│ │ Notes: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ │ │

│ │ │ │

│ │ Connection Status: [Dropdown: Excellent/Good/Fair/Poor] │ │

│ │ │ │

│ └─────────────────────────────────────────────────────────────────────────┘ │

│ │

│ [SAVE DRAFT] [CONTINUE] [SUBMIT REPORT] │

│ │

└─────────────────────────────────────────────────────────────────────────────┘

```

---

## 6. Counter Report Workflow

### Workflow Steps

1. \*\*Authentication\*\*: User signs into system

2. \*\*Navigation\*\*: User clicks Reports → Counter Reports

3. \*\*Site Selection\*\*: Choose site from dropdown

4. \*\*Counter Selection\*\*: Choose specific counter

5. \*\*Information Verification\*\*: Verify/request changes to counter device info

6. \*\*Counter Checks\*\*: Complete comprehensive checklist with media uploads

7. \*\*Validation\*\*: System validates all required fields

8. \*\*Submission\*\*: Report submitted for review

9. \*\*Approval\*\*: Admin reviews any requested changes

10. \*\*History\*\*: Report stored in history with full audit trail

### Validation Rules

```

IF IsOn = FALSE THEN

IsOnNote = REQUIRED

All other checks = OPTIONAL

Report can be submitted

ELSE

All designated checks = REQUIRED

Notes required only for failed checks

Media uploads required for specified checks

END IF

```

### Media Requirements

\*\*Required Media Upload for:\*\*

- IsOn check

- BeltOn check

- LightOn check

- InternetOn check

- CustomerDisplayOn check

- CSDisplayExtendOn check

- HandScannerOn check

- TableScannerOn check

- EFTOn check

- EFTLink verification

- CashDrawerOn check

- CashDrawerLink verification

- PrinterOn check

- PrinterLinked verification

- LSInstalled verification

- LSOnlineOn check

- LSOfflineOn check

- AntivirusOn check

- AgentOn check

### Draft Management

- Auto-save every 30 seconds

- Manual save via [SAVE DRAFT] button

- Draft expires after 24 hours

- User can resume from last saved state

- Multiple drafts per user supported

---

## 7. System Architecture

### Multi-Tier Architecture

```

┌─────────────────────────────────────────────────────────┐

│ PRESENTATION LAYER │

│ (Responsive Web Interface) │

│ HTML5 │ CSS3 │ JavaScript │ Progressive Web App │

└─────────────────────────────────────────────────────────┘

│

┌─────────────────────────────────────────────────────────┐

│ APPLICATION LAYER │

│ (RESTful API) │

│ Authentication │ Authorization │ Business Logic │

│ File Upload │ PDF Generation │ Email Notifications │

└─────────────────────────────────────────────────────────┘

│

┌─────────────────────────────────────────────────────────┐

│ DATA LAYER │

│ (Relational Database + File Storage) │

│ MySQL/PostgreSQL │ Media Storage │ Audit Logs │

└─────────────────────────────────────────────────────────┘

```

### API Endpoints Structure

```

Authentication:

POST /api/auth/login

POST /api/auth/logout

GET /api/auth/profile

Applications:

GET /api/applications

POST /api/applications (Admin only)

PUT /api/applications/{id} (Admin only)

DELETE /api/applications/{id} (Admin only)

Counter Reports:

GET /api/sites

GET /api/sites/{id}/counters

GET /api/counters/{id}/info

POST /api/reports/counter

PUT /api/reports/counter/{id}

POST /api/reports/counter/{id}/media

GET /api/reports/counter/{id}/export

Tasks & Notes:

GET /api/tasks/assigned

POST /api/tasks

PUT /api/tasks/{id}

GET /api/notes

POST /api/notes

PUT /api/notes/{id}

DELETE /api/notes/{id}

Admin Functions:

GET /api/admin/counters

POST /api/admin/counters

PUT /api/admin/counters/{id}

GET /api/admin/counter-changes/pending

POST /api/admin/counter-changes/{id}/approve

POST /api/admin/counter-changes/{id}/reject

```

---

## 8. Security Model

### Authentication & Authorization

```

┌─────────────────────────────────────────────────────────┐

│ SECURITY LAYERS │

├─────────────────────────────────────────────────────────┤

│ 1. Authentication (JWT Tokens) │

│ - Secure password hashing (bcrypt) │

│ - Multi-factor authentication ready │

│ - Session timeout management │

│ - Account lockout protection │

├─────────────────────────────────────────────────────────┤

│ 2. Authorization (Role-Based Access Control) │

│ - Admin: Full system access │

│ - Technician: Limited device/report access │

│ - User: Read-only personal access │

├─────────────────────────────────────────────────────────┤

│ 3. Data Protection │

│ - Encrypted sensitive fields │

│ - Complete audit logging │

│ - File upload security scanning │

│ - SQL injection prevention │

├─────────────────────────────────────────────────────────┤

│ 4. Network Security │

│ - HTTPS/TLS encryption │

│ - CORS policy enforcement │

│ - Rate limiting │

│ - IP whitelist support │

└─────────────────────────────────────────────────────────┘

```

### Role Permissions Matrix

| Function | Admin | Technician | User |

|----------|-------|------------|------|

| Manage Users | ✓ | ✗ | ✗ |

| Manage Applications | ✓ | ✗ | ✗ |

| Approve Counter Changes | ✓ | ✗ | ✗ |

| Create Counter Reports | ✓ | ✓ | ✗ |

| View Own Reports | ✓ | ✓ | ✓ |

| View All Reports | ✓ | ✗ | ✗ |

| Export Reports | ✓ | ✓ | ✗ |

| Manage Tasks | ✓ | ✓ | ✗ |

| Personal Notes | ✓ | ✓ | ✓ |

| System Settings | ✓ | ✗ | ✗ |

---

## 9. Integration Guidelines

### Database Integration Points

1. \*\*Modular Table Structure\*\*: Each functional area can be deployed independently

2. \*\*Consistent Foreign Keys\*\*: All relationships follow standard patterns

3. \*\*Audit Trail Integration\*\*: AuditLog table captures changes from any module

4. \*\*Configuration Driven\*\*: SystemSettings table allows behavior modification

### API Integration Standards

```json

{

"response\_format": {

"success": true,

"data": {},

"message": "Operation completed successfully",

"errors": [],

"metadata": {

"timestamp": "2025-08-18T10:30:00Z",

"version": "1.0",

"pagination": {

"page": 1,

"limit": 50,

"total": 100

}

}

}

}

```

### File Upload Specifications

```json

{

"media\_upload": {

"allowed\_types": ["image/jpeg", "image/png", "video/mp4", "video/webm"],

"max\_file\_size": "50MB",

"compression": "automatic",

"security\_scan": "required",

"storage\_path": "/uploads/reports/{year}/{month}/{reportId}/",

"thumbnail\_generation": "automatic\_for\_videos"

}

}

```

---

## 10. Implementation Roadmap

### Phase 1: Core Infrastructure (Weeks 1-4)

\*\*Database Setup\*\*

- [ ] Create all core tables (User, Role, Permission, Company, Department, Site)

- [ ] Implement authentication tables (UserSession, AuditLog)

- [ ] Set up initial data seeding

- [ ] Configure database indexes and constraints

\*\*Basic Authentication\*\*

- [ ] User registration/login system

- [ ] Password security implementation

- [ ] Session management

- [ ] Role-based access control

\*\*Application Framework\*\*

- [ ] Application management system

- [ ] Basic dashboard layout

- [ ] Navigation structure

- [ ] Responsive design foundation

### Phase 2: Counter Management (Weeks 5-8)

\*\*Counter Infrastructure\*\*

- [ ] Create Counter, CounterDevice, CounterHistory tables

- [ ] Implement counter information management

- [ ] Set up device tracking system

- [ ] Create approval workflow for changes

\*\*Report Templates\*\*

- [ ] Design ReportTemplate system

- [ ] Create counter report template

- [ ] Implement validation rules

- [ ] Set up media requirements

### Phase 3: Counter Reports (Weeks 9-12)

\*\*Report Creation Workflow\*\*

- [ ] Site selection interface

- [ ] Counter selection interface

- [ ] Information verification page

- [ ] Counter checklist form with all fields

\*\*Media Integration\*\*

- [ ] File upload system

- [ ] Image/video processing

- [ ] Security scanning

- [ ] Storage management

\*\*Draft Management\*\*

- [ ] Auto-save functionality

- [ ] Draft persistence

- [ ] Resume capabilities

- [ ] Expiration handling

### Phase 4: Advanced Features (Weeks 13-16)

\*\*Export Capabilities\*\*

- [ ] PDF report generation

- [ ] Excel export functionality

- [ ] Image compilation

- [ ] Email delivery system

\*\*Task Management\*\*

- [ ] Task assignment system

- [ ] Task dashboard

- [ ] Notification system

- [ ] Task completion tracking

\*\*Personal Features\*\*

- [ ] Interactive notes system

- [ ] Personal dashboard

- [ ] User preferences

- [ ] Profile management

### Phase 5: Admin & Polish (Weeks 17-20)

\*\*Admin Functions\*\*

- [ ] Application management interface

- [ ] User management system

- [ ] Counter approval workflow

- [ ] System settings management

\*\*Performance & Security\*\*

- [ ] Performance optimization

- [ ] Security audit

- [ ] Load testing

- [ ] Documentation completion

---

## Technical Specifications

### Database Requirements

- \*\*Engine\*\*: MySQL 8.0+ or PostgreSQL 13+

- \*\*Storage\*\*: Minimum 100GB (scales with media uploads)

- \*\*Backup\*\*: Daily automated backups with 30-day retention

- \*\*Indexing\*\*: Optimized for report queries and audit searches

### Server Requirements

- \*\*CPU\*\*: Minimum 4 cores, recommended 8 cores

- \*\*RAM\*\*: Minimum 8GB, recommended 16GB

- \*\*Storage\*\*: SSD recommended, minimum 200GB

- \*\*Bandwidth\*\*: Minimum 100Mbps for media uploads

### Client Requirements

- \*\*Browser\*\*: Modern browsers (Chrome 90+, Firefox 88+, Safari 14+, Edge 90+)

- \*\*JavaScript\*\*: ES6+ support required

- \*\*Screen Resolution\*\*: Responsive design supports 320px to 4K

- \*\*Connection\*\*: Minimum 1Mbps for basic functionality, 5Mbps for media uploads

### Security Considerations

- \*\*SSL/TLS\*\*: Required for all connections

- \*\*Password Policy\*\*: Minimum 12 characters, complexity requirements

- \*\*Session Security\*\*: 30-minute timeout, secure token storage

- \*\*File Security\*\*: Virus scanning, file type validation, size limits

- \*\*Audit Logging\*\*: Complete action tracking for compliance

---

## Conclusion

This IT Management System provides a comprehensive foundation for managing IT infrastructure with a focus on counter reporting in Phase 1. The modular design ensures easy expansion to additional modules while maintaining security, performance, and usability standards.

The system's architecture supports:

- \*\*Scalability\*\*: Database and application design supports growth

- \*\*Security\*\*: Enterprise-level security with complete audit trails

- \*\*Usability\*\*: Intuitive interface with mobile-first responsive design

- \*\*Integration\*\*: API-first approach for future system integrations

- \*\*Maintenance\*\*: Clear documentation and structured codebase

\*\*Next Steps\*\*:

1. Set up development environment

2. Begin Phase 1 implementation

3. Conduct user acceptance testing

4. Deploy to production environment

5. Monitor and optimize performance

For technical questions or implementation support, refer to the development team or system administrator.