PHASE IV: PROJECT DESIGN

Date	06 November 2025
Team ID	NM2025TMID04603
Project Name	Medical Inventory Management
Maximum Marks	4 Marks

Title: Project Design Phase for *"MedicalConnect – Medical inventory Management"*

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1. Objective

The primary objective of the design phase in a medical inventory management project is to translate user needs and system requirements into a practical, efficient, and user-centered system design that ensures accurate tracking, optimal utilization, and timely replenishment of medical supplies across healthcare facilities

2. Design Overview

The design stage uses Salesforce's declarative and programmatic features to model a robust, user-friendly system.

- **Accuracy:** Eliminate human error in stock counting and record-keeping.
- **Efficiency:** Automate ordering, tracking, and reporting processes.
- **Visibility:** Provide real-time insights into inventory status and usage trends.
- **Integration:** Enable seamless communication between pharmacy, procurement, and supplier systems.
- **Compliance:** Maintain data integrity and regulatory compliance (e.g., FDA, WHO, HIPAA).

The system follows a **modular, multi-tier architecture**:

Layer	Description
User Interface Layer	Provides dashboards and interfaces for pharmacists, nurses, administrators, and suppliers.
Application Layer	Handles business logic — inventory tracking, alerts, analytics, and report generation.
Database Layer	Stores inventory data, supplier information, transaction records, and audit trails securely.
Integration Layer	Connects with external systems such as hospital ERP, supplier APIs, and barcode/RFID scanners.

Inventory Control Module

- Tracks all items (drugs, consumables, equipment) with batch and expiry data.
- Supports barcode or RFID-based scanning for quick updates.
- Implements *First-Expiry-First-Out (FEFO)* logic to minimize waste.

Procurement & Reordering Module

- Automates purchase requests when stock reaches minimum thresholds.
- Integrates supplier catalogs for easy ordering.
- Tracks order status and delivery timelines.

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User Interface Design

- **Role-Based Dashboards:** Separate views for pharmacists, procurement officers, and administrators.
- **Visual Indicators:** Color-coded alerts (red for low stock, yellow for expiring items).
- **Mobile Accessibility:** Responsive design for tablets and smartphones to allow on-the-go updates.

6. Data Flow Overview

1. Medical staff logs inventory movements (receiving, dispensing, or returning).
2. System updates database in real time via barcode/RFID input.
3. Low-stock or expiry conditions trigger automated alerts.
4. Procurement module generates purchase requests and tracks supplier responses.
5. Management dashboards display analytics for oversight and planning.

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7. Design Considerations

- **Scalability:** Designed for multi-department and multi-location use.
- **Interoperability:** Uses standard APIs and formats (e.g., HL7/FHIR) for healthcare system integration.
- **Reliability:** Data backup and recovery mechanisms ensure continuity.
- **Security:** Data encryption, authentication, and secure network protocols protect sensitive information.

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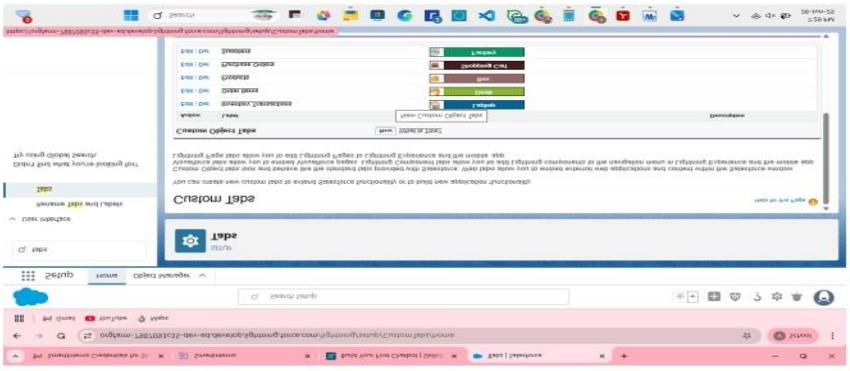
8. Expected Outcomes

- Improved inventory accuracy and reduced human error.
- Decrease in expired or wasted stock.
- Faster and data-driven procurement decisions.



3. User Interface (UI) Design

3.1 Lightning App Design

A custom Lightning App named **“medicalconnect”** was created to give NGOs and volunteers a seamless experience.

Steps:

1. Navigate to Setup → App Manager → New Lightning App.
2. Add App Name, Description, and choose the app logo.
3. Configure navigation with the following tabs:
    - Home
    - Venues
    - Drop-Off Points
    - Tasks
    - Execution Details
    - Volunteers
    - Reports & Dashboards

Design Principle Used:

- **Minimalist UI:** Clean interface, large form spacing for clarity.
- **Role-based Navigation:** Admins access all tabs, volunteers see task-related ones only.

3.2 Home Page Design

The Home Page serves as the operational dashboard and record entry point.

Components Added:

- **Screen Flow:** "Venue Form Flow" for fast record creation.
- **Embedded Dashboard:** Shows total deliveries, distances, and volunteer activity.
- **Informational Card:** Displays a motivational banner image on food donation impact.

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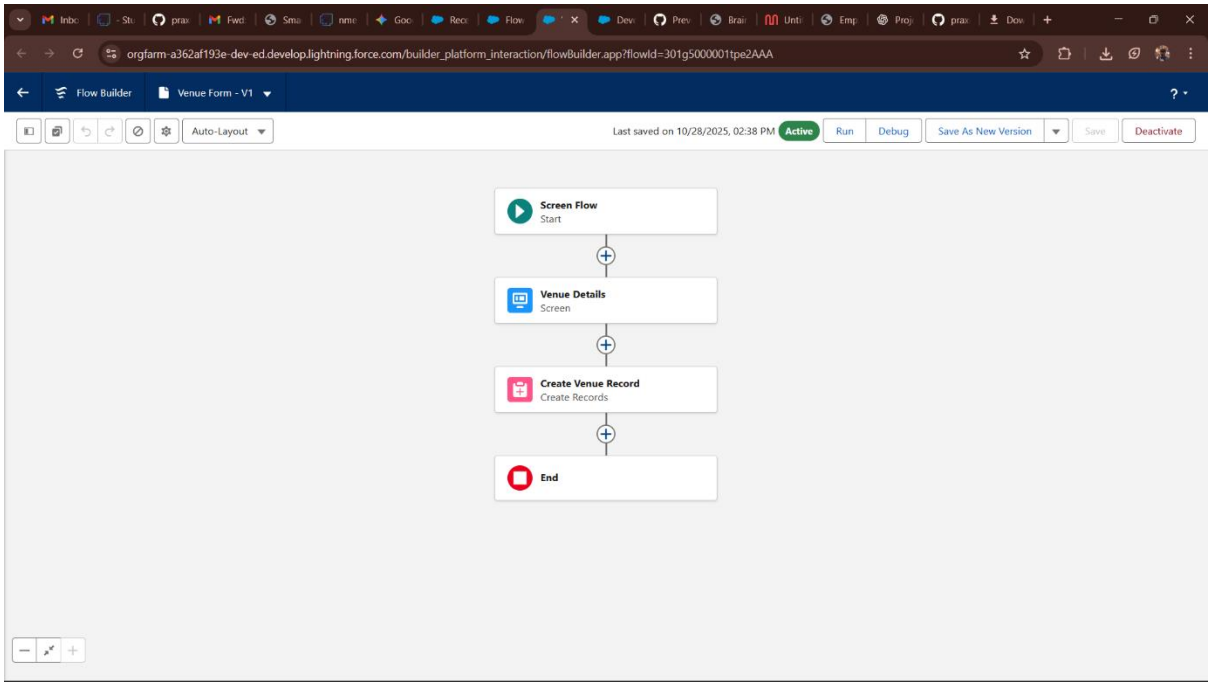
4. Automation Design

Automation ensures a **hands-free workflow** by minimizing manual interventions and maintaining data accuracy.

4.1 Screen Flow: Venue Form Flow

Flow Steps:

1. Add Screen Elements → Venue Name, Email, Phone, Latitude, Longitude.
2. Use **Create Record Element** → Store data in the Venue Object.
3. Add confirmation screen → “Venue Record Created Successfully.”



4.2 Apex Trigger Design

A custom **Apex Trigger** was designed on the *Drop-Off Point* object to auto-calculate the **Distance Field** using the formula:

```
DISTANCE(Drop_Off_Point_Location__c, Venue__r.Geolocation__c, 'km')
```

Trigger Steps:

1. Event: *Before Insert*
2. Function: Fetch associated Venue record.
3. Calculate distance dynamically.
4. Store result in “Distance__c” field.

Rationale:
This ensures every new Drop-Off Point record includes an accurate distance value before saving, enabling precise task assignment.

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5. Security Design

The **Security Model** in Salesforce ensures data privacy and controlled access among users.

5.1 Profile-Based Access

- **Volunteer Profile:** Read and Create permissions on Volunteer and Task objects.
- **NGO Admin Profile:** Full CRUD access to all objects.
- **System Admin:** Access to all configurations.

5.2 Criteria-Based Sharing Rules

Two automated rules were defined:

- If *Distance < 15 km* → Share with **Isha Volunteers Group**.
- If *Distance > 30 km* → Share with **NGO Coordinators Group**.

Benefit:
This allows automatic filtering of records by geographic location, keeping data relevant and clutter-free.

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6. Reporting and Dashboard Design

6.1 Reports

Custom report types were created to link:

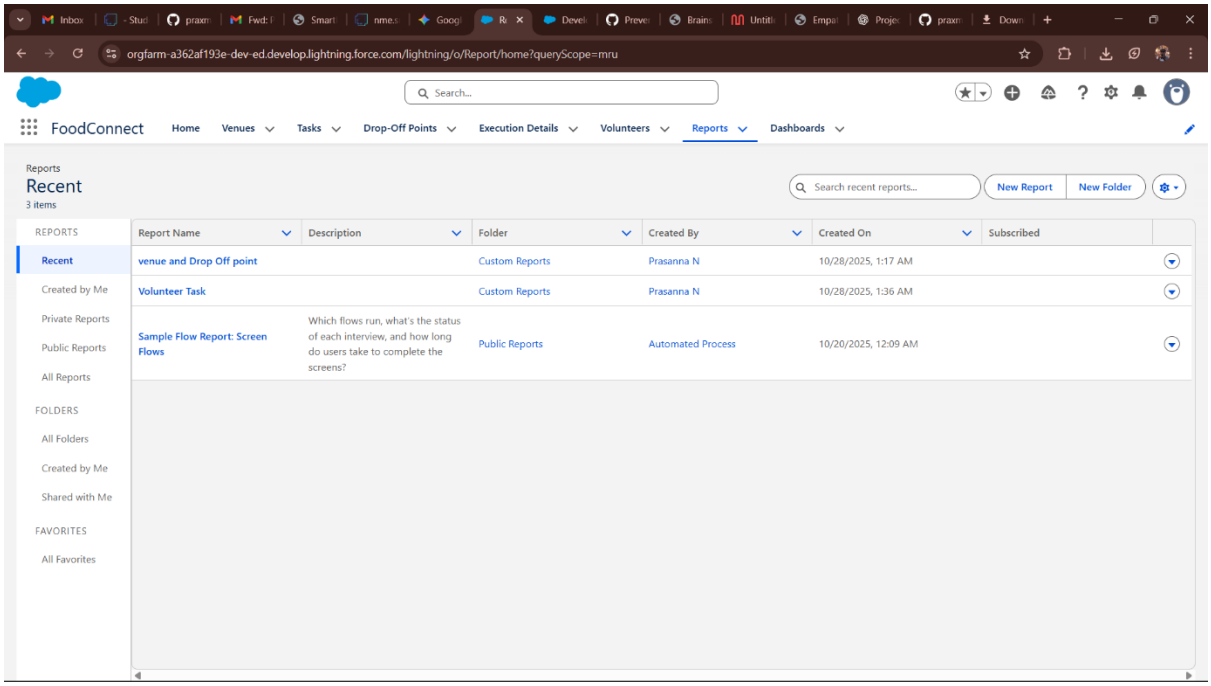
- **Venue → Drop-Off Point → Task**
- **Volunteer → Task → Execution Details**

6.2 Dashboard Components

The dashboard visualizes real-time project impact using:

- **Bar Chart:** Total deliveries by volunteers.
- **Pie Chart:** Food category distribution (Veg / Non-Veg).
- **Line Chart:** Monthly volunteer participation trends.

- **Table View:** Task completion details.



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7. System Architecture Design

The system architecture integrates UI, automation, database, and reporting modules into one functional ecosystem.

Layer	Component	Function
Presentation Layer	Lightning App UI	User interaction interface
Logic Layer	Apex Triggers, Flows	Automates business logic
Data Layer	Custom Objects, Fields	Manages records and relationships
Analytics Layer	Dashboards, Reports	Provides insights and metrics

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8. Design Constraints

Constraint	Impact	Solution
Formula field performance under large datasets	Slower computation	Use indexed fields for faster lookup
User error in Flow inputs	Invalid data records	Add validation rules
Dashboard refresh limits	Slight delay in real-time updates	Schedule refresh every 15 mins

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9. Future Design Considerations

1. Integration with **Google Maps API** for advanced geolocation tracking.
2. Development of **Mobile App Interface** using Salesforce Mobile SDK.
3. AI-based **Food Demand Prediction System** for NGOs.

These enhancements will further expand FoodConnect's scalability and intelligence.

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10. Summary

- Dashboards
- MIMS provides an integrated platform that connects **pharmacy departments, procurement teams, and suppliers**, enabling seamless coordination across all inventory operations. It automates key processes such as **stock updates, expiry tracking, low-stock alerts, and reorder management**, thereby minimizing human error and saving valuable time for healthcare staff.
- Through **barcode or RFID integration**, the system captures accurate data on stock movements, while **analytics dashboards** offer real-time visibility into usage trends, stock performance, and procurement efficiency. The platform also supports **regulatory compliance**, maintaining detailed audit trails and reports required for healthcare standards and inspections.
- By implementing the Medical Inventory Management System, healthcare organizations can achieve:
- Enhanced **efficiency and accuracy** in managing medical supplies

- Reduced **stockouts** and **expired inventory losses**
- Improved **decision-making** through data-driven insights
- Strengthened **accountability** and **transparency** in inventory processes