

Project Design Phase-II

Technology Stack (Architecture & Stack)

Field	Details
Date	04 November 2025
Team ID	NM2025TMID03885
Project Name	Medical Inventory Management System
Maximum Marks	4 Marks

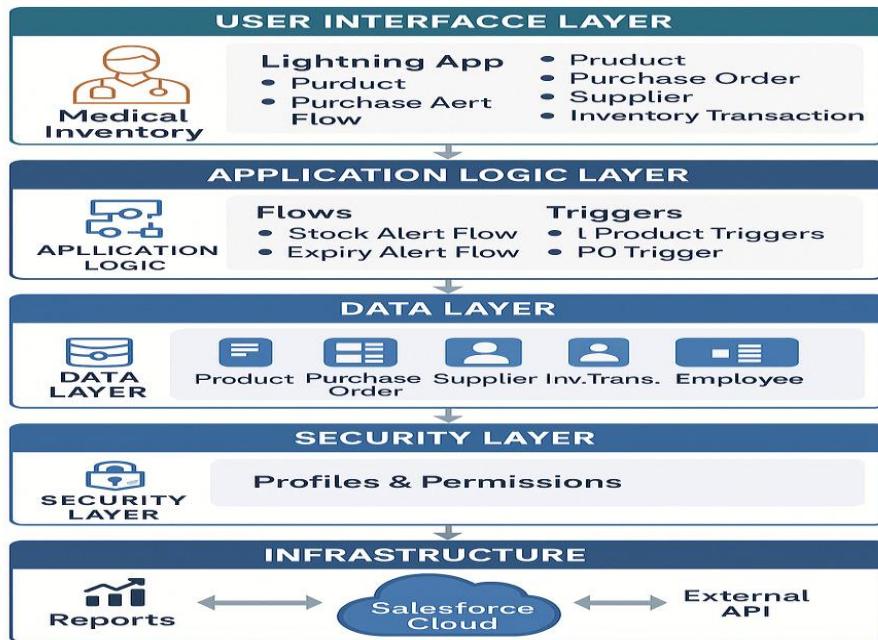
Technical Architecture:

The Deliverable shall include the architectural diagram as below and the information as per the table1 & table 2

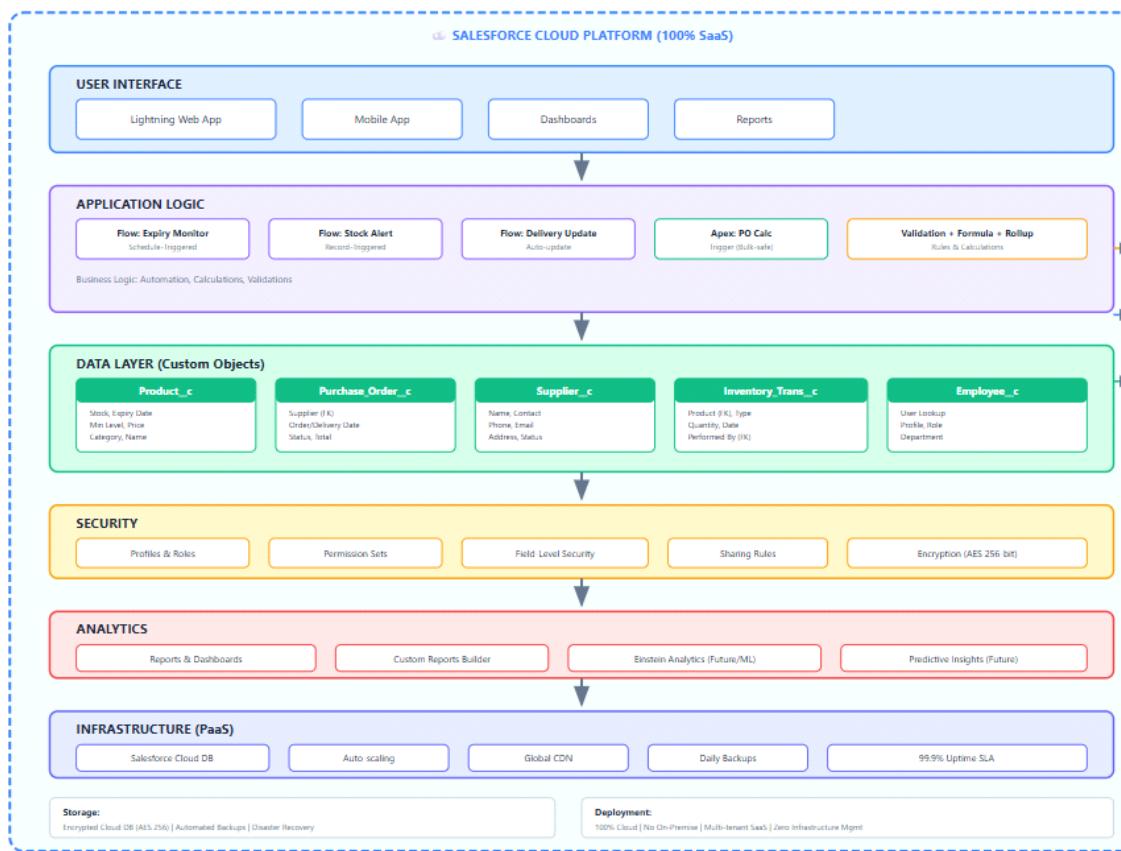
Example: Medical Inventory Management for Healthcare Facilities

Reference: <https://trailhead.salesforce.com/content/learn/modules/platform-development-basics>

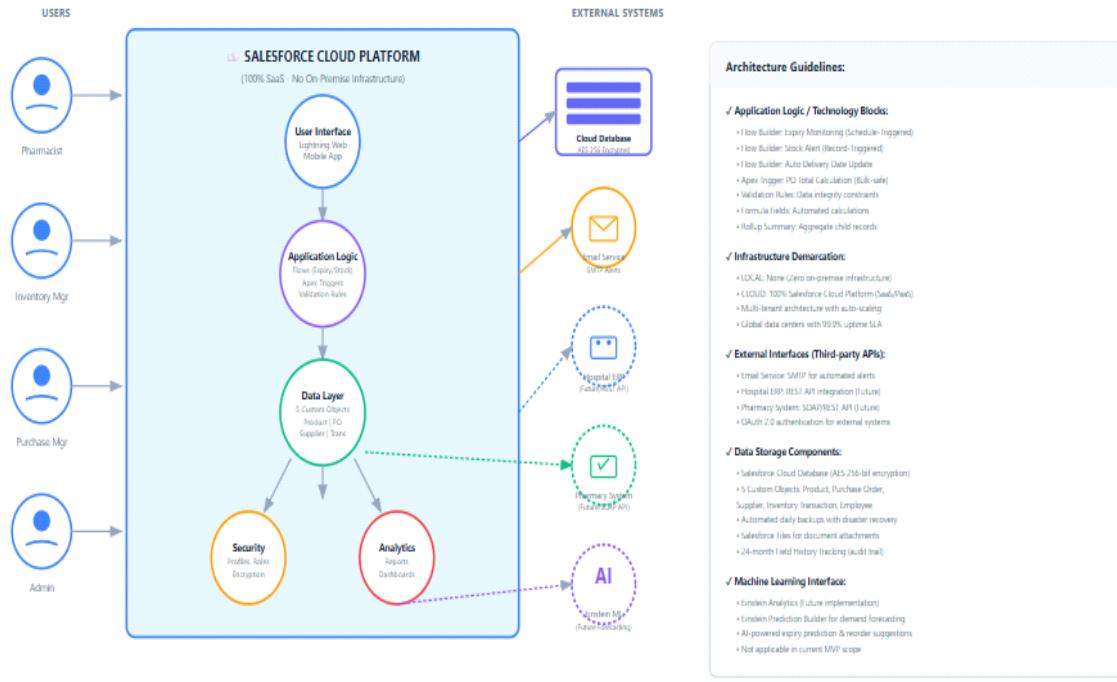
Technical Architecture Diagram:



Technical Architecture - Medical Inventory Management System



Medical Inventory Management System - Technical Architecture



Team ID: NM00251M005677 | Date: 08 November 2025 | Prepared by: Prakash N

Table-1: Components & Technologies:

S.No	Component	Description	Technology
1.	User Interface	Healthcare staff (pharmacists, inventory managers, purchase managers) interact via Lightning App with custom tabs for Product, Purchase Order, Supplier, and Inventory Transaction management. Includes dashboards and reports.	Salesforce Lightning Experience (Web UI) Salesforce Mobile App (iOS/Android for warehouse)
2.	Application Logic-1	Monitors product expiry dates daily. Sends automated email alerts at 30, 15, and 7 days before expiry to prevent dispensing expired medicines to patients.	Salesforce Flow Builder Schedule-Triggered Flow Email Alert Actions

3.	Application Logic-2	Monitors current stock levels against minimum thresholds. Triggers alert to Inventory Manager when Current Stock < Min Stock Level with reorder recommendations.	Salesforce Flow Builder Record-Triggered Flow Decision & Assignment Elements
4.	Application Logic-3	Automatically updates Actual Delivery Date field when Purchase Order Status changes to "Delivered". Calculates delivery variance for supplier performance tracking.	Salesforce Flow Builder Record-Triggered Flow (Before Update) Formula calculations
5.	Application Logic-4	Automatically calculates Purchase Order Total Amount when Order Items are added, updated, or deleted. Handles bulk operations (100+ items) efficiently.	Apex Trigger (After Insert/Update/Delete) SOQL aggregation Bulk-safe processing
6.	Validation Logic	Prevents invalid data entry: Expected Delivery Date must be after Order Date, no negative stock, required fields populated. Error messages guide users.	Salesforce Validation Rules Formula expressions (IF, AND, OR) Custom error messages
7.	Formula Fields	Auto-calculates values: Line Total (Quantity × Unit Price), Days Until Expiry (Expiry_Date - TODAY()), Stock Status (if Current < Min then "Low").	Salesforce Formula Fields Date, Number, Text functions
8.	Roll-up Summary	Aggregates child Order Item amounts to parent Purchase Order Total. Real-time updates without manual intervention.	Salesforce Roll-up Summary Fields SUM aggregation function
9.	Database - Product	Stores medicine/supply master data: Product Name,	Salesforce Custom Object (Product__c) Encrypted cloud

		Description, Min Stock Level, Current Stock Level, Unit Price, Expiry Date. Indexed for fast search.	database Standard & Custom Fields
10.	Database - Purchase Order	Stores procurement records: Supplier (Lookup), Order Date, Expected Delivery Date, Actual Delivery Date, Status (Picklist), Total Amount (Roll-up).	Salesforce Custom Object (Purchase_Order__c) Lookup relationship to Supplier Master-Detail to Order Items
11.	Database - Supplier	Stores vendor information: Supplier Name, Contact Person, Phone, Email, Address. Related list shows all Purchase Orders.	Salesforce Custom Object (Supplier__c) Standard field types (Phone, Email, Text Area)
12.	Database - Inventory Transaction	Complete audit trail: Product (Lookup), Transaction Type (Stock In/Out - Picklist), Quantity, Transaction Date, Performed By (User Lookup). Immutable records.	Salesforce Custom Object (Inventory_Transaction__c) Lookup to Product & User Read-only after creation
13.	Database - Employee	User/staff management integrated with Salesforce User object for profile and role assignments.	Salesforce Custom Object (Employee__c) Integration with User object
14.	Cloud Database Backend	All data hosted on Salesforce multi-tenant cloud with AES 256-bit encryption, daily automated backups, disaster recovery, 99.9% uptime SLA.	Salesforce Cloud Database Encrypted at rest & in transit Global data centers
15.	File Storage	Minimal use. Stores system logs internally. Future: Attachment storage for invoices, delivery receipts, product images.	Salesforce Files, Attachments Salesforce Content Management Internal system logs
16.	External API-1	Email service for automated notifications: expiry alerts (30/15/7 days), stock alerts	Salesforce Email Services SMTP integration Email

		(below minimum), delivery confirmations to purchase managers.	Templates & Alerts
17.	External API-2	(Optional future) Hospital ERP integration for financial reconciliation, patient billing, budget tracking via REST API with OAuth 2.0 authentication.	REST API in Salesforce HTTP Callouts, JSON/XML OAuth 2.0 authentication
18.	External API-3	(Optional future) Pharmacy Management System integration for prescription-inventory linkage, dispensing records synchronization.	Salesforce REST/SOAP APIs Middleware integration Bidirectional data sync
19.	Machine Learning Model	Not applicable for current MVP. Future potential: AI-powered demand forecasting, expiry prediction based on usage patterns, optimal reorder quantity suggestions.	- (Future: Einstein Analytics, Einstein Prediction Builder)
20.	Infrastructure (Cloud)	Fully hosted on Salesforce Platform as a Service (PaaS). Zero on-premise infrastructure. Auto-scaling, load-balanced, globally distributed with CDN for fast access.	Salesforce Cloud (SaaS/PaaS) Multi-tenant architecture Auto-scaling infrastructure Global CDN

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology
1.	Open-Source Frameworks	Not applicable - Salesforce is a proprietary enterprise platform. All development uses native Salesforce tools and languages (Apex, Lightning). No external open-source dependencies.	- (Proprietary Salesforce Platform)

2.	Security Implementations	<p>Multi-layered security: User authentication (SSO, OAuth 2.0, MFA), Role-based access control (Profiles, Roles), Field-level security (sensitive data protection), Sharing rules (record-level access), Audit trails (Field History Tracking), Data encryption (AES 256-bit at rest and in transit).</p>	<p>Salesforce Identity & Access Management Profiles, Roles, Permission Sets Field-Level Security, Sharing Rules Shield Platform Encryption Event Monitoring</p>
3.	Scalable Architecture	<p>Cloud-native SaaS architecture. Horizontally scalable via Salesforce multi-tenant infrastructure. Handles growth from 1,000 to 100,000+ products seamlessly. Supports 5 to 50+ hospital facilities with same codebase. Auto-scales resources based on demand without performance degradation.</p>	<p>Salesforce Multi-tenant Cloud Architecture Auto-scaling infrastructure Load balancing across global instances Distributed database architecture</p>
4.	Availability	<p>99.9% uptime SLA guaranteed by Salesforce. Hosted across multiple global data centers with automatic failover. Real-time health monitoring and status dashboard. Scheduled maintenance windows with advance notification. Disaster recovery with geo-redundant backups.</p>	<p>Load-balanced Salesforce instances Global data center distribution Automatic failover mechanisms Real-time monitoring (Trust.salesforce.com)</p>
5.	Performance	<p>Optimized for enterprise-scale operations: Page load < 3 seconds, Flow execution < 5 seconds (10,000+ products), Trigger processing < 3 seconds (bulk 100+ records), Search results < 2 seconds,</p>	<p>Salesforce Lightning (optimized rendering) Apex Triggers (bulk-safe patterns) Flow Builder (asynchronous execution) SOQL query optimization Database indexing</p>

		Dashboard refresh < 5 seconds. Asynchronous processing for heavy operations. Database query optimization with indexed fields.	Queueable Apex for heavy processing
6.	Maintainability	<p>Version-controlled development with Salesforce DX and Git integration.</p> <p>Modular design (Flows, Triggers, Components) allows isolated updates.</p> <p>Comprehensive documentation: Flow descriptions, Apex code comments, architecture diagrams. Standard naming conventions (Object__c, Field__c). Test coverage $\geq 75\%$ for Apex code. Change sets for controlled deployments.</p>	<p>Salesforce DX (version control) Git integration (GitHub, Bitbucket)</p> <p>Sandboxes for dev/test/staging Change Sets, Deployment packages</p> <p>Apex Test Classes (75%+ coverage) Inline code documentation</p>
7.	Interoperability	<p>REST and SOAP APIs for integration with external systems (Hospital ERP, Pharmacy systems). Bulk API for mass data imports/exports.</p> <p>Email integration via SMTP.</p> <p>Outbound messaging for event-driven integrations.</p> <p>Salesforce Mobile SDK for custom mobile apps. Data export to Excel/CSV for analysis.</p>	<p>Salesforce REST & SOAP APIs</p> <p>Bulk API (CSV import/export)</p> <p>Outbound Messages Platform Events (pub/sub)</p> <p>Email Services (SMTP)</p> <p>Salesforce Mobile SDK</p>
8.	Compliance & Regulatory	HIPAA-ready platform with BAA (Business Associate Agreement) available. SOC 2 Type II certified. ISO 27001 certified. GDPR compliant with data residency options. Complete audit trails for	<p>Salesforce Shield (HIPAA compliance)</p> <p>Field Audit Trail (24-month history)</p> <p>Event Monitoring logs</p> <p>Data Residency (region selection)</p> <p>Compliance certifications (SOC 2, ISO</p>

		regulatory compliance (FDA, healthcare regulations). Data retention policies configurable (7+ years for purchase records).	27001)
9.	Recoverability	Automated daily backups by Salesforce. Recycle Bin retains deleted records for 15 days. Field History Tracking for 24 months (with Shield). Weekly data export recommended for additional safety. Point-in-time recovery available through Salesforce support. Metadata version control via Salesforce DX.	Salesforce automatic backups Recycle Bin (15-day retention) Field History Tracking Weekly Data Export Service Salesforce DX snapshots
10.	User Experience (UX)	Modern, responsive Lightning interface with drag-drop customization. Mobile-optimized for iOS/Android access. Color-coded dashboards (Red: Critical, Yellow: Warning, Green: OK). Intuitive navigation with Lightning App navigation bar. Quick actions for common tasks. Global search across all objects. Contextual help and tooltips.	Salesforce Lightning Experience Lightning App Builder (drag-drop) Lightning Web Components Salesforce Mobile App Dynamic Forms, Path, Actions Einstein Search
11.	Deployment Model	Cloud-only (SaaS). No on-premise installation required. Access via web browser (Chrome, Firefox, Edge, Safari) and mobile apps. Automatic platform updates (3 releases/year by Salesforce). Zero infrastructure management overhead. Instant provisioning of new users/orgs.	Salesforce Cloud (100% SaaS) Browser-based access Salesforce Mobile App Automatic platform updates Centralized administration

12.	Cost Model	<p>Subscription-based pricing per user per month. No upfront infrastructure costs. Includes platform, storage, security, backups, updates. Scalable licensing (add/remove users as needed). Developer Edition free for development/testing. Additional costs: Extra storage, Shield encryption, Einstein Analytics (optional).</p>	<p>Salesforce User Licenses Subscription model (monthly/annual) Developer Edition (free) Usage-based pricing for add-ons</p>
-----	------------	--	--