

Project Design Phase-II
Technology Stack (Architecture & Stack)

Date	30 october 2025
Team ID	F6ECDDC2BAA51CF97204E983A5BEFB35
Project Name	Medical Inventory Management
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: Order processing during pandemics for offline mode

Reference: <https://developer.ibm.com/patterns/ai-powered-backend-system-for-order-processing-during-pandemics/>

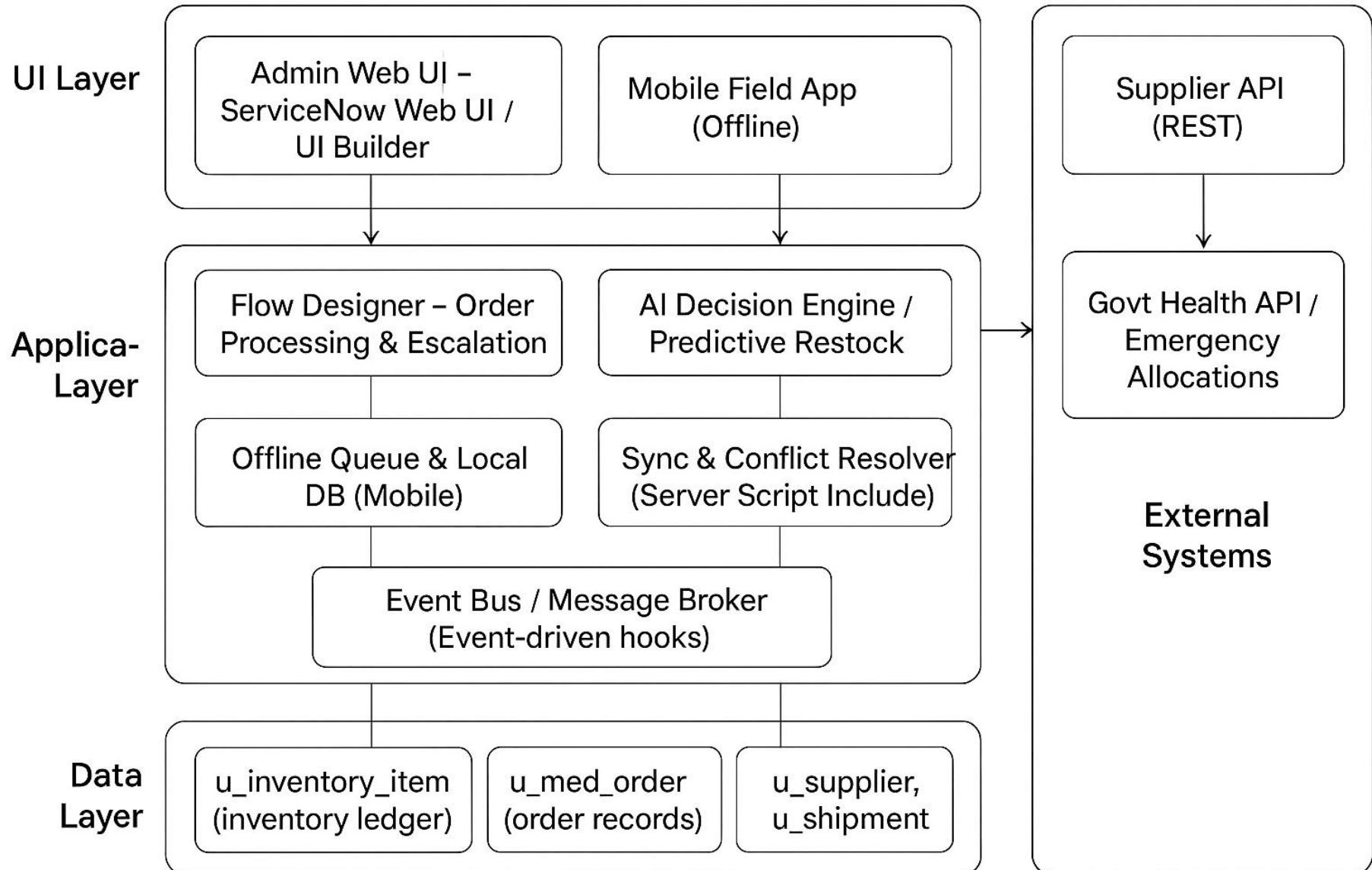


Table-1: Components & Technologies (Medical Inventory Management System)

S.No	Component	Description	Technology / Implementation (ServiceNow)
1	User Interface	Admins and Inventory staff interact through a unified dashboard to manage users, stock items, orders, suppliers, incidents, and assignments. Mobile staff operate in offline mode during pandemic-related connectivity issues.	ServiceNow Web UI (UI Builder), Service Portal, Now Mobile App (Offline-enabled local storage)
2	Application Logic – 1	Core order processing & escalation workflow for approvals, prioritization (pandemic mode), emergency routing, and stock reservation.	ServiceNow Flow Designer (Flows, Subflows, Actions), Workflow Engine
3	Application Logic – 2	Server-side logic that validates assignments, checks stock quantity, ensures no linked shipments, resolves sync conflicts from offline submissions.	Business Rules, Script Includes (GlideRecord queries), Server Scripts
4	Application Logic – 3	Sends automated alerts when order deletion, restock request, or emergency escalation is triggered. Pandemic mode pushes critical alerts instantly.	ServiceNow Notifications, Email, SMS, Push Notifications, In-App Messages
5	Database	Stores users, inventory items, medical orders, suppliers, purchase orders, shipments, expiry logs, field transactions, and audit logs.	ServiceNow tables: sys_user, u_inventory_item, u_med_order, u_supplier, u_shipment, task, po_item, audit tables
6	Cloud Database	Secure multi-tenant backend hosting tenant inventory data with built-in replication and high availability.	ServiceNow Cloud Database (SaaS multi-tenant architecture)
7	File Storage	Stores attachments (supplier invoices, GRNs), offline sync payloads, exported CSV reports, and audit evidence.	ServiceNow Attachments, System Logs, Export to Cloud (optional)
8	External API – 1	Integration with HRMS/AD for auto-user provisioning, employment verification, and role sync (useful for temporary pandemic staff).	IntegrationHub, REST API, OAuth 2.0, Basic Auth
9	External API – 2	Integration with suppliers or pharmacies for real-time stock checks, automated purchase order submission, order tracking, and emergency procurement.	IntegrationHub, REST/SOAP APIs, MID Server (if needed)
10	Machine Learning Model	Predictive restocking, demand forecasting (pandemic spikes), expiry prediction, fraud/anomaly detection.	ServiceNow Predictive Intelligence, external ML (Python/TensorFlow) via API
11	Infrastructure (Server/Cloud)	Underlying managed infrastructure for scaling, failover, auto performance optimization, and compliance for healthcare environments.	ServiceNow Cloud (SaaS), Load-balanced nodes, Multi-zone High Availability

Table-2: Application Characteristics:

S.No	Characteristic	Description	Technology / Approach
1	Open-Source Frameworks	ServiceNow is a proprietary SaaS platform; however, integration components, mobile offline modules, and external AI services may use open-source tooling where allowed.	Not applicable for core ServiceNow; Optional use of Python/Node.js OSS libraries in IntegrationHub custom spokes or external microservices
2	Security Implementations	Implements strong RBAC, ACL-based data protection, encryption at rest and transit, secure API authentication, and full auditability—critical for medical inventory and pandemic emergency data.	ServiceNow ACLs, Scoped App Security, OAuth 2.0, TLS 1.2+, Field/Row ACLs, Encrypted Columns, sys_security, Zero-Trust API access
3	Scalable Architecture	Platform autoscaling handles sudden pandemic-time order surges. Heavy processing runs asynchronously. Offline orders sync in batches to reduce load.	ServiceNow Cloud AutoScaling, IntegrationHub sync actions, Event-Driven Flows, Asynchronous Business Rules, Message Queuing
4	Availability	ServiceNow provides guaranteed uptime SLA with redundancy, failover, and geo-replication—Important for uninterrupted medicine supply chains.	Multi-region nodes, Hot-standby failover, Instance redundancy, Health dashboards, Scheduled maintenance windows
5	Performance	Optimized database queries, indexed inventory tables, background workers for long-running jobs, and smart caching for high-volume pandemic order spikes.	Indexed columns, GlideAggregate, Query Hints, Background Scripts, Cache API, Scheduled Jobs, Batch Processing
6	Reliability	Ensures data consistency during inventory updates, offline sync, or emergency procurement. Soft-delete, rollback, and transaction control safeguard medical order integrity.	Soft-delete (u_is_active flag), GlideRecord transaction checkpoints, Audit logs, Scripted rollback actions, Flow Designer compensating actions
7	Maintainability	Modular architecture with scoped apps, reusable script includes, versioning, and automated testing ensure long-term maintainability of inventory and order workflows.	Scoped Applications, Script Includes, Update Sets / App Repo, Automated Test Framework (ATF), Modular Flow Designer actions
8	Compliance & Auditing	Full audit trail of inventory changes, order processing, offline sync reconciliation, and user access—meeting healthcare governance and pandemic-response requirements.	sys_audit tables, Audit History, Log retention policies, Encryption, Compliance Dashboards, Data Certifications