

Digital Data Solution for **Drug Inventory Management**

A platform that offers real-time visibility into drug inventories and meaningful insights presented through user-friendly dashboards.



Overview

A comprehensive software solution designed for the healthcare industry to enhance drug inventory visibility and utilization. Our solution included IoT integration, data processing, UI and mobile app development, backend API creation, DevOps support, and quality assurance. The system replaced conventional storage methods with smart, real-time inventory tracking to reduce drug wastage through overstocking, minimize compliance risks, and optimize labor costs, while improving quality of patient care.

Client Profile

A US-based startup specializing in software solutions that digitize operations and processes for healthcare providers, including hospitals and clinics.



Business Challenges

The hospital struggled due to lack of insights into the large volumes of medical inventory. The conventional medical storage methods failed to track distribution of medicines across various locations within the health system in real-time. This led to shortages in some departments and overstocking in others.

If a location had higher demand for a particular medicine, the health system was unable to identify location-specific usage metrics in advance and stock medicines accordingly. These details could be obtained only while manually auditing each department and storage space. This was a time consuming process that delayed distribution of medicines and impacted quality of patient care. Additionally, manual processes caused human errors in recording inventory statistics and expiry dates at a location or on a medical bin level.

Business Requirement

The client wanted to implement a digital platform that tracks drug inventories in real-time using IoT sensors and process data from connected devices to generate useful insights. They also required an easy-to-use dashboard and mobile app to monitor and manage the inventory without having to manually check all the shelves.

QBurst Solution

The solution comprised hardware and software components. The suite of services included IoT integration, data processing and calculations, user interface (UI) development, mobile app development, backend API creation, DevOps support for packaging and deployment, and quality assurance. The hardware components are smart medical bins, which replaced the conventional storage system. These smart bins are equipped with IoT sensors which capture user activity and transfer data to the cloud in real-time. All activities happening in a bin are considered events, which can be medical stocking, dispensing, and replacing medicines.

The data transferred to the cloud is processed to determine utilization, current statistics, and usage trends of the bin. The calculated data is then displayed on a dashboard, accessible through web and mobile applications. This enables users to monitor the utilization of medication at each location, providing insights into the distribution of medicines across the health system. Based on usage statistics, the health system determines the precise number of items that need to be replenished. This minimizes wastage or

Using an agile approach, we collaborated closely with the client to:

- Enhance data integration from smart medical bins to the cloud using IoT
- Perform complex calculations on IoT data
- Identify the usage data & predict the future insights for the bin's usages
- Address and resolve bugs promptly

Feature Development

- Created user experience screens and prototyped user flows
- Designed technical solutions, developed data publishing IoT components, real-time analytical tools, REST APIs, and front-end applications
- Provided DevOps support, documentation, final packaging, and handover

Maintenance/Bug Fixing

- Conducted Root Cause Analysis (RCA) and planned bug fix implementations
- Developed UIs, updated IoT components, and modified APIs to fix bugs
- Implemented real-time notifications and log captures for every component
- Designed batch jobs to ensure data validity on a periodic basis

Key Features

Device Firmware: AWS Greengrass component to publish real-time events from the physical devices to the cloud in real-time.

Event Streaming: Kinesis streams for scalable, ordered event streaming from IoT devices.

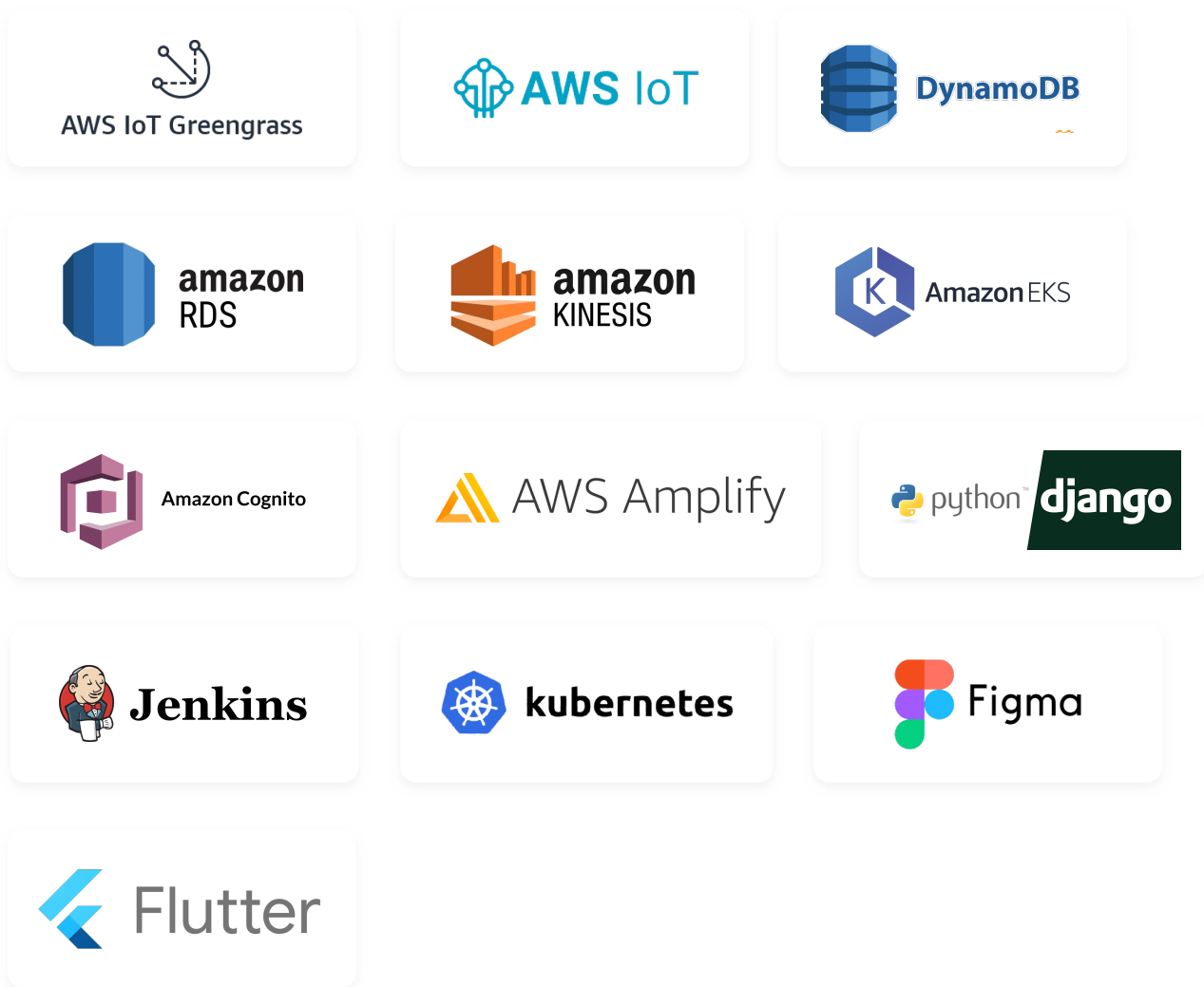
Calculation Engine: A scalable consumer application that processes events in real-time from multiple physical devices allocated across health systems, generating meaningful insights.

User Notifications: Subscription-based, real-time email notifications for device events and calculated insights.

Performance enhancement: Subscription-based, real-time email notifications for device events and calculated insights.

Change Bin Mode: Enables users to switch bin modes (front stocking, auto stocking, and disconnected stocking) using the mobile application with acknowledgements from physical devices sent back to the app.

Technologies Used



Business Benefits

Improved Efficiency: Agile methodology ensured faster iterations and quick adjustments, streamlining the development process and timely delivery of client MVP (Minimum Viable Product).

Enhanced Quality: Rigorous testing, including performance and integrity tests, ensured high-quality software with minimal defects, improving overall user satisfaction.

Better User Experience: The design of user experience screens and prototyping of user flows enhanced the application's usability, resulting in better adoption and user engagement.

Seamless Deployment: DevOps support for final packaging, documentation, and deployment streamlined the release process, reducing downtime and operational disruptions.

Robust Maintenance: Proactive maintenance and efficient bug fixing, supported by root cause analysis and CI/CD, minimized system downtime and improved system reliability.

Scalability: Technical stack upgrades and enhancements optimized the system for future growth, ensuring it can handle increased demand and support new features efficiently.



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