



Unified PACS-based Mobile Ecosystem for Remote Diagnosis

Centralizing fragmented imaging systems into a unified PACS-based mobile ecosystem to enable remote diagnosis and collaborative clinical analysis.

Overview

QBurst delivered a high-performance medical imaging solution based on Picture Archiving and Communication System (PACS) technology. The system centralizes DICOM (Digital Imaging and Communication in Medicine) objects from various diagnostic machines into a single repository, allowing physicians to remotely access, analyze, and compare complex medical frames directly from their iPads.

- **Enhanced Diagnostic Precision:** Enabled side-by-side comparative studies of medical series with synchronized multi-frame viewing and infinite loop controls.
- **Operational Mobility:** Replaced restrictive desktop-only systems with mobile accessibility, allowing faculty and staff to review data on the move.



Client Profile

Headquartered in the USA, the client is a premier nonprofit multi-specialty practice group. Serving over a million patients annually, the group is closely affiliated with one of the nation's top medical schools, where many members serve as faculty treating complex medical cases.

Fragmented Repositories and Restricted Access

The lack of a "single source of truth" for medical imaging created operational bottlenecks that impacted the speed of patient care.

- **Data Silos:** Numerous clinical systems generated high volumes of images, but they were stored in disparate repositories, making comprehensive analysis difficult.

- **Lack of Mobility:** Physicians were tied to fixed desktop stations to view diagnostic results, preventing real-time collaboration during rounds or remote faculty reviews.
- **Collaborative Barriers:** Sharing measurements and comments across departments was a manual, slow process, hindering interdisciplinary treatment planning.

Solution: PACS-Integrated Mobile Analysis Suite

We architected a centralized server that parses and stores DICOM objects received from various imaging machines. This middleware connects the PACS repository to intuitive web and iPad interfaces via secure web services.

- **High-Fidelity Imaging:** Implemented raw image processing and lossless JPEG compression to maintain diagnostic integrity while ensuring fast mobile rendering.
- **Advanced Clinical Tools:** Built-in filters for brightness and contrast based on pixel window dimensions, alongside automated area calculation through pixel density extrapolation.
- **Secure Enterprise Sync:** Integrated LDAP/RADIUS for robust login authentication and HL7 protocols for standardized healthcare data transfer.
- **Interactive Diagnostics:** Developed a feature-rich image viewer allowing doctors to zoom, pan, measure, and annotate images in real-time.

Implementation Approach: Clinical Mobility

The solution was built using Django for a secure, scalable backend and native iOS for the iPad application to ensure the responsiveness required for frame-by-frame medical analysis. The interface supports a dual-view mode where 2–4 frames are displayed simultaneously for comparative series studies.

Key Features

- **Dynamic Search:** Filter records instantly using Patient ID, Doctor ID, machine type, or clinic name.
- **Controlled Playback:** Infinite loop functionality for image series with customizable speeds for detailed frame analysis.
- **Secure Collaboration:** Doctors can email snapshots of measurements and annotated comments directly from the app.
- **Automated Security:** Features both manual and automatic timed logout to ensure HIPAA compliance and data privacy.



Impact

- **Instant Clinical Access:** Physicians have transitioned from stationary desktops to on-demand mobile devices, accelerating the time-to-diagnosis.
- **Inter-Departmental Synergy:** The centralized repository has fostered improved collaboration among various medical departments and faculty members.
- **Reduced IT Overhead:** Consolidating multiple repositories into a single PACS architecture has simplified data management and reduced infrastructure costs.
- **Continuous Patient Care:** Clinicians can now record and review critical data from any location, ensuring treatment planning never stalls.