

Streamlining EHR Parsing and Referral Management

Introduction

Efficient information exchange among healthcare professionals and systems is essential for delivering optimal patient care. This case study highlights Mindfire's solution for EHR parsing and streamlined referral management, combining advanced OCR technology with a sophisticated referral system. The solution addresses key challenges in healthcare information exchange while improving operational efficiency, data accuracy, and accessibility, enabling a more seamless approach to managing patient information and referrals.

Client Details

Name: Confidential | **Industry:** Healthcare | **Location:** USA

Technologies

Backend : Node.js, Express.js

Frontend : HTML, CSS, Angular, TypeScript

SCM : Github

Cloud : AWS EC2, AWS Secret Manager, AWS S3, AWS Load Balancer , AWS Certificate Manager, Azure Form Recognizer

OCR : Tesseract OCR, Google Vision OCR, Azure Form Recognizer

EHRs supported

Every healthcare organization operates its own EHR environment and may rely on different interoperability standards. Our solution connects with major EHR platforms and integrates using the standard supported by the receiving system ; from legacy **HL7 messaging to modern FHIR APIs**. This enables faster onboarding of hospitals, imaging centers, and referring practices without the need for separate, vendor-specific integrations.

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The EHRs we support are :

- AllScripts Enterprise
- AllScripts Pro
- AllScripts Touchworks
- Amazing Charts
- Athena
- Epic
- CareCloud
- Drchrono
- eClinical Works
- eMDS
- Greenway
- Kareo
- M-OBGYN
- NextGen
- OncoEHR
- Practice EHR
- Practice Fusion
- G Gastro

Project Description:

The Challenge: Simplifying EHR Printing for Non-Technical Physicians

One of the primary challenges addressed by Mindfire was the need to simplify the process of sending Electronic Health Records (EHRs) to the parsing server, especially for physicians who may not possess advanced technical skills. While digital methods, such as uploading PDFs through an application, were available, they posed significant hurdles for many healthcare professionals.

The Solution: Virtual Printer Driver:

We developed virtual printer driver which integrates seamlessly with EHR systems, enabling physicians to print EHRs effortlessly with one click. The driver automatically initiates parsing upon printing, extracting patient data and clinical information. It's ready to use right out of the box, reducing setup complexity.

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Challenges Faced Before Implementing OCR by Physicians:

Before implementing OCR technologies, physicians encountered several challenges:

- **Manual Data Entry:** Physicians were burdened with manually transcribing patient information and clinical histories from EHRs onto paper-based forms, leading to time-consuming and error-prone processes.
- **Data Accuracy:** Manual data entry introduced the risk of transcription errors, affecting the accuracy of patient information and clinical histories.
- **Inefficiency:** The manual transcription process was inefficient, often causing delays in radiology exam orders and impacting patient care.

Improvising Accuracy Step by Step

We embarked on a journey to address these challenges and enhance accuracy step by step:

- **Tesseract OCR:** Initially, Tesseract OCR was introduced providing a reliable solution for parsing standard EHR documents and reducing manual data entry.
- **Google Vision OCR:** To address the challenges caused by distorted faxed orders, we transitioned to Google Vision OCR, which demonstrated superior performance in processing such documents and significantly improved data extraction accuracy.
- **Azure Form Recognizer:** To further elevate accuracy and efficiency, we implemented Azure Form Recognizer. Custom models were created and trained for each EHR system, utilizing features such as custom fields, tables, and signatures. This advanced technology allowed for the parsing of complex data, ensuring accurate extraction of critical information.

Onboarding Challenges:

Manual Onboarding with Excel Sheet Submission: In the past, client application lacked an automated onboarding process. Administrators were required to manually add physicians and practices to the system, relying on Excel sheet submissions. This manual approach often led to inefficiencies and delays in the onboarding process.

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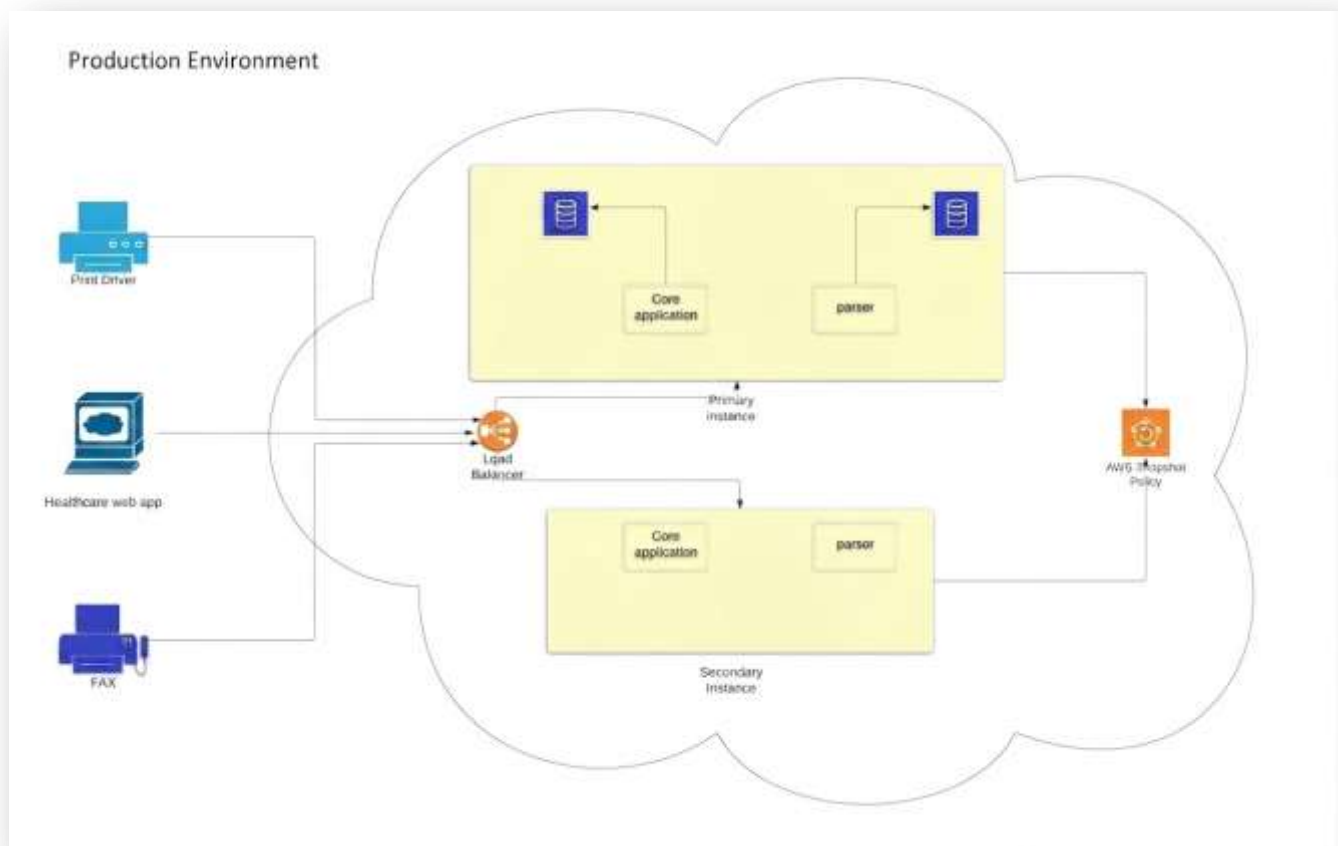
Addressing Onboarding Challenges:

To enhance the onboarding experience for physicians and healthcare practices, the company introduced a streamlined and user-friendly process:

- **Invitation-Based Onboarding:** The revamped onboarding process now begins with the issuance of invitation links to practices. These links empower practices to seamlessly and independently input the required details, including physician information, directly into the system.
- **Efficient Data Collection:** With this updated approach, practices are now empowered to fill in essential data accurately and efficiently. This method eliminates the need for manual data entry by administrators and significantly expedites the onboarding process.
- **Swift and Seamless Registration:** By enabling practices to directly provide necessary information during the onboarding process, the company ensures that physicians and healthcare staff experience a more user-friendly, swift, and efficient registration process, eliminating delays and simplifying their introduction to the system.

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Architecture:



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Screenshots:

EHR Solutions : Sent Document Type

 **EHR System**

Select location
OBGYN-test - MacArthur Medical Cent

Select document type
Order **Chart**

Is this patient insured under Medicare or Medicare Advantage Plans ☐ Yes ☐ No

Submit

Virtual Printer Driver (v7.6)

Practice Management
Orders & Providers

OBGYN-test

Integ. TX
3722730501

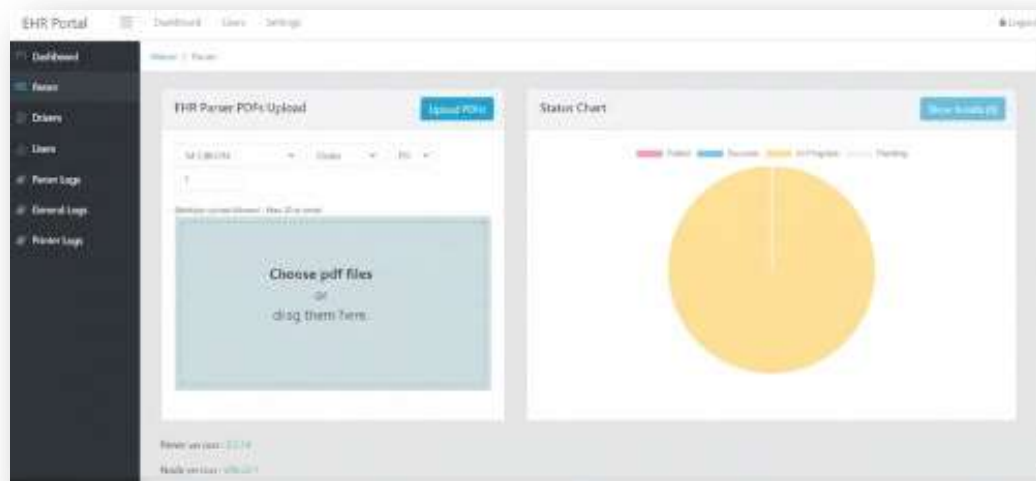
View Details

Orders | Charts | Aging | Advice | Physicians | Encounters

All | Pending | Active Orders | Recent Patient

Date	Type	Patient	Physician	Center	Exam	Status	Scheduled	
26/04/2023	First Available	James, John	OBGYN-test	MacArthur Medical Center (TX)		Pending	Not Scheduled	☒ ☐ ☐
28/04/2023	First Available	James, John	OBGYN-test	MacArthur Medical Center (TX)		Pending	Not Scheduled	☒ ☐ ☐
06/05/2023	First Available	James, John	OBGYN-test	MacArthur Medical Center (TX)		Pending	Not Scheduled	☒ ☐ ☐
09/04/2023	First Available	James, John	OBGYN-test	MacArthur Medical Center (TX)		Pending	Not Scheduled	☒ ☐ ☐
09/04/2023	First Available	James, John	OBGYN-test	MacArthur Medical Center (TX)		Pending	Not Scheduled	☒ ☐ ☐
08/04/2023	First Available	James, John	OBGYN-test	MacArthur Medical Center (TX)		Pending	Not Scheduled	☒ ☐ ☐

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Benefits and Results :

The implementation of OCR technologies, the step-by-step approach to enhancing accuracy, and the improvements in onboarding have yielded significant benefits:

- **Enhanced Accuracy:** Automation and OCR technologies reduced the risk of transcription errors, ensuring that patient information and clinical histories are accurately captured.
- **Efficiency:** Streamlined workflows accelerated order processing, leading to shorter wait times for patients and improved practice efficiency.
- **Cost Savings:** Reduced manual labor and administrative overhead translated into cost savings for healthcare providers.
- **Improved Onboarding:** Addressing registration challenges resulted in a more user-friendly and efficient onboarding process, reducing user frustration and delays.

Conclusion:

Healthcare interoperability is rarely constrained by standards alone. A significant portion of clinical information still arrives as scanned or faxed documents, and interoperability cannot begin until these images are converted into structured, usable data.

This project addressed that challenge at its source i.e. the point where documents enter the healthcare workflow. By capturing documents through an interface supported by existing EHR systems, continuously refining the parsing pipeline based on real-world input, and introducing human validation to improve accuracy without adding significant delays, Mindfire delivered a solution that supports major EHR systems without requiring individual vendor integrations. The platform transforms printed orders into structured, auditable records within minutes, improving both efficiency and data accuracy.

If you seek to revolutionize your healthcare management system or require customized software solutions, Mindfire is here to help. Contact us today to discuss your requirements and discover how we can transform your healthcare operations.