**AI-Driven Preauthorization Automation Hub**

## **1. Executive Summary**

Hospitals send **preauthorization requests** primarily through:

* **SLADE**: A hospital-facing system for structured claim submissions.
* **Email**: Scanned forms, unstructured PDFs, and free-text communications.

These preauth requests are **reviewed manually** by claims officers, which is slow, labor-intensive, and prone to inconsistencies.

This project introduces an **AI-driven automation layer** that unifies SLADE and email inputs into a single, structured workflow. Using OCR, NLP/LLM models, and RPA integration, the platform automates much of the review and decision-making process, while providing real-time analytics through **Power BI**.

The goal is **accuracy, speed, transparency, and scalability** — enabling insurers to handle increasing hospital volumes efficiently and make smarter decisions based on high-quality data.

## **2. The Current Challenge**

| **Challenge Area** | **Description** |
| --- | --- |
| **Manual Processing** | Preauths from SLADE and email are reviewed by humans, creating delays. |
| **Volume Growth** | As SLADE adoption grows, submissions are increasing, but capacity is fixed. |
| **Data Fragmentation** | SLADE and email channels are siloed, making holistic reporting difficult. |
| **Lack of Visibility** | Historical data is buried in emails and PDFs, limiting analytics. |
| **Fraud & Error Risks** | Manual review makes it hard to detect duplicate or abnormal claims patterns. |

## **3. Solution Overview**

### **a) Ingestion Layer**

* **SLADE Connector**: API or CSV-based data pull for structured hospital submissions.
* **Email Gateway**: Automated mailbox polling for incoming preauth emails.

### **b) AI & NLP Pipeline**

* **OCR** to extract data from scanned forms and PDFs.

**LLM-powered parsing** to convert unstructured text into a structured schema:  
  
 MemberNumber, MemberName, ServiceType, BenefitType,

InvoicedAmount, SchemeName, ClinicalSummary,

ClaimDetails, ClaimText, Timestamp,

EmailSubject, EmailBody, IsChronic, IsSmart, EmailReceivedTime

### **c) Decision Support & RPA Integration**

* **Rules Engine**: Auto-classifies routine claims as “smart” and routes them for auto-approval.
* **RPA Bots**: Actionable outputs to update claims systems or trigger manual review workflows.

### **d) Data Lake & Analytics**

* Structured data is stored in **AWS S3**.
* Power BI dashboards provide operational, financial, and fraud insights.

## **4. Key Features**

1. **Unified Preauth Hub** One pipeline for both SLADE and email submissions, creating a single source of truth.
2. **AI-Powered Extraction** Uses OCR and LLMs to accurately read scanned and unstructured documents.
3. **Automation & Smart Routing** AI + RPA classifies claims into “auto-approve,” “manual review,” or “flag for investigation.”
4. **Data-Driven Insights** Every processed preauth becomes structured, searchable data for analytics, risk detection, and strategic planning.
5. **Audit & Compliance Ready** Full traceability and secure data storage for regulatory reporting and dispute resolution.

## **5. Power BI Insights**

| **Dashboard** | **Description** |
| --- | --- |
| **Operational Efficiency** | Tracks volumes from SLADE and email, processing speed, and channel trends. |
| **Preauth Decision Analysis** | Shows auto-approved vs manually-reviewed cases and reasoning tags. |
| **Hospital & Scheme Analytics** | Visualizes top hospitals, schemes, and service types driving preauth requests. |
| **Fraud & Risk Indicators** | Flags duplicate requests, unusual charges, or suspicious provider activity. |
| **Member Utilization Trends** | Shows chronic case patterns, frequent claimants, and seasonal demand spikes. |

## **6. Business Impact**

* **Scalability:** Handles SLADE-driven volume growth without proportional staffing increases.
* **Accuracy:** Reduces human error in claim interpretation and data entry.
* **Fraud Visibility:** Detects anomalies early with structured data and AI-based checks.
* **Data Value Creation:** Turns unstructured PDFs and emails into analytics-ready assets.
* **Faster Hospital Turnaround:** Builds trust and improves provider relationships by reducing preauth processing time.

## **7. Strategic Fit**

This solution positions the organization as:

* **Digitally mature** — leveraging AI for operational excellence.
* **Partner-friendly** — enabling faster and more transparent hospital interactions.
* **Data-driven** — creating a foundation for predictive analytics, pricing optimization, and future product innovation.

It aligns with **industry trends** toward digital claims automation, regulatory audit-readiness, and fraud prevention.

## **8. Roadmap**

| **Phase** | **Scope** | **Deliverable** |
| --- | --- | --- |
| **P1: Foundation** | SLADE API integration, email ingestion, initial OCR/LLM pipeline. | Unified dataset for both channels. |
| **P2: Smart Automation** | RPA workflows, auto-classification, fraud tagging. | Live automation for simple cases. |
| **P3: Analytics Layer** | S3 data store, Athena queries, Power BI dashboards. | Executive dashboards and reports. |
| **P4: Continuous Improvement** | Feedback loop for AI models, workflow tuning. | Improved accuracy and value over time. |

## **9. Why This Matters**

This project is not just a claims processing tool; it’s a **strategic platform**. It:

* Solves a current operational pain (manual preauths).
* Prepares for **growing SLADE adoption**.
* Provides **data infrastructure** for fraud prevention, pricing, and risk modeling.
* Differentiates the company in a competitive insurance market with faster service and stronger provider relations.