

# CALLSCRIBE AI

## AI-Powered Call Transcription.

### ABSTRACT

The exponential growth of voice-based medical interactions presents a significant challenge for research, pharmacovigilance (PV), and quality compliance teams. **CallScribe AI** (Call2Text) is a specialized, cloud-native SaaS solution designed to automate the ingestion, transcription, and analysis of vast audio datasets from clinical and customer support channels. By deploying an advanced NLP and LLM pipeline on a secure AWS architecture, CallScribe AI converts unstructured voice recordings into high-fidelity, structured summaries and actionable regulatory data, ensuring operational efficiency and total regulatory readiness.

# 1. Introduction

In the pharmaceutical and MedTech industries, monitoring voice interactions for safety signals is a foundational but labour-intensive process. Manual review of recordings from platforms like Amazon Connect is slow, prone to human oversight, and creates significant bottlenecks in reporting to regulatory bodies such as the FDA or EMA.

CallScribe AI addresses these challenges by providing an automated Python-based pipeline that integrates directly with cloud telephony and generative AI models. The platform ensures that critical insights, ranging from Adverse Events to Product Complaints are captured, summarized, and routed to stakeholders with minimal manual intervention.

## 2. Solution Overview

CallScribe AI is a multi-layered platform that integrates with cloud infrastructure to act as an intelligent intermediary for voice data. It begins by automatically ingesting MP3 or WAV recordings from AWS S3, then utilizes advanced AI engines to provide high-accuracy, multilingual transcription.

The system's core strength lies in intelligent categorization, automatically sorting interactions into four streams: Adverse Events (AE), Medical Inquiries (MI), Product Quality Complaints (PQC), and Others (O). Finally, it performs structured data extraction, transforming raw dialogue into organized metadata (JSON, CSV, or XLSX) containing vital patient, product, and contextual details for seamless downstream use.

## 3. Business Impact

By automating the end-to-end processing of voice data, CallScribe AI transforms raw interactions into a strategic asset that drives both clinical precision and organizational growth.

- **Operational Efficiency:** Reduces manual transcription and review effort by up to 80%, allowing teams to focus on medical assessment rather than data entry.
- **Regulatory Compliance:** Ensures 100% of calls are screened for safety signals, mitigating the risk of missed Adverse Event reporting.
- **Scalability:** The modular design allows the system to scale effortlessly across multiple clients and higher call volumes without performance degradation.
- **Data-Driven Insights:** Real-time dashboards provide analytics on call trends, volume, and categorization accuracy.

## 4. Product Objectives

- **Automate Voice Ingestion:** Establish direct cloud-native connections to telephony storage for seamless data flow.
- **High-Fidelity Transcription:** Ensure multilingual, time-aligned accuracy across all clinical and support channels.
- **Regulatory Accuracy:** Categorize interactions into AE, MI, and PQC with high precision for regulatory routing.
- **Actionable Summarization:** Convert raw unstructured audio into structured narratives for immediate stakeholder review.

## 5. Process Architecture and Flow

### 5.1 Architecture Layers

- **Orchestration Layer:** Controls the execution flow and manages Windows Task Scheduler triggers.
- **Processing Layer:** Handles transcription via Gen AI Model and summarization through custom NLP models.
- **Integration Layer:** Interfaces with AWS S3 for file management and Microsoft Graph API for secure communications.
- **Utility Layer:** Manages execution tracking, SQL data bridging, and PII protection through SHA-256 hashing.

### 5.2 The Data Pipeline

- **Extraction:** Audio files are discovered and streamed from AWS S3 or manual upload points.
- **Transformation:** AI models perform transcription and generate structured narratives.
- **Loading:** Validated data is stored in client data buckets; notifications are triggered via Microsoft Graph API.

## 6. Technology Stack

Callscribe AI is built on a secure and scalable technology foundation:

**Python**

**Backend services for orchestration, classification, and rule execution**

**AWS**

**Cloud infrastructure providing secure hosting, storage, and computing power.**

**Data Storage**

**Secure relational databases for structured case management**

**GenAI Models**

**AI models that assist with natural language interpretation and data processing.**

**Security**

**Comprehensive access control, user identification, and data encryption.**

## 7. Decision Logic and Governance

The system implements clearly defined and auditable logic:

- **PII/PHI Protection:** Implements field-level encryption and SHA-256 hashing for PII masking.
- **Access Control:** Role-Based Access Control (RBAC) enforces strict segregation of duties between Admins, Managers, and Standard users.
- **Auditability:** A comprehensive SQL-based logging system tracks every processing step, error, and user action for full traceability.
- **Quality Assurance:** Critical scenarios (audio screening/categorization) are validated through manual process and security testing to verify unauthorized access blocking.
- **System Integrity:** Automatic retry mechanisms, duplicate-processing prevention, and a 3-step recovery process ensure business continuity.