



**20X faster time savings:  
Indium's AI NLU solution  
is a healthcare industry  
gamechanger**

SUCCESS STORY

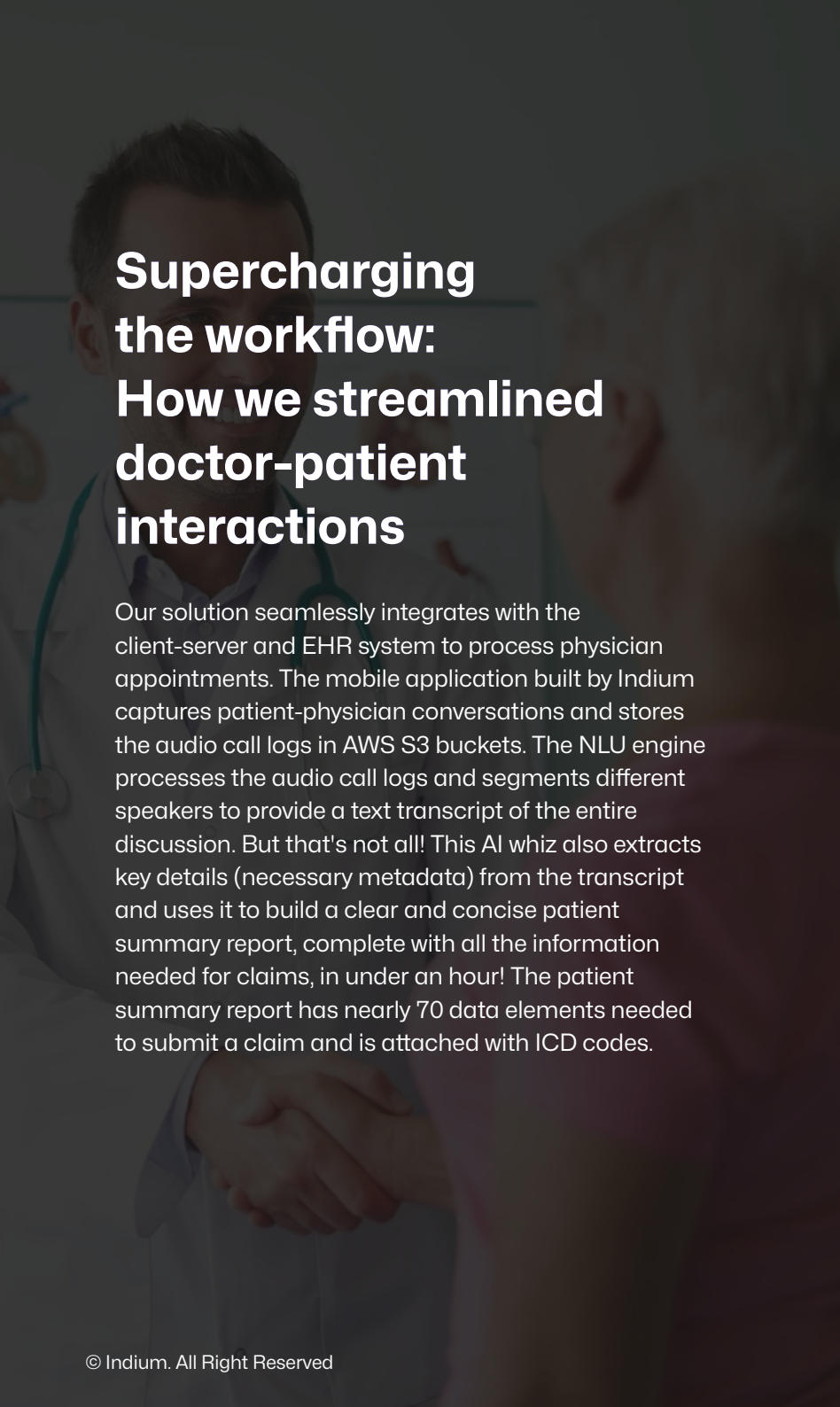
## Behind the scenes: The hidden pain points of medical care

Our client is a technology service provider of healthcare platforms for hospital systems and RCM (Revenue Cycle Management) companies. They partner with hospitals, specialized clinics, health systems, health information exchanges, and integrated delivery networks to offer high-caliber, expert-level services and solutions across the globe. However, they identified several key challenges in the current workflow. These included:

- 1 Time-consuming and error-prone note-taking:** Manually capturing accurate clinical notes during patient consultations hinders healthcare provider efficiency and can lead to missing critical information.
- 2 Data extraction hurdles:** Extracting relevant medical terminology, timestamps, visit history, medications, vitals, and other crucial data points from conversations is essential. However, traditional methods lack efficiency and make it difficult to ensure patient privacy and data security.
- 3 Slow claims processing:** Identifying different speakers and summarizing conversations into actionable text using traditional methods significantly delays the claim submission process. Additionally, extracting data from transcripts for accurate claim building was a time-consuming bottleneck.







## Supercharging the workflow: How we streamlined doctor-patient interactions

Our solution seamlessly integrates with the client-server and EHR system to process physician appointments. The mobile application built by Indium captures patient-physician conversations and stores the audio call logs in AWS S3 buckets. The NLU engine processes the audio call logs and segments different speakers to provide a text transcript of the entire discussion. But that's not all! This AI whiz also extracts key details (necessary metadata) from the transcript and uses it to build a clear and concise patient summary report, complete with all the information needed for claims, in under an hour! The patient summary report has nearly 70 data elements needed to submit a claim and is attached with ICD codes.

## From doctor's notes to quick claims: The AI concierge for medical conversations

### 1. AI-NLU-powered speech engine

Indium deployed an AI model powered by the Natural Language Understanding (NLU) speech engine to swiftly transcribe audio recordings of doctor-patient encounters in near real-time.

### 2. Voice input from the mobile app

The mobile app captures audio input, which is then routed to the ML model for further processing. Leveraging Python, complex automation pipelines were built.

### 3. Decryption and pre-processing

The model is compatible with a variety of high-quality audio file formats, including mp3, m4a, wav, and AAC. Advanced pre-processing methods greatly decreased transcription delays and enabled noise cancellation. Pydub was used to read and process audio files in various formats. With the help of automatic speech recognition (ASR) models built using PyTorch, Indium transcribed ~20-30 pages of medical consultations or patient interactions (audio recordings) into text.

#### **4. Speaker diarization**

The model precisely identifies physicians, patients, and other voice/speech by separating an audio recording into segments corresponding to different speakers. Spectral cluster method is employed to process the audio, while a speaker diarization model built with SciPy and sci-kit learn was trained to recognize and distinguish different speakers in the conversation.

#### **5. Speaker verification and diagnostic study**

Pydhub is used to extract useful information for further analysis which helps the providers handle the Medicaid efficiently. They used NLP algorithms to extract salient information such as patient history, present illness, and diagnostic reports from the audio transcription and create a concise summary.

#### **6. Speech transcription**

PyTorch-based deep learning model is used for the transcription of lengthy physician encounters. It helped the client extract the most critical information from audio files and present it concisely, enabling healthcare professionals to quickly grasp essential details.

#### **7. Encryption**

JamSpell helps correct spelling errors, which are critical for maintaining accurate and reliable medical records. HIPPA compliant encryption algorithm (AES-GCM) is used to encrypt the reports.

#### **8. Post-processing**

The final patient summary reports are transferred to the Textician system integrated into the NLU model to add ICD codes. As it requires time for insurance companies to crack medical terminologies, attaching ICD codes to medical terms and phrases helps them accelerate the claim submission process.

#### **9. Data storage and consumption**

The client (point-of-care systems) uses reports made up of crucial claim data and ICD codes stored in their portal to efficiently create claim forms and handle submissions to payers.



## By the numbers

- ▶ Automating patient-doctor interactions with our AI NLU-powered speech engine delivered a **20x improvement** in processing speed. Near-real-time generation of patient summaries and claim data extraction boosted operational efficiency by a whopping **90%**.
- ▶ This translates to significant cost savings. The solution streamlined claim submissions, resulting in **first-time-right claims** and eliminating rework caused by manual errors. The reports, containing **85% of the data needed** for insurance submissions, are generated in **under an hour**. The impressive 85% transcription accuracy also minimized errors and improved documentation quality.
- ▶ **Here's the bottom line:** Near-real-time transcription and data extraction dramatically enhanced productivity. Previously taking days, these tasks are now completed in hours, freeing up valuable resources.



## How AI streamlined Healthcare (and saved everyone a ton of time)

- ▶ **Reduced report generation time from days to under an hour** (previously took two days to extract data from 20,000-40,000 lines of transcript)
- ▶ **Generated precise patient summaries with 70 critical claim elements in just one hour** (essential for claim form 837)
- ▶ **Achieved 80-90% transcription accuracy**
- ▶ **Improved operational efficiency by 40-50%**
- ▶ **Enabled first-time-right claims, eliminating rework**
- ▶ **Captured error-free healthcare data directly from conversations**

