

Point of View

Beyond the Logs

AI-Powered Well Data Management
for Instant Engineering Insights



Imagine an engineer preparing for a critical decision, buried under hundreds of pages of handwritten well logs, scattered emails, and manually filled forms. This is a daily reality in the oil and gas industry, where vast amounts of operational data remain unstructured and difficult to access. From exploration and drilling to production and distribution, the sector generates immense volumes of data—but much of it is locked in formats that slow down decision-making.

The good news? A powerful wave of digital transformation driven by the need for greater efficiency, safety, and sustainability is reshaping the oil and gas industry. The urgency to adapt is amplified by macro trends such as volatile oil prices, increasing pressure to reduce carbon emissions, talent shortages due to an aging workforce, and growing regulatory demands for data transparency. These challenges are pushing industry to embrace intelligent technologies that can unlock insights from unstructured data and enable faster, more informed decisions.

AI tools are now central to this transformation, helping energy companies achieve the imperative of “less investment, more sustainability” while building resilient, future-ready operations.

Historically, unstructured data has been a barrier to business agility, often leading to delayed decisions and operational inefficiencies. It has a direct impact on:



Due to these barriers, in real-life scenarios, decisions on thousands of wells, each accompanied by hundreds of pages of documentation, were significantly delayed. Engineers ended up spending countless hours sifting through data, time that could have been better invested in high-impact tasks that truly mattered.

To move ahead in the game, the industry must shift its strategy from traditional methods to the latest IT methods, which will help engineers make quick business decisions effectively and efficiently.

Eliminating Silos and Unstructured Data Dominance

As data volumes surge and operational complexity increases, the ability to manage and extract value from unstructured information has become a strategic imperative. Traditional document workflows—often fragmented and siloed—are no longer sufficient to meet the demands of modern exploration, production, and compliance.

To address these challenges, the industry is embracing scalable, intelligent solutions powered by AI, machine learning (ML), and cloud-native platforms. These technologies are not just modernizing workflows; they are transforming how data is perceived, accessed, and utilized across the enterprise.

Strategic Implications for Driving Transformation



AI-Powered Document Intelligence: A Game Changer

Solutions like Microsoft Azure Form Recognizer and AI Document Intelligence are purpose-built to convert unstructured content—such as PDFs, scanned images, and Word documents—into structured, actionable data. These platforms extract key-value pairs, tables, and layout information with high accuracy, enabling seamless access and collaboration across teams and domains.

By integrating these tools into enterprise workflows, companies can:

- **Improve data quality and accessibility**
- **Accelerate insights and decision-making**
- **Ensure secure, scalable, and unified access to critical information**

When combined with generative AI, these platforms go further—automating data extraction, summarization, and contextualization. The result is faster business decisions, enhanced collaboration, and measurable business value.

Proposed Solution

Artificial Intelligence (AI) presents a transformative opportunity. By converting Electronic Well Files (EWF) into structured, searchable insights, AI empowers engineers to act with speed and precision—unlocking new levels of operational agility and strategic foresight.

Here's a quick look at how unstructured data is transformed into structured, actionable insights through this workflow.

1. Get unstructured data:

- Leveraging unstructured data files
- Daily Drilling Reports (DDRs)
- Daily Completion Reports (DCRs)
- Daily Morning Reports (DMRs)

2. AI data center

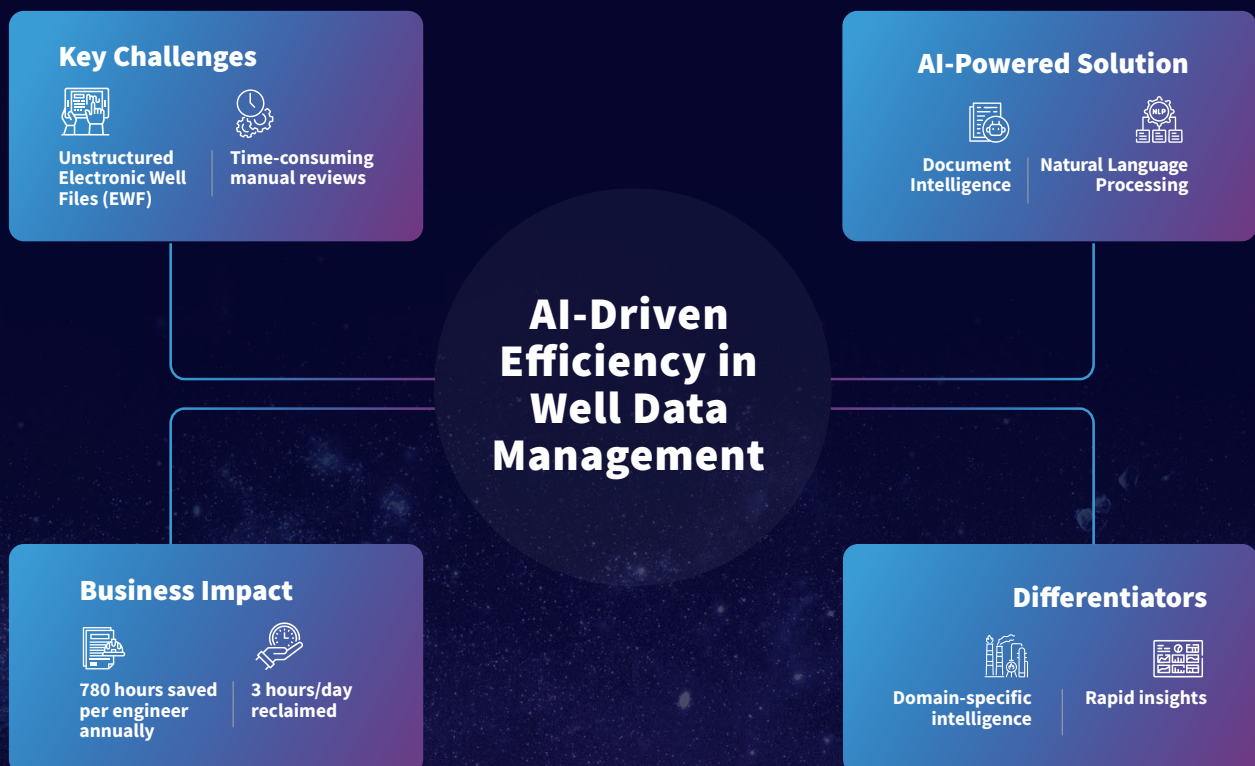
- Well data extraction
- Using Azure AI Document Intelligence, extract well data files and create a summary of well file(s) by using the components available in the AI data center.
 - A. Document analysis
 - B. Pre-built models
 - C. Custom models
- Well data summarization
- Generate a consolidated summary of all well data for further indexing and decision making by:
 - A. Making a connection to OpenAI GPT 4
 - B. Generate file Summary
 - C. Well data summary

3. Process automation:

Once the required well data is summarized, push it for further process automation to leverage these well summary documents further.

The solution is built on Microsoft Azure's AI ecosystem, selected for its scalability, security, and seamless integration with enterprise platforms.

- Azure AI Document Intelligence extracts structured data from complex formats like scanned well reports and handwritten notes, and creates a summary of well files.
- GPT-4 Turbo summarizes and contextualizes well histories into decision-ready insights.
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 - Generate a consolidated summary of all well data for further indexing
- **Future process automation:** In the future, the proposed solution will be scalable and leverage any RPA automation tools for well data summarization on unstructured data.
- **Seamless integration:** APIs connect with existing engineering platforms, ensuring minimal disruption.
- **Vision for transformation:** The proposed AI-powered solution redefines well data management by integrating advanced document intelligence and natural language processing. Engineers gain instant access to structured well histories, enabling smarter decisions in re-drilling, completions, workovers, and abandonment planning. This shift from manual data review to AI-driven insight generation is not just a technological upgrade—it's a strategic enabler for well data management in the industry.



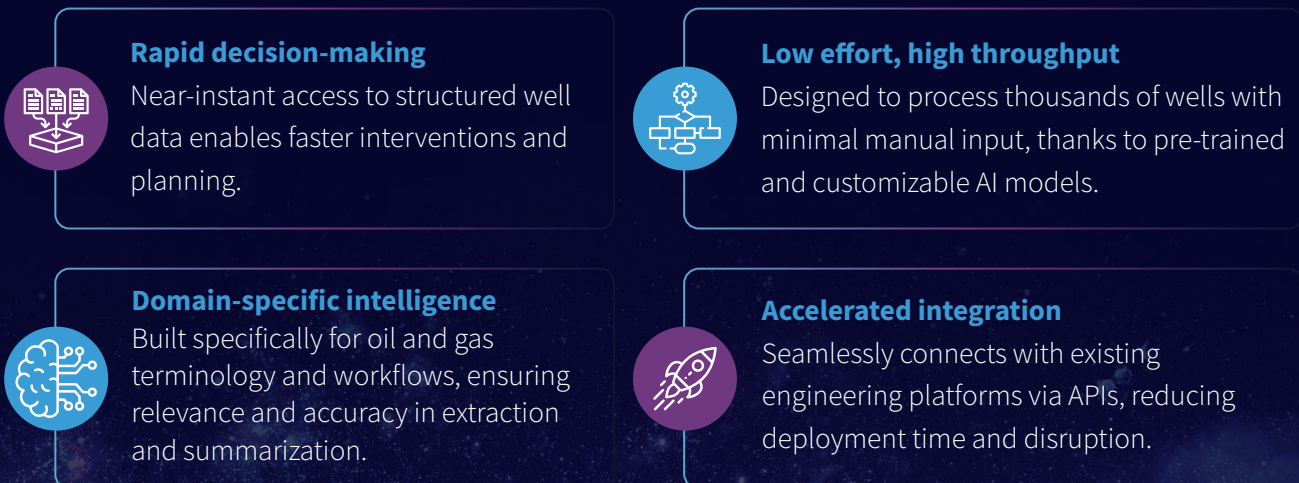
Features and Benefits of the Solution

The AI-powered solution streamlines well data processing and enhances engineering workflows through:

- **Enhanced productivity:** Automates the extraction and summarization of well data, freeing engineers from manual review and enabling focus on high-value tasks.
- **Improved decision-making:** Converts unstructured data into structured insights, reducing ambiguity and supporting confident operational planning.
- **Scalable deployment:** Designed to work across diverse assets, basins, and geographies, ensuring consistent value at enterprise scale.
- **Operational efficiency:** Minimizes delays and manual effort, accelerating workflows and reducing overhead.
- **Strategic alignment:** Supports digital transformation and cloud-first initiatives, preparing operations for future growth and sustainability goals.

Differentiators

What sets this solution apart is its deep alignment with oil and gas workflows and its ability to scale with minimal effort:



Looking Ahead: The Future of Well Data Management

The oil and gas industry stands at a pivotal moment—where data-driven agility is no longer a luxury but a necessity. As AI continues to evolve, its role in transforming well data management will only deepen. From predictive analytics to autonomous operations, the next frontier will be defined by intelligent automation, cross-domain data integration, and real-time decision support.

Companies that embrace this shift will not only reduce operational overhead but also unlock new levels of safety, sustainability, and strategic foresight. The future belongs to those who can turn complexity into clarity—and AI is the key.

Ready to empower your engineers with instant insights and accelerate your digital transformation? Write to us at **eugene.comms@ltimindtree.com**

Citations

¹ *Oil and Gas Has a Problem With Unstructured Data*, Alec Walker, jpt.spe.org, July 02, 2019:
<https://jpt.spe.org/oil-and-gas-has-problem-unstructured-data>

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Vairamuthu Kuthalingam has over 18 years of deep, hands-on experience in the IT and oil and gas sectors, with a strong focus on data management initiatives. His expertise spans across key programs such as Subsurface Data Management Program (SDMP), Data Foundation Solutions, Data Analysis, Electronic Well Files (EWF), and Robotic Process Automation (RPA). In addition to serving as a Scrum Master, he currently leads a diverse team of 30+ professionals, including RPA experts, data engineers, data analysts, and Power Platform developers. Together, they drive application development and maintenance (ADM) efforts, delivering operational enhancements and new solutions for one of the world's leading oil and gas majors.