

# EMPOWERING ENGINEERS WITH SECURE, OFFLINE AI

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# 01.

## AST Anlagenbau & Engineering GmbH

AST Anlagenbau & Engineering GmbH, a leading German engineering company, boasts extensive expertise in pipeline construction, sophisticated steelwork, and comprehensive industrial plant services. With approximately 400 employees in Germany, Poland, and Slovenia, AST Anlagenbau & Engineering GmbH executes complex industrial projects for critical energy and chemical sectors.

Recognizing the growing importance of technological advancement, the company embarked on a strategic initiative to leverage artificial intelligence (AI) to significantly enhance its engineers' ability to manage and utilize technical documentation more efficiently and effectively.





# 02.

## AST Anlagenbau & Engineering GmbH Needs

AST Anlagenbau & Engineering GmbH sought to explore how artificial intelligence could streamline their engineers' daily work, particularly in managing the vast amount of technical documentation across their projects. They required a secure, fully offline AI environment that would enable free experimentation while ensuring all data remained safely within their own infrastructure.

The desired characteristics of the system included:

- **A completely isolated AI setup:** The platform had to operate entirely offline, guaranteeing that no information ever left AST Anlagenbau & Engineering GmbH's internal network.
- **Support for AI experimentation:** Engineers required a flexible environment to leverage, test, and compare different AI models, adjust configurations, and identify the most effective workflows for their needs.
- **Retrieval-grounded answers:** The system had to go beyond generative AI responses—it needed to cite and display relevant excerpts from AST Anlagenbau & Engineering GmbH's internal technical documentation to substantiate its answers. The legacy data included approximately 650 GB of a digital library containing scientific and engineering documentation.
- **Monitoring capability:** A framework ensuring the system tracks progress regarding accuracy and depth of knowledge over time, incorporating user feedback for continuous response refinement.
- **Comprehensive system backup and recovery:** Reliability was paramount. AST Anlagenbau & Engineering GmbH required a Bacula-based backup strategy, including database-specific preparation steps for MongoDB and Milvus. The setup needed to be capable of being reset and restarted from previous checkpoints to avoid loss of configuration, indexed knowledge, database state, and time-consuming reprocessing or re-indexing, while preserving user interactions.



## 03.

### Project Challenges

Developing this project presented several significant challenges. Initial objectives were open-ended, necessitating an adaptive approach to define technical requirements and guide agile development.

- **Resource Constraints:** All components, from model inference to OCR, had to operate efficiently on a single, resource-constrained workstation.
- **Document Complexity:** Processing AST Anlagenbau & Engineering GmbH's complex documents, replete with formulas and diagrams, demanded a highly accurate and swift OCR pipeline for reliable knowledge extraction.
- **Data Traceability:** Ensuring clear data traceability for every AI response was critical for engineering trust and compliance.
- **Future Readiness:** Designing an easily evolving, modular platform that lays the groundwork for subsequent development phases.

## 04.

### Solution Developed by Do IT Now Group

Do IT Now Group designed a self-hosted solution, precisely tailored to AST Anlagenbau & Engineering GmbH's technical and security requirements. The solution enables AST Anlagenbau & Engineering GmbH to conduct in-house AI research and development, ensuring data integrity and confidentiality while fostering secure innovation within their proprietary technical data. This project underscores Do IT Now Group's expertise in delivering secure, high-performance AI solutions for complex operational demands.

"This project has been particularly interesting, it allowed us to evaluate different technologies tailoring the solution to AST Anlagenbau & Engineering GmbH needs and constraints."

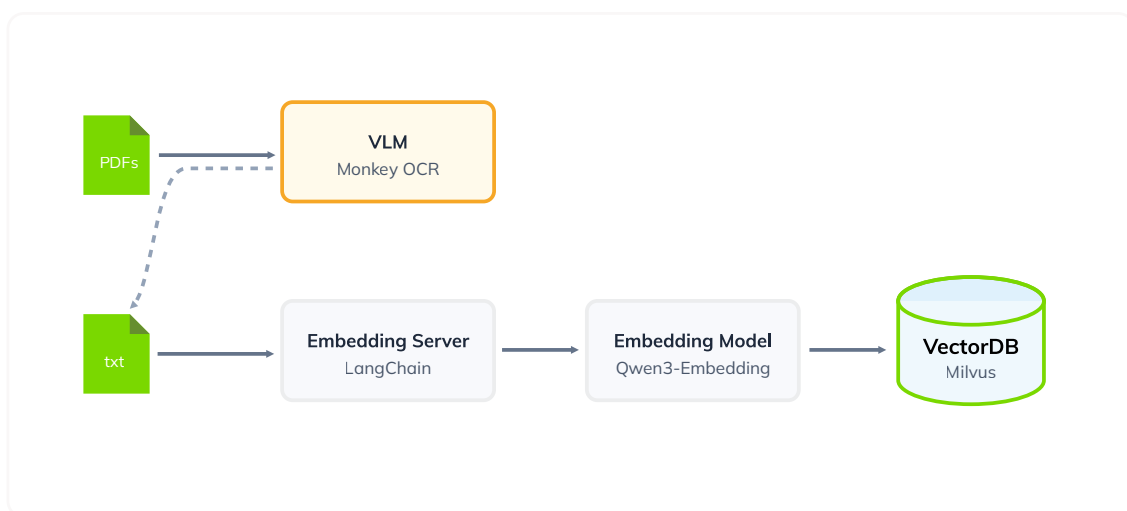
— Thierry Porcher, CTO, Do IT Now France

# 05.

## Technical Overview

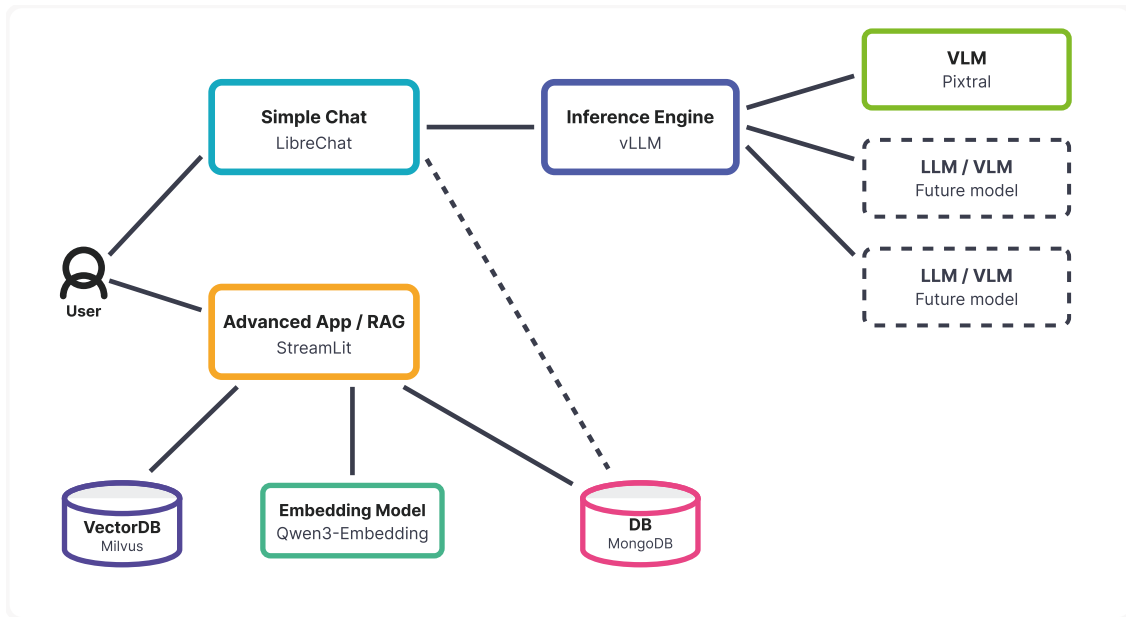
- **Hardware:** A purpose-built workstation with an NVIDIA RTX 6000 GPU, providing the necessary computing power for AI and OCR tasks.
- **Core System Setup:** The system environment was built for stability, performance, and modularity using the following components:
  - Ubuntu 22.04 LTS as the base operating system.
  - An evaluated OCR pipeline incorporating both Tesseract-based and VLM-based approaches for high-fidelity text and structure extraction.
  - NVIDIA CUDA and NVIDIA Container Runtime to enable GPU acceleration within containers.
  - Miniconda for Python environment and dependency management.
  - MongoDB NoSQL database for document management.
- **AI & Application Layer:**
  - vLLM inference engine with OpenAI-compatible API for flexible model deployment.
  - Retrieval-Augmented Generation (RAG) architecture based on Milvus.
  - LibreChat / custom RAG interface allowing engineers to upload, query, and interact with technical files.

### Document Ingestion Pipeline





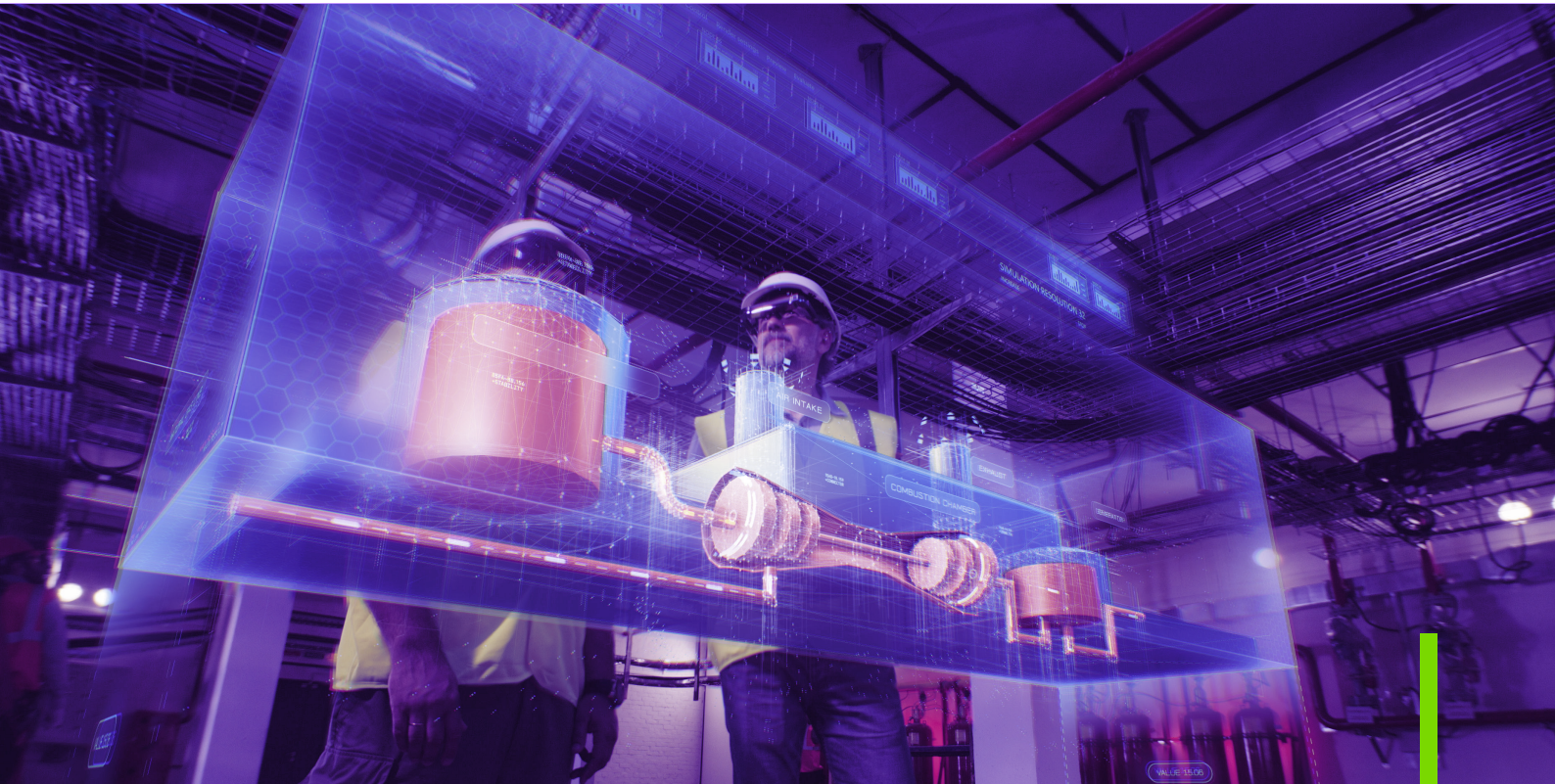
## Interacting with the System



## 06. Outcome

The AI infrastructure is now fully operational within AST Anlagenbau & Engineering GmbH's internal network. It empowers engineers to securely experiment with AI, retrieve retrieval-grounded and traceable answers based on internal documentation, and benchmark model performance—all without external dependencies.

Do IT Now's solution provided AST Anlagenbau & Engineering GmbH with a secure, high-performing foundation for AI innovation, helping the company explore intelligent tools while maintaining the reliability and data integrity essential to its industry.



# 07.

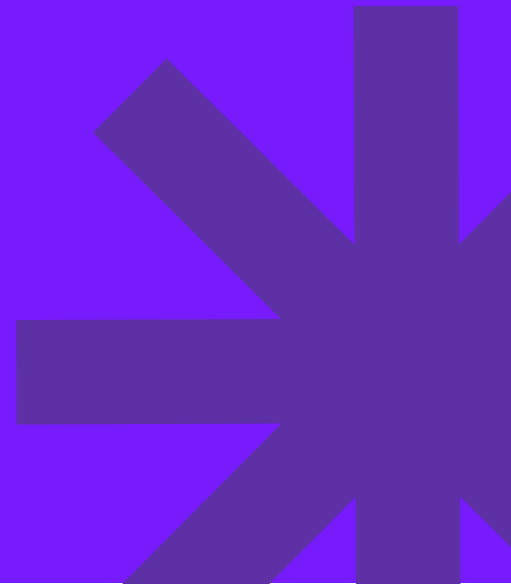
## Added Value of Do IT Now Group

- **Collaborative design approach:** Instead of a pre-packaged solution, Do IT Now developed the platform in close collaboration with AST Anlagenbau & Engineering GmbH, adapting the design throughout development to perfectly match real operational needs.
- **AI Full-Stack knowledge and experience:** The team handled every layer, from OS setup and GPU configuration to AI deployment, OCR tuning, and custom UI integration, ensuring seamless system functionality.
- **Benchmarking experience:** To achieve optimal precision and efficiency, particularly with mathematical notation and technical content, various OCR engines underwent rigorous testing and optimization.
- **Modular Architecture:** Do IT Now provided an ad-hoc modular platform both ready for immediate usage and perfectly structured for future scaling and customization.

## FUTURE OUTLOOK

As a next step, AST Anlagenbau & Engineering GmbH and Do IT Now are exploring a standardized memory and retrieval layer that can connect local and external AI models while keeping provenance, long-term context, and sensitive knowledge under AST Anlagenbau & Engineering GmbH's control.

*"AST Anlagenbau & Engineering GmbH sees this project as an important step toward a secure and practical use of AI in industrial engineering. The local AI infrastructure allows us to evaluate AI capabilities with our own technical documentation while keeping sensitive knowledge under our control. For us, the key value lies not in generic AI experimentation, but in traceable, document-based support for real engineering and project workflows."*



# DRIVING HPC INNOVATION FORWARD

Discuss your HPC needs today

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