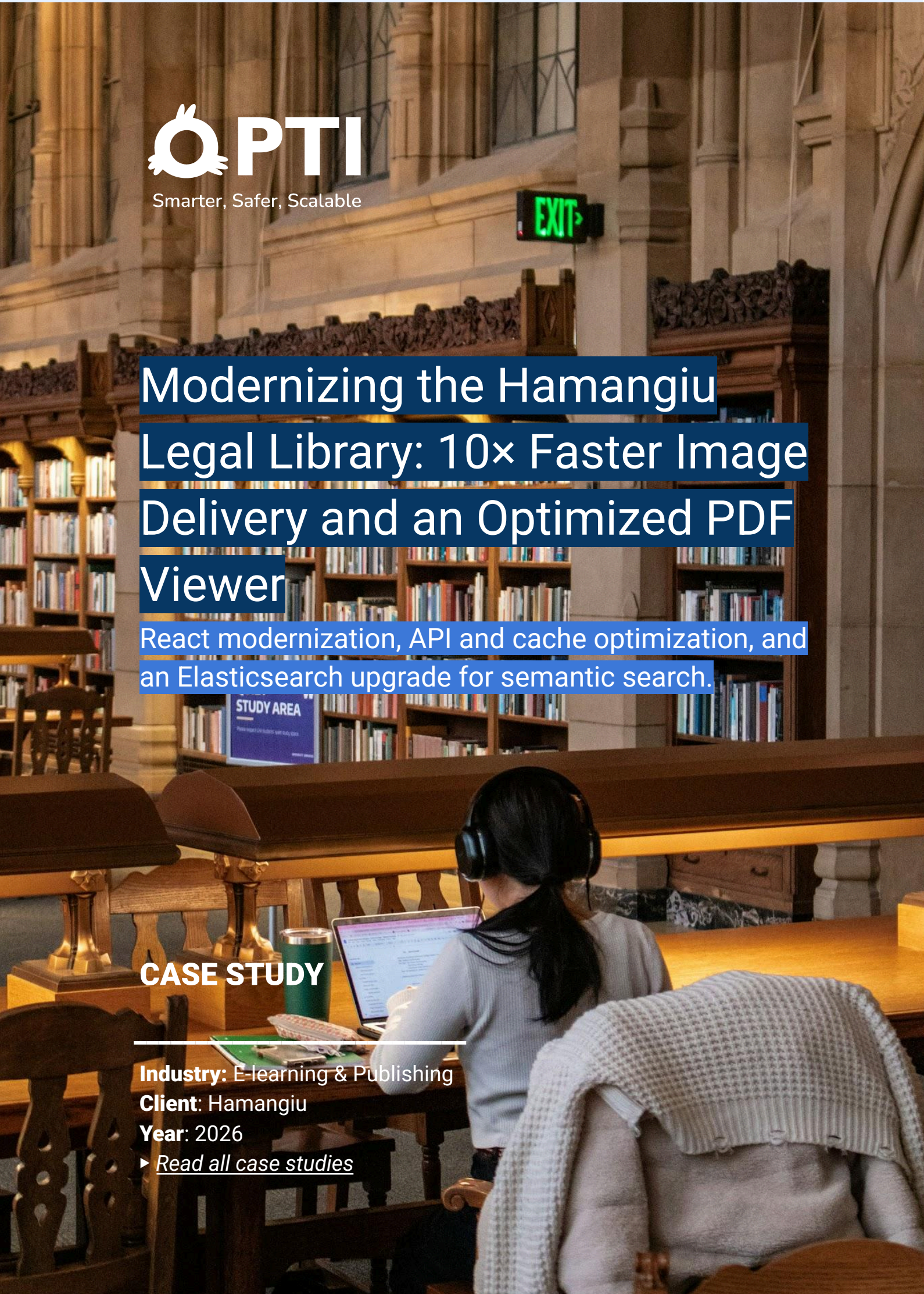
OPTI

Smarter, Safer, Scalable

Modernizing the Hamangiu Legal Library: 10× Faster Image Delivery and an Optimized PDF Viewer

React modernization, API and cache optimization, and an Elasticsearch upgrade for semantic search.



CASE STUDY

Industry: E-learning & Publishing
Client: Hamangiu
Year: 2026

▸ *Read all case studies*

INTRODUCTION

The Hamangiu Legal Library is a digital reading platform designed for legal professionals in Romania. In a previous project, OPTI developed the annotations, bookmarks, document navigation, and usage limit control features.

In 2026, the new challenge was **increasing real-world performance**: rapid document opening, smooth navigation between PDF pages, accessing the table of contents, and reducing loading times.

OPTI modernized the application for high traffic and smooth operation by refactoring React, adopting Vite, optimizing APIs and resource delivery, improving the PDF viewer, and upgrading Elasticsearch. These interventions delivered immediate performance gains while also preparing the platform for the semantic search and AI phase.









CHALLENGES

The digital library did not need to be rebuilt, but rather modernized by rewriting the components that improve the user experience.

1. Accumulated technical debt



The platform was functional, but some components consumed more resources than necessary and had become increasingly difficult to optimize over time.

2. Complex frontend and excessive re-renders



The application contains complex pages featuring filters, lists, book details, authentication, a PDF viewer, and a permissions module. It needed reducing unnecessary renders and optimizing resource-intensive components.

3. Frequently accessed documents and resources



Covers and PDF pages are accessed repeatedly. Images needed to be delivered and cached efficiently, including specific pages requested within very long books.

4. Search modernization



The search engine needed to be upgraded while preparing the architecture for search capabilities based on meaning and relationships between concepts.



SOLUTION

The project started with benchmarking. We analyzed frontend-backend requests, endpoints, response times, API response sizes, PDF viewer rendering, and Lighthouse scores.

1. Technical audit and prioritization

- Issues were ordered according to their effect on the user. Thus, the team separated optimizations with immediately visible results from high-impact structural interventions.

2. React frontend modernization

- Components were refactored, libraries were updated, and flows with sequential calls were reorganized to parallelize requests.

3. More efficient APIs and caching

- APIs were adjusted to return only the data needed for each context with a reduced payload. Images and other static resources were separated and cached in a dedicated service.

4. PDF Viewer optimization

The new e-reader prioritizes the requested page and adjacent pages. Parallelization and monitoring provide performance and visibility into page loading patterns, duplicate requests, and frequently accessed sections of documents.

5. Modernized search

The Elasticsearch upgrade included reorganizing existing indices with compatibility for semantic/hybrid search.



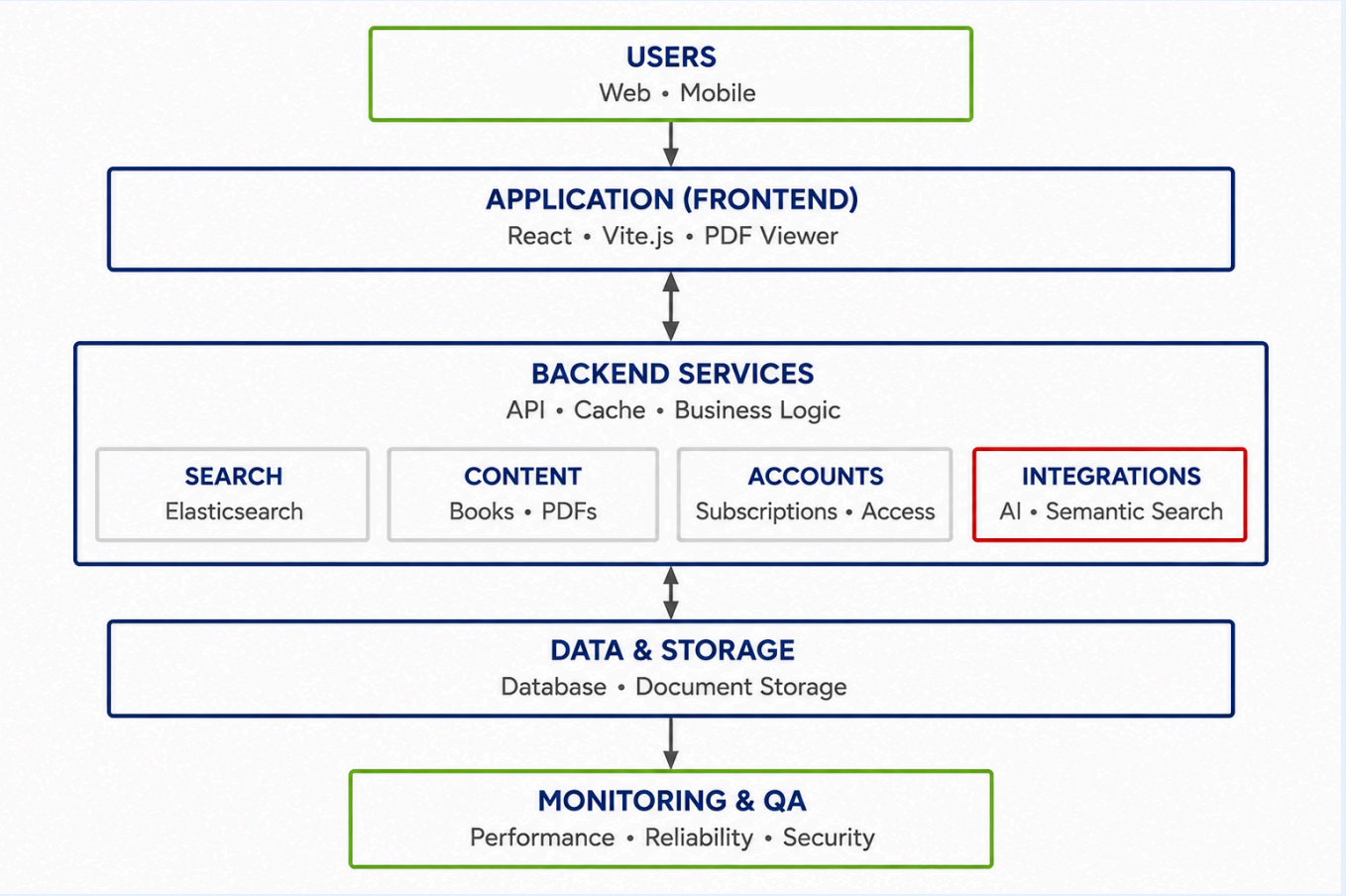
TESTIMONIAL

"I think OPTI is one of the most professional teams we have worked with. They always deliver on time, are very well organized, and always give us updates about their tasks."

\- Ruxandra Antal
Hamangiu Publishing House

ARCHITECTURE

Performance optimization at every layer, from the user interface to API responses and document delivery.



FROM THE ENGINEERING TEAM



"For a mature application, performance does not come from a single optimization. You have to track the entire path: how many requests the interface makes, how fast the API responds, what gets cached, and how an e-reader can work securely."

— Cătălin Chivu, Software Engineer

RESULTS

The upgrade improved the user experience and the long-term technical foundation for the Library.

10X faster image delivery

By switching to cacheable static resources, image delivery time dropped from 600 ms to approximately 60 ms.

Smooth navigation and reading

Fewer requests, smaller API responses, and parallelized operations reduced delays in frontend workflows.

Optimized PDF viewer

Unnecessary loads are avoided, and documents are browsed naturally by readers.

Rising Lighthouse scores

In Lighthouse after optimizations, the platform achieved scores of **80/86/92/100.**

Reduced technical debt

Updating libraries, refactoring components, and implementing Vite.js reduced technical debt.

Semantic search foundation

The Elasticsearch upgrade prepares the platform for retrieving information by meaning and context.

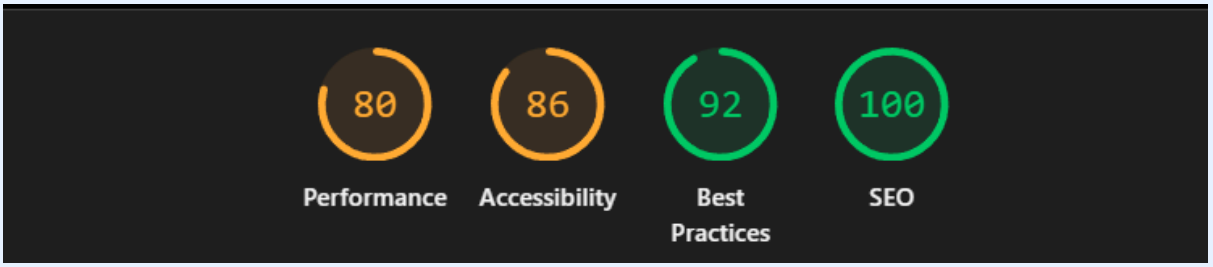


Fig.1. After refactoring, optimizing the JavaScript bundle, and improving static resource delivery, the application reached Lighthouse scores of Performance 80, Accessibility 86, Best Practices 92, and SEO 100.

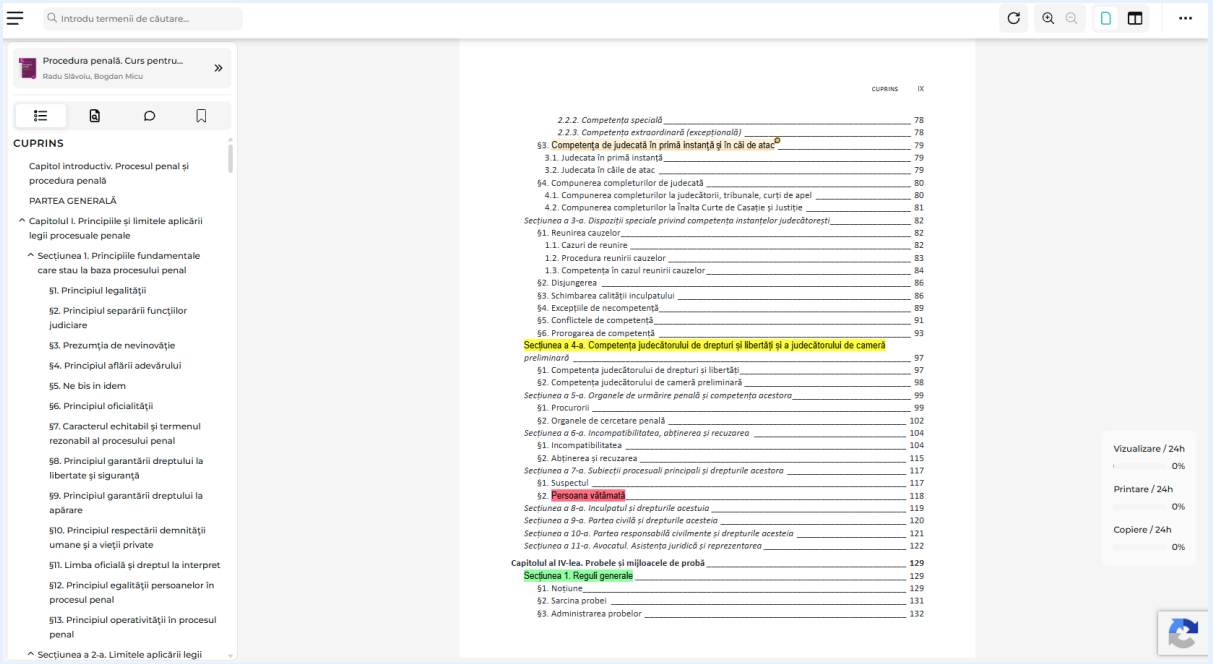


Fig.2. Screenshot of the Hamangiu Legal Library, including the book's table of contents, annotations, and quick search.

Name	Status	Type	Initiator	Size	Time
6afedfc0d5e6112e8a50196f.webp	200	webp	vendor-react-CS3uKHaT.js:9	7.1 kB	27 ms
6afef88cd5e6112e8a501a00.webp	200	webp	vendor-react-CS3uKHaT.js:9	8.5 kB	32 ms
6afc14bfd5e6112e8a501757.webp	200	webp	vendor-react-CS3uKHaT.js:9	7.6 kB	47 ms
6afd6dbbd5e6112e8a5018c4.webp	200	webp	vendor-react-CS3uKHaT.js:9	14.1 kB	49 ms
6ae35fa4d5e6112e8a50137c.webp	200	webp	vendor-react-CS3uKHaT.js:9	10.8 kB	57 ms
6ad37cc95446c08b0b41e405.webp	200	webp	vendor-react-CS3uKHaT.js:9	6.4 kB	61 ms
6ae33853d5e6112e8a5012a8.webp	200	webp	vendor-react-CS3uKHaT.js:9	8.1 kB	61 ms

Fig.3. Image loading in 60 ms from dedicated static files service in Developer Tools.

TECHNOLOGIES AND METHODOLOGY

Services: Performance audit, web application modernization, frontend refactoring, API and cache optimization, PDF viewer optimization, search engine upgrade, monitoring and QA.

Tech: React, Vite.js, JavaScript, REST/API, Elasticsearch, PDF viewer, cache, node.js, PostgreSQL, Lighthouse.

Methodologies and best practices: Initial analysis, prioritization, refactoring, testing and QA, launch and bug fixing.

Standards: ISO 9001 (quality), ISO 27001 (information security), ISO 42001 (AI management).

LEARN MORE

⇒ Read our **previous Digital Library Case study** ➛

⇒ Read on AI-Ready Infrastructure for Web, Email and Sales ➛ - case study covering infrastructure update

⇒ Read the case study on E-Commerce UX & SEO modernization ➛

⇒ View all our Software Services ➛

⇒ View all Our E-learning and Publishing Page ➛

⇒ See all case studies ➛

CONTACT

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About OPTI

Smarter business processes. Scalable results.

We build **software**, **AI agents** and **data integrations**, alongside Google Cloud and HubSpot CRM services. Our management systems are certified to ISO 9001, ISO/IEC 27001, and ISO/IEC 42001.

In 2026, our projects received multiple awards and distinctions, including **Best R&D Program of the Year** at the ANIS Gala and **Bronze Startup of the Year** at the RO Startup Awards. Founded in 2005, OPTI is a HubSpot Solutions Partner and Google Cloud Partner, with individually certified specialists across the technologies we use.

CERTIFICATIONS

HubSpot Partner · Google Cloud Partner · ISO 27001 · ISO 42001 · ISO 9001 · Microsoft Certification CRM · Microsoft Certification ERP · Google Workspace Administrator · Data Engineer · REVIEWED ON Clutch 5/5 RATING

KNOW-HOW

