# PHARMA SEMANTIC SEARCH

## CONNECTING REGULATORY INFORMATION TO INTERNAL R&D DATA VIA A KNOWLEDGE GRAPH

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Matthias Jurisch

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BACKGROUND AND GOAL

TECHNICAL CHALLENGES

SOLUTION AND IMPLEMENTATION

VALUE FOR THE CUSTOMER

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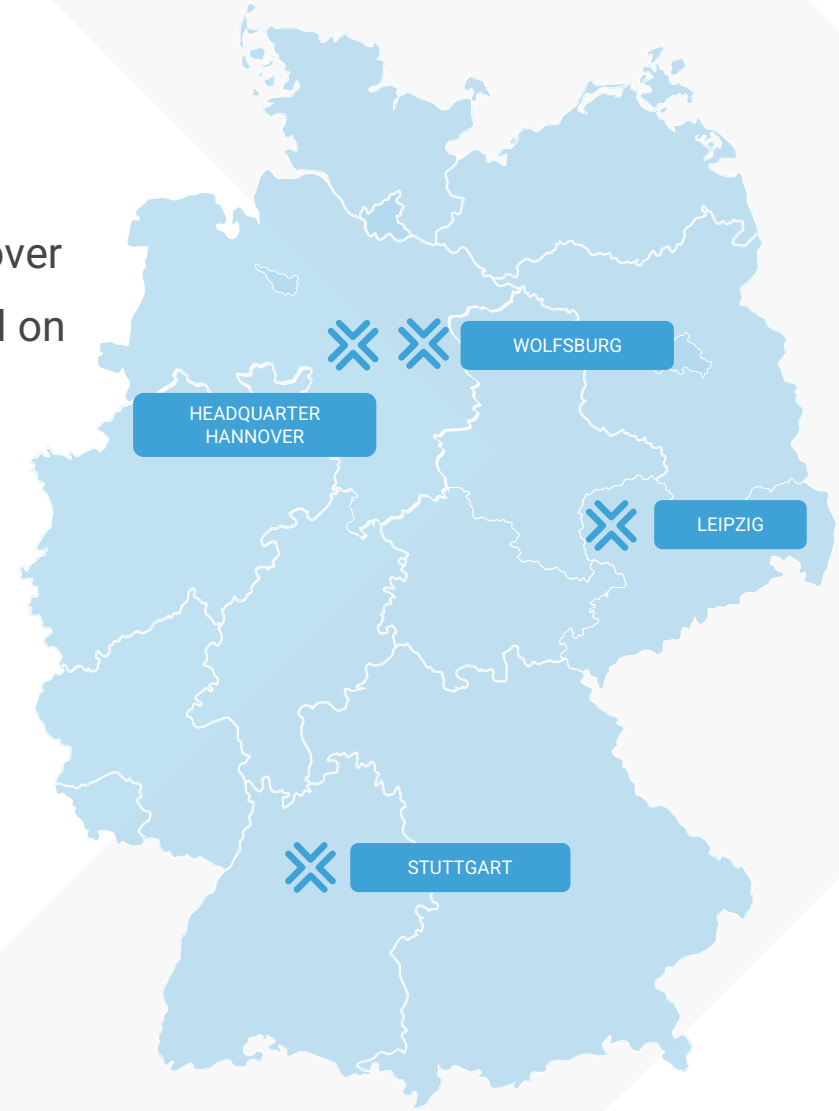
# brox IT-Solutions GmbH

IT-Consulting

- **Founded:** 26.11.1998
- **CEO:** Hans-Christian Brockmann
- **Headquarter:** An der Breiten Wiese 9 | 30625 Hannover
- **Verticals:** Automotive & Manufacturing, focused on Process- and IT-Consulting
- **Research Partners:** University Leipzig, DFKI
- **Departments:**

  IT Sourcing Management
  IT Architecture & Infrastructure
  IT Lifecycle Management
  **Information Management**

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# Our Customers

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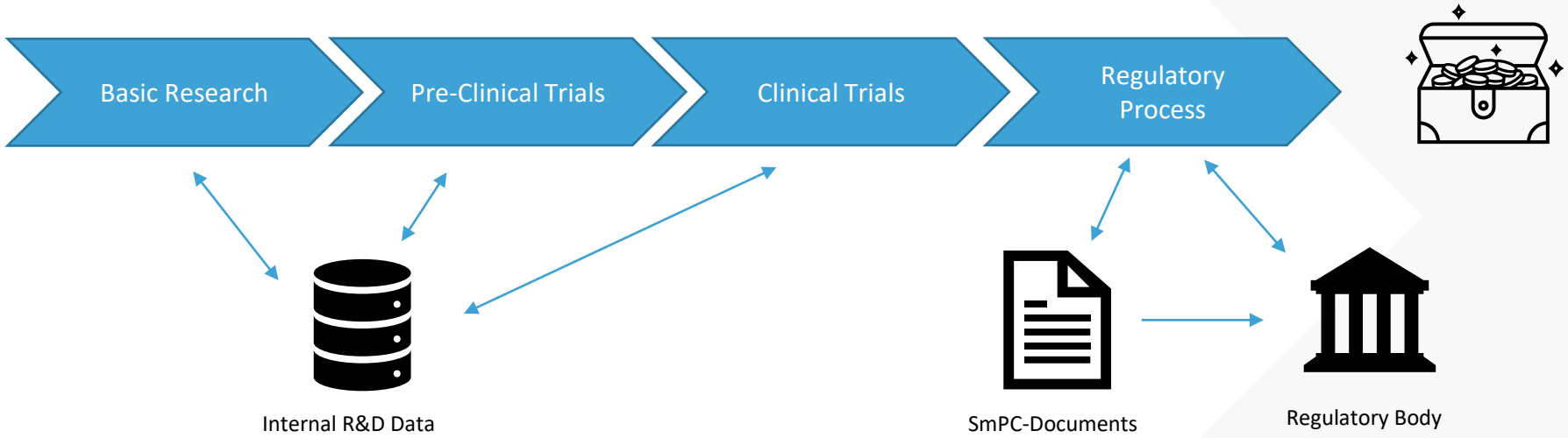
# Background

Drug Development and Regulatory Process in the Pharma Domain




- Challenge: Regulatory documents and internal R&D data are not linked
  - E.g., internally a substance is referred to as “candidate 2917493” – not external name
- Not linking the data can cause significant issues

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# Goal

Requirements

## Integrate data from regulatory and R&D Domain to

- ensure data quality of submission documents
- getting information on which substances are registered in which countries
- directing research effort to areas that result in products

## Provide frontend for exploring the data

- Users: no data-science/analytics background
- Use known UI metaphors

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# Technical Challenges

Technical Challenges

## Integrating data from the R&D and regulatory domain

- Input: Text-mined documents
- Data cleansing required
- matching to internal (RDF) master data on substances and legal entities
- Result needs to be integrated to other sources (-> knowledge graph)

## Making the data available to non-technical users via a front-end

- Use an interaction pattern that was known to users -> search engine
- Allow a faceted search over RDF data

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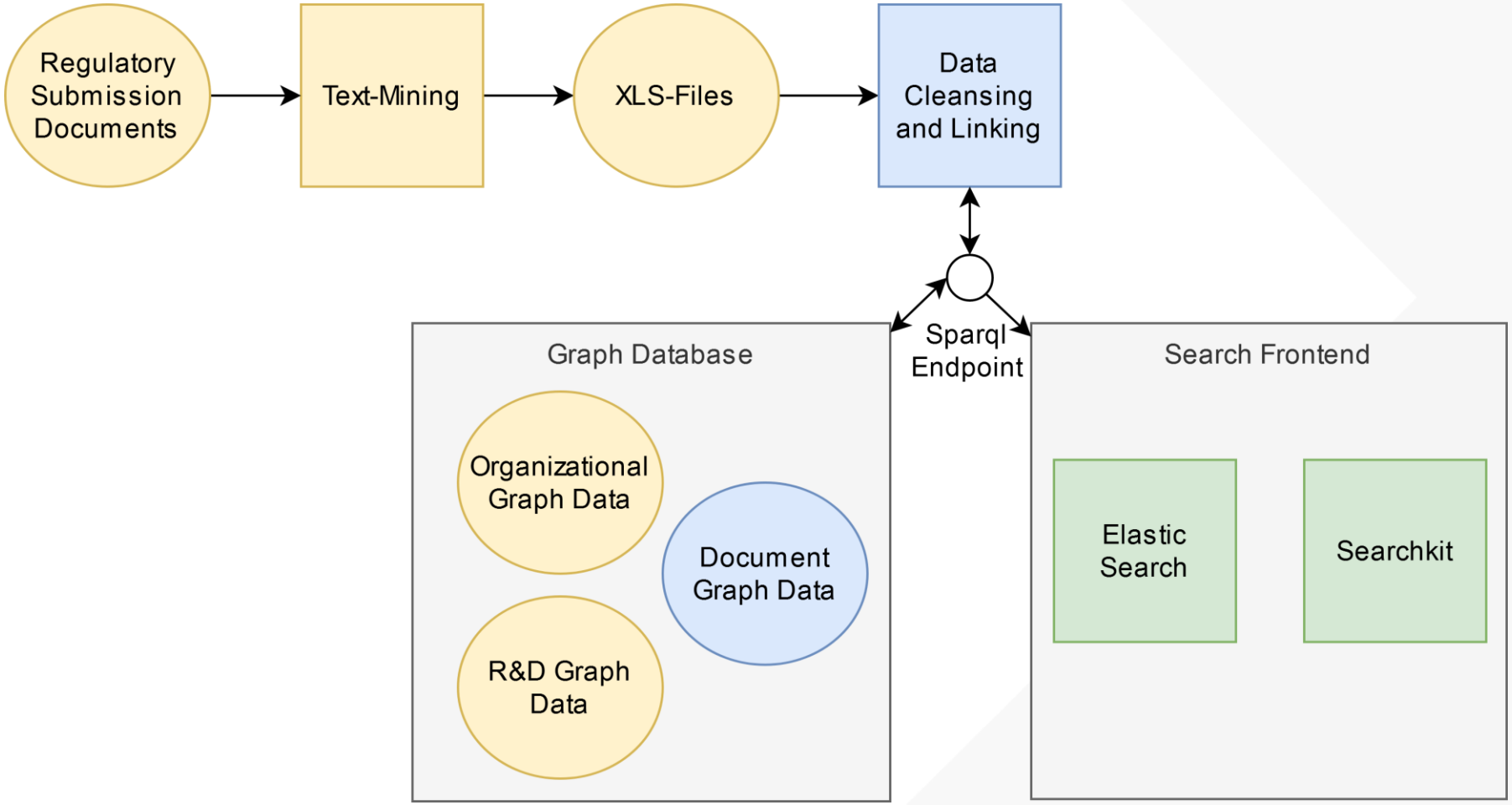
# Architecture

## Implementation







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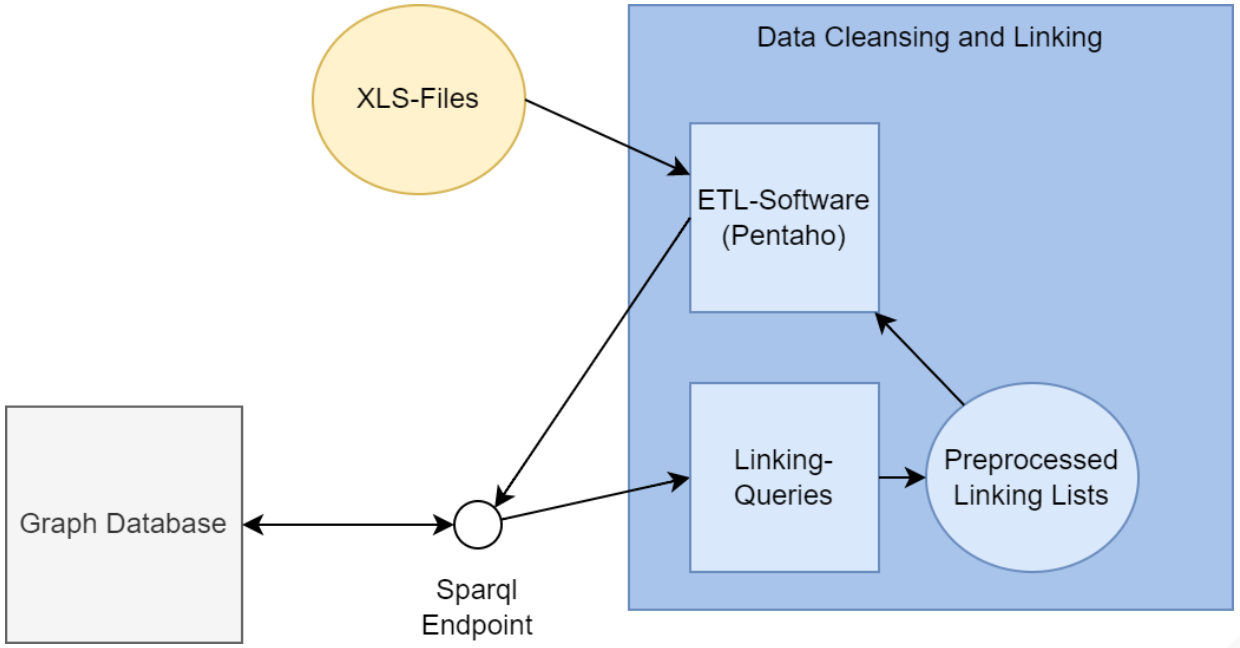
# Data Integration

Implementation




- ETL-Software was used to extract data from text mining results and create a graph.
- Matching text mining results via linking patterns created with SPARQL queries.
- Data was then ingested into an RDF database into a document graph, linked to the other graphs

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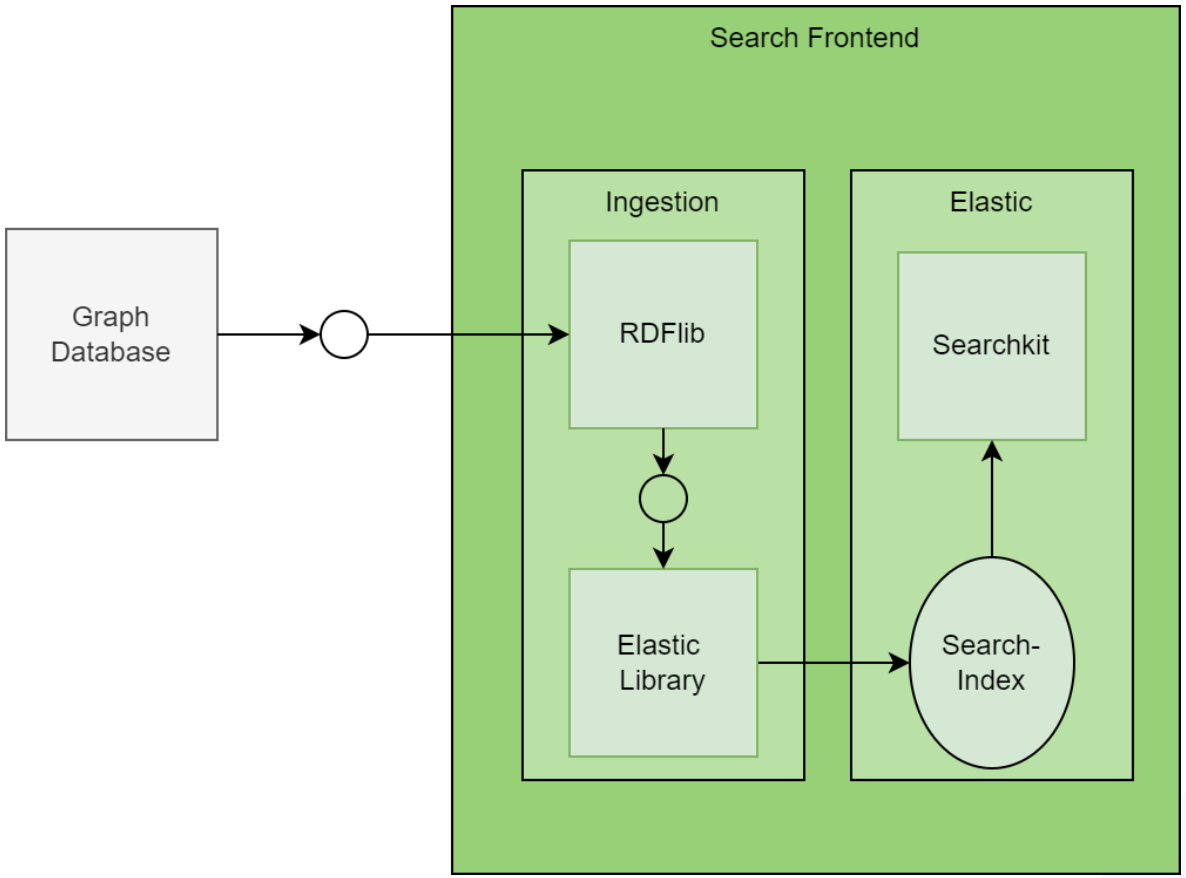
# Search Frontend

Implementation




- Frontend building block: Elastic
- Ingestion:
  - Rdflib
  - Elastic library for python
- Frontend: searchkit
  - fast implementation
  - easy and accessible templates.

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# Value for the Customer

Risk and cost reduction, new streams of revenue

- Reduce Risk:
  - Discover Inconsistencies between regulatory and R&D data
- Cutting Costs:
  - Connecting products, substances, and legal entities that are allowed to sell them in the graph. Without the graph: hours or even days of manual work searching through documents.
  - Implementation done within weeks (a graph was already present for internal R&D data; tools like pentaho, graph databases, searchkit facilitate quick prototyping)
- New Streams of Revenue:
  - Regulatory data can be filtered by country, internal substance identifiers, related company, … -> overview of the current market access of the company

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# Conclusion

What did we learn today?

- Data issues in the pharma regulatory process
- What do users in that domain need?
  - Data Integration
  - Simple UI
- How to do that?
  - ETL tools
  - Graph database
  - Data cleansing
  - Standard search solutions
- Why is this usefull?
  - Cost reduction: no manual information integration
  - Risk reduction: reduces regulatory risks

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# THANKS
# FOR YOUR ATTENTION

**Dr. Matthias Jurisch**
Manager Information Management Unit

**brox IT-Solutions GmbH**
m: +49 173 3969952
e: mjurisch@brox.de


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