

INDUSTRY-READY NLP SERVICE FRAMEWORK BASED ON KAFKA.

DR. BERNHARD WALT

DATA SCIENTIST, ARTIFICIAL INTELLIGENCE, NATURAL LANGUAGE PROCESSING
GROUP IT, BMW GROUP

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— NLP LAB —

Natural Language Processing

Consulting | Development | Research

A BMW GROUP IT Initiative.

Agenda.

-  Intro.
-  NLP Use Cases at BMW Group.
-  NLP Service Framework.
-  KAFKA as Streaming and End-to-end Backend.

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THE BMW GROUP IT: AN ORGANIZATION WITH AN INTERNATIONAL FOOTPRINT.

5500 employees worldwide.



THE BMW GROUP IT IS ORGANIZED IN A WORLDWIDE NETWORK.

60 Nationalities in 29 Countries

form the global BMW Group IT network in headquarters, in markets, in DevOps Hubs and in innovation locations (tech offices).

230 products and a complete product orientation

optimize existing business processes and enable new business areas.

694 Locations

(Sales cooperation, offices, ...) are connected through the global network infrastructure.

~ 12,200,000 Vehicles

are connected with the BMW Group ConnectedDrive Backend.

~ 1,000,000,000 Requests

to the BMW Group backend through ConnectedDrive are processed daily.

BMW GROUP IT.

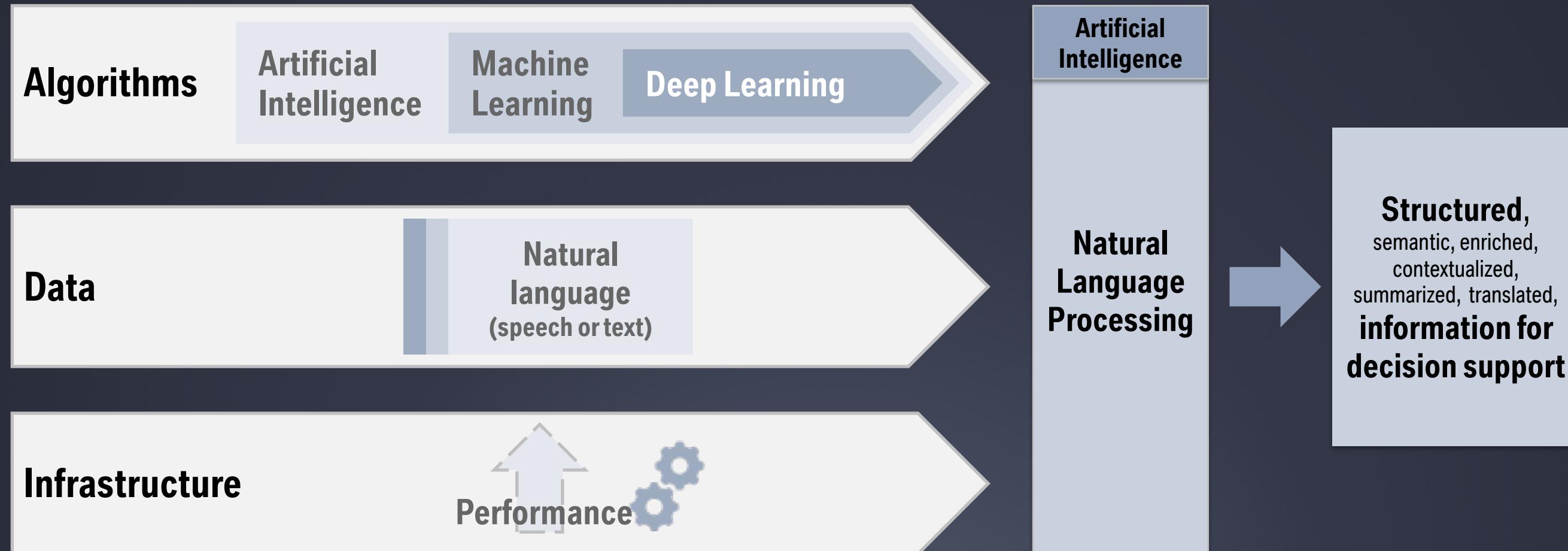
5.500 employees



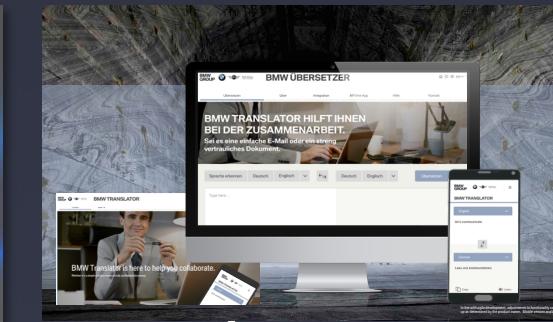
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NATURAL LANGUAGE PROCESSING – IN A NUTSHELL.



SELECTED NLP USE CASES.



Digital Contract Intelligence

Vision: Automation of the processing and analysis of legal documents within BMW Group.

- Smart Information Extraction and Search
- Automated Risk Assessment
- Plausibility Checks and Negotiation Support

Workplace Assistant

Vision: Virtual Assistant for BMW Group employees to accelerate daily tasks and routines.

- Bot ecosystem on Azure providing a new UX using voice & text
- Initial bot apps: meeting organization, room booking, person search

Machine Translation

Vision: BMW Group-wide machine translation service consumable to enable multilingual NLP use cases.

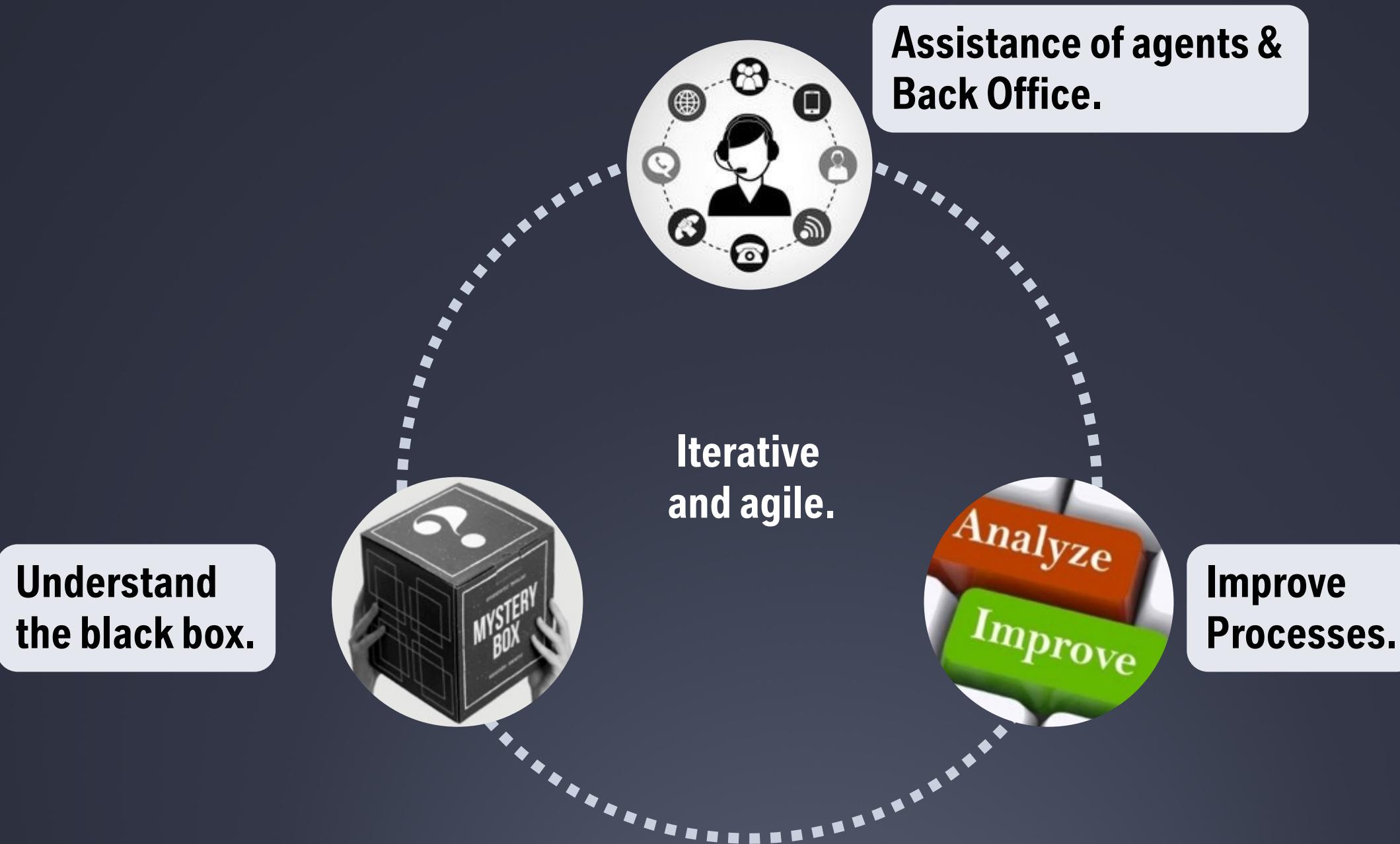
- Cooperation with FG-8 and FG-AM-61
- Provide on-premise translation service for generic domains
- Cloud service for domain specific translations.

Service Desk Automation

Vision: Automation of Service Desks by Self-Service, Chatbots and Smart Analysis.

- Speech Analysis of CIC Calls to improve quality management.
- Self-service using smart knowledge bases
- Agent Support
- Chatbots

USE CASE: CALL CENTER ANALYSIS.



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Phases

- I. User Consent
- II. Transcribe speech files into text
- III. Processing of text dialogues (NLP)
- IV. Visualization and business insights

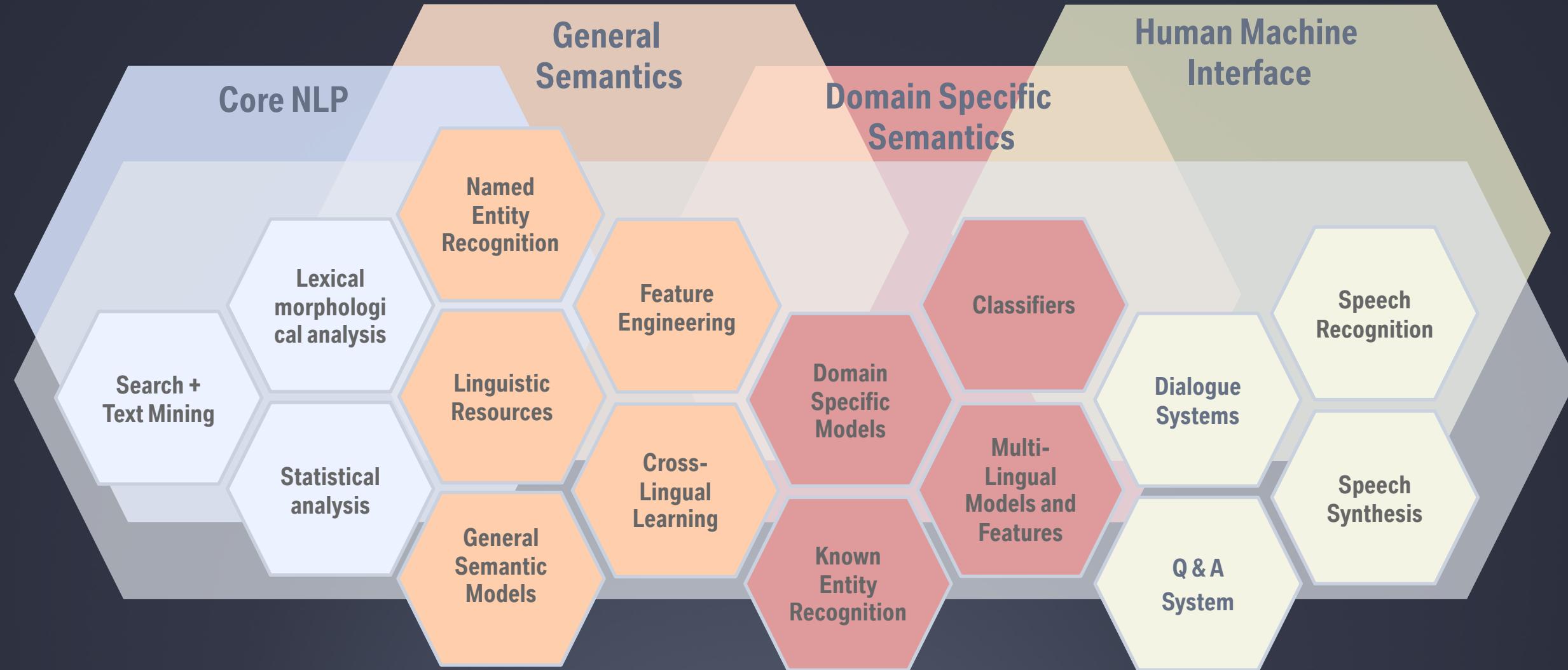
Data

- I. Time: last 5 months
- II. Calls: approx. 40 000 Calls → 3000h / Dialogue
- III. Lang.: German and English



Translating recorded calls to text files allows us to better understand our customers' needs, identify improvement opportunities and implement the right measures to increase customer experience and save operational costs.

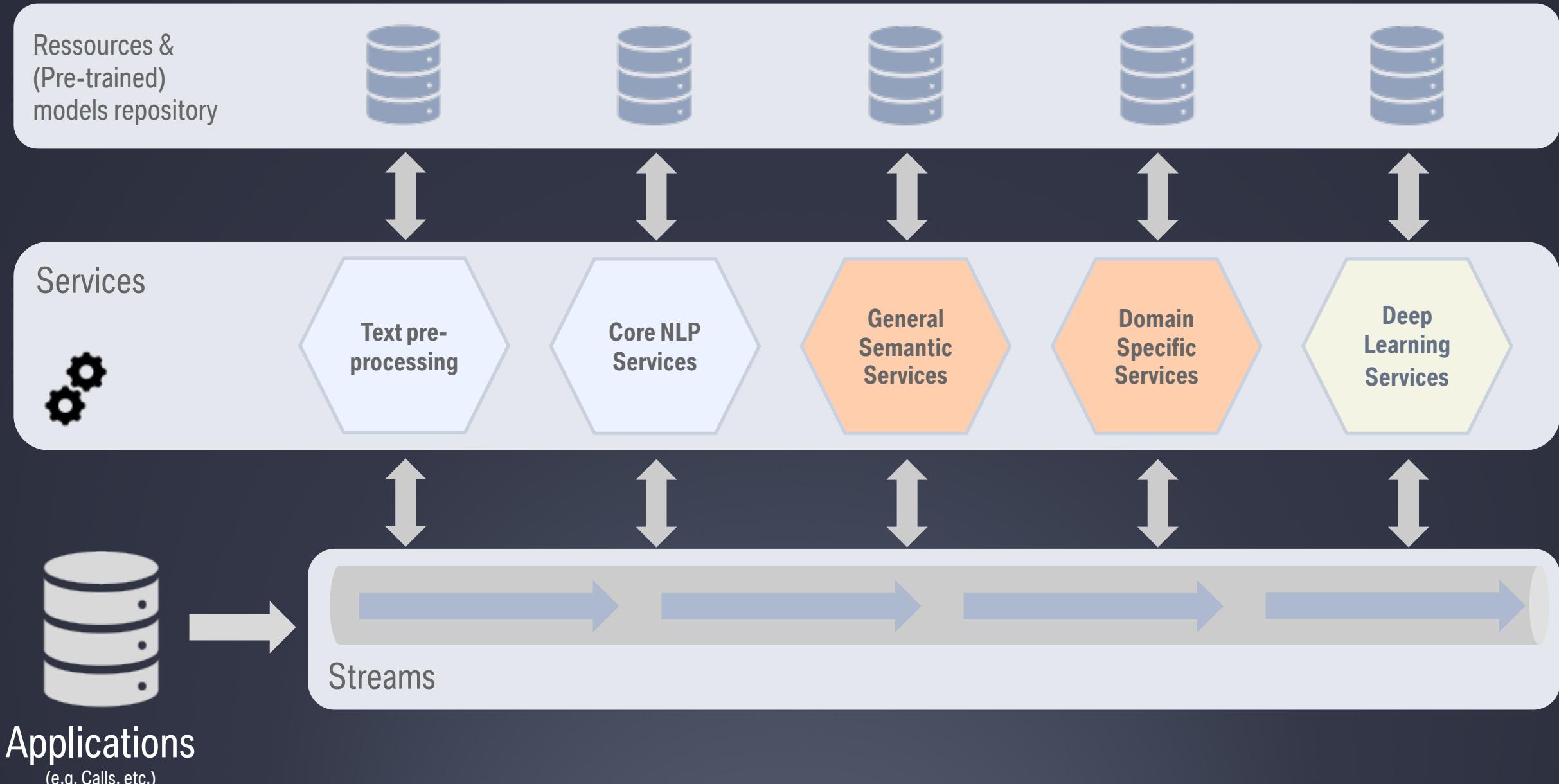
NLP TASKS AND COMPONENTS.



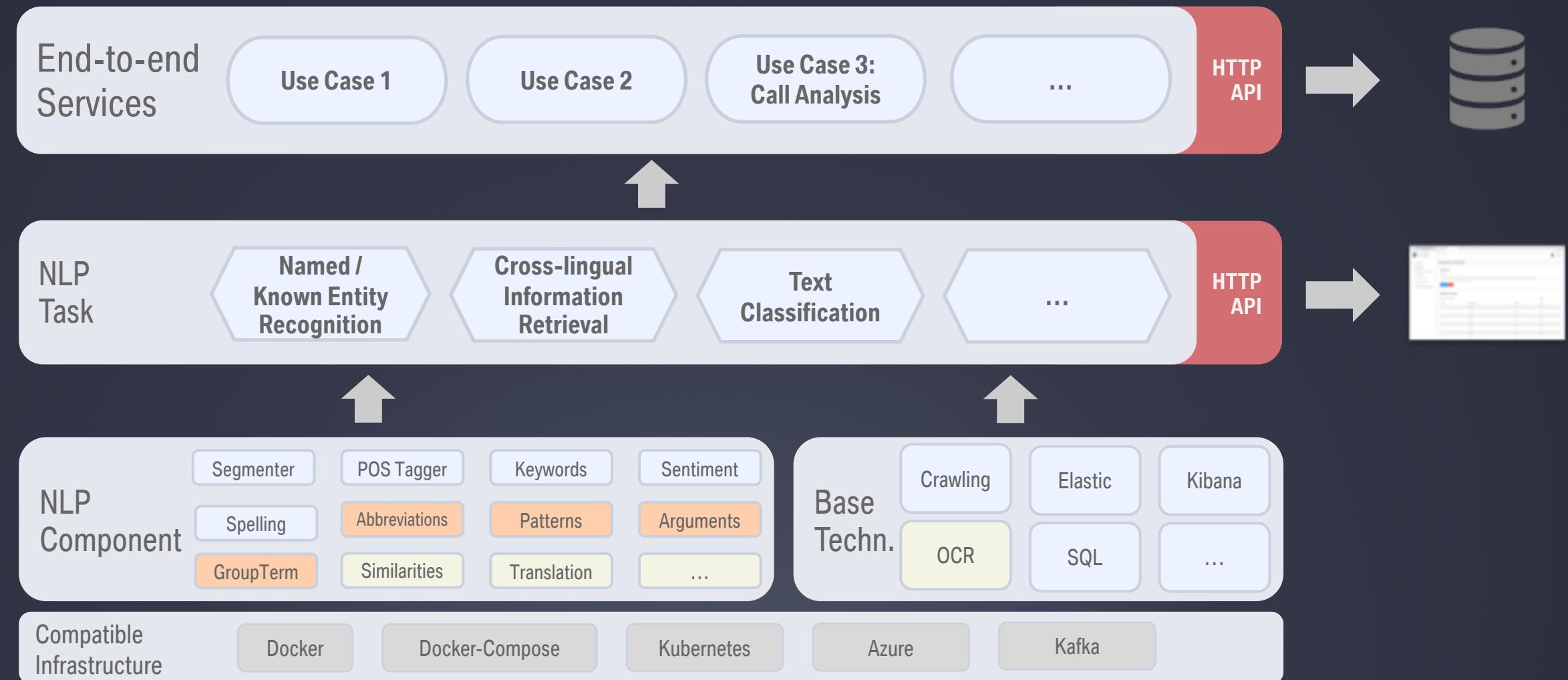
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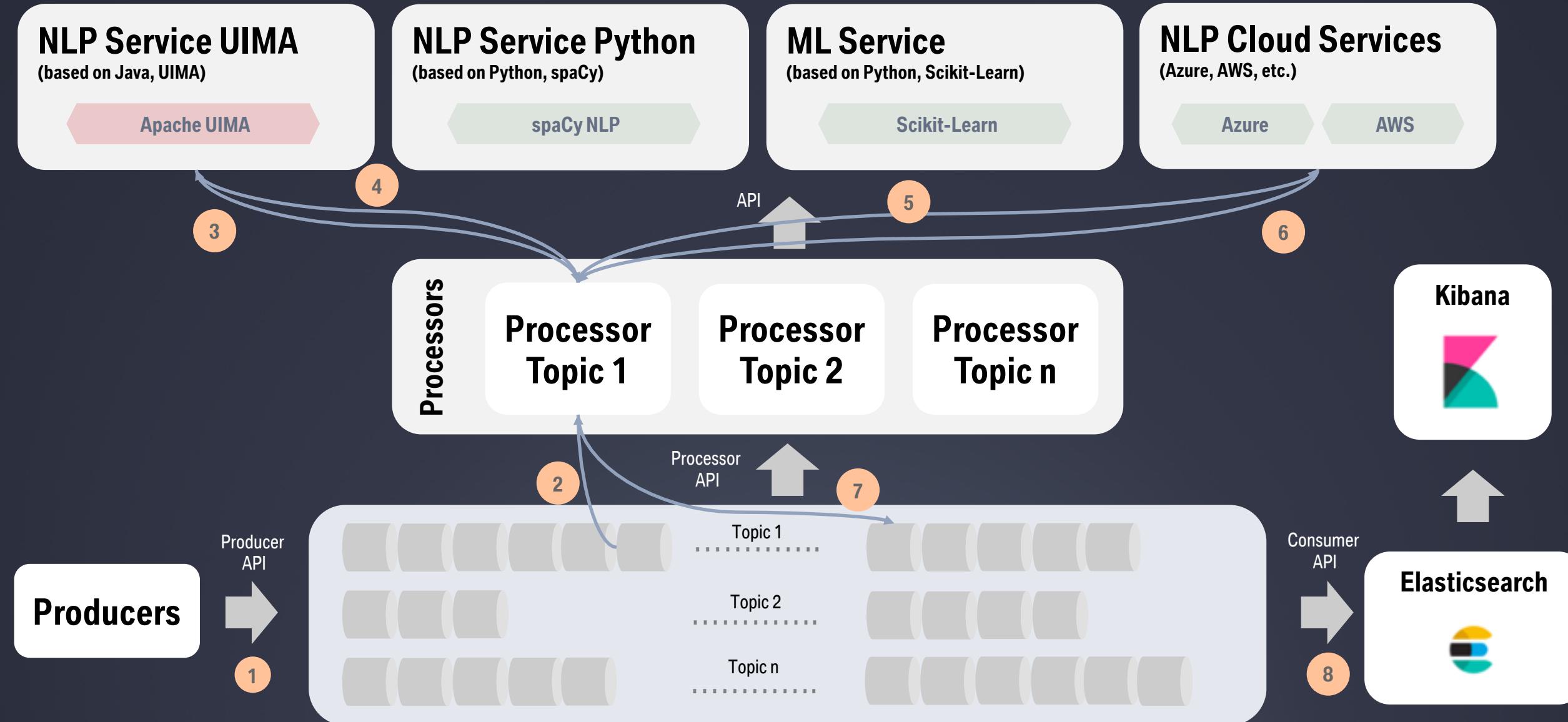
NLP SERVICE FRAMEWORK.



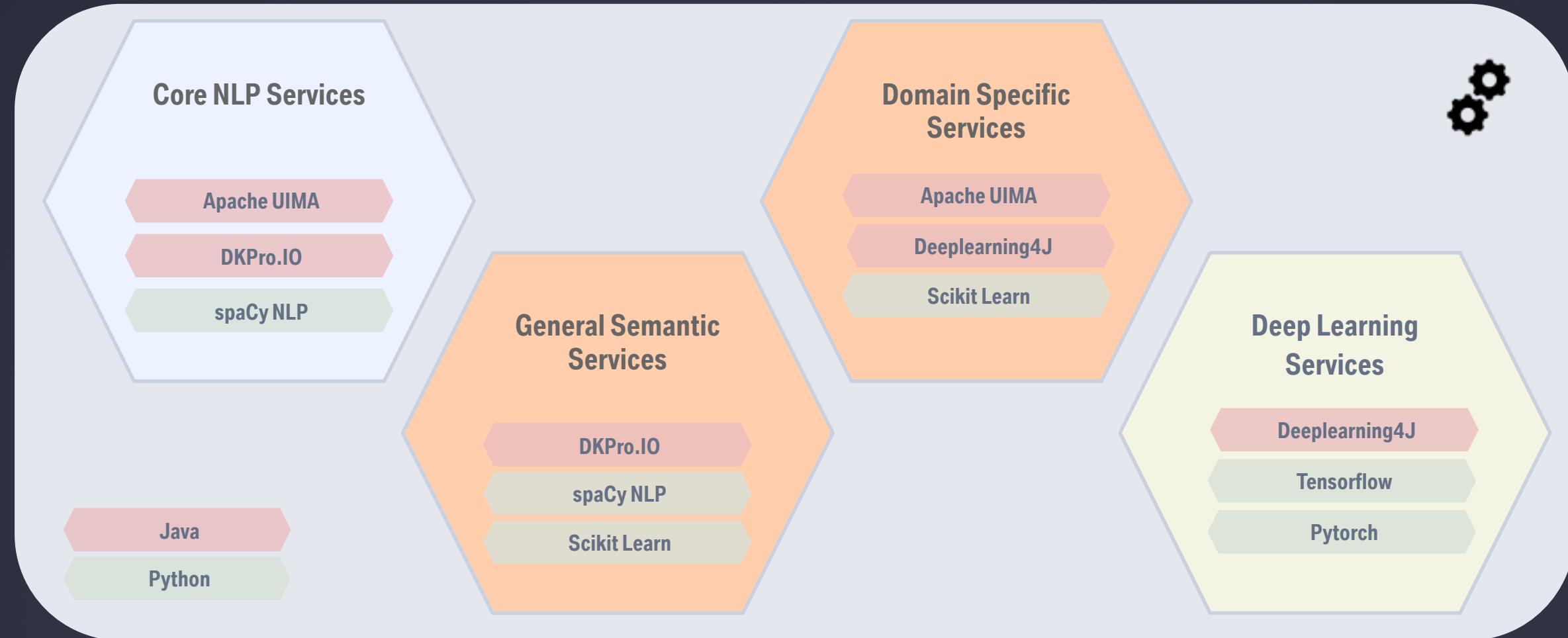
END-TO-END SERVICES.



MICROSERVICE ARCHITECTURE.



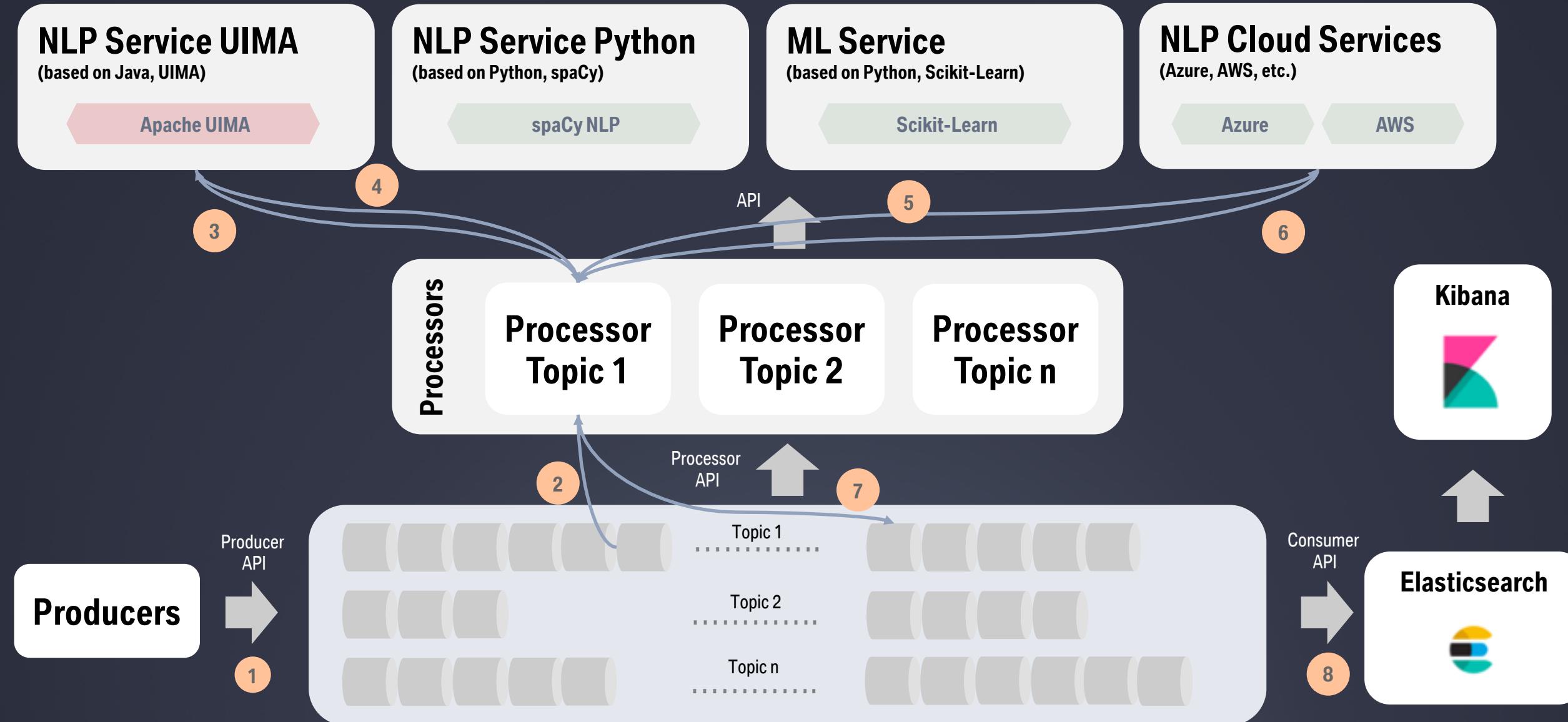
POLYGLOT FRAMEWORK: JAVA, PYTHON, ...



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MESSAGE BROKERING AND STREAMING.



INTERACTION AND INTEROPERABILITY.

FLEXIBLE INTEGRATION

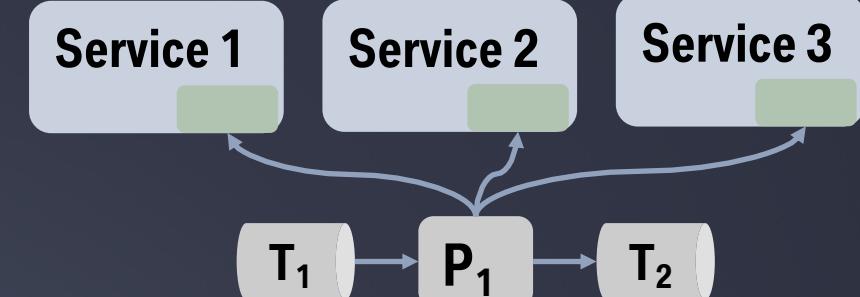
multiple supported interfaces for different deployment scenarios

NLP Service UIMA

KAFKA GRPC REST

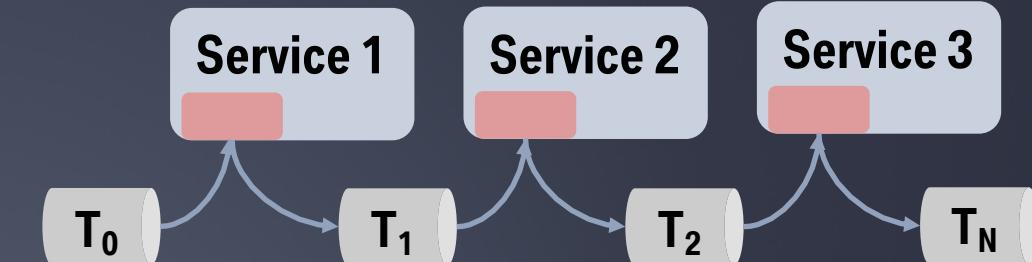
MODULAR END-TO-END PIPELINES

services can be connected to provide full-fledged NLP applications

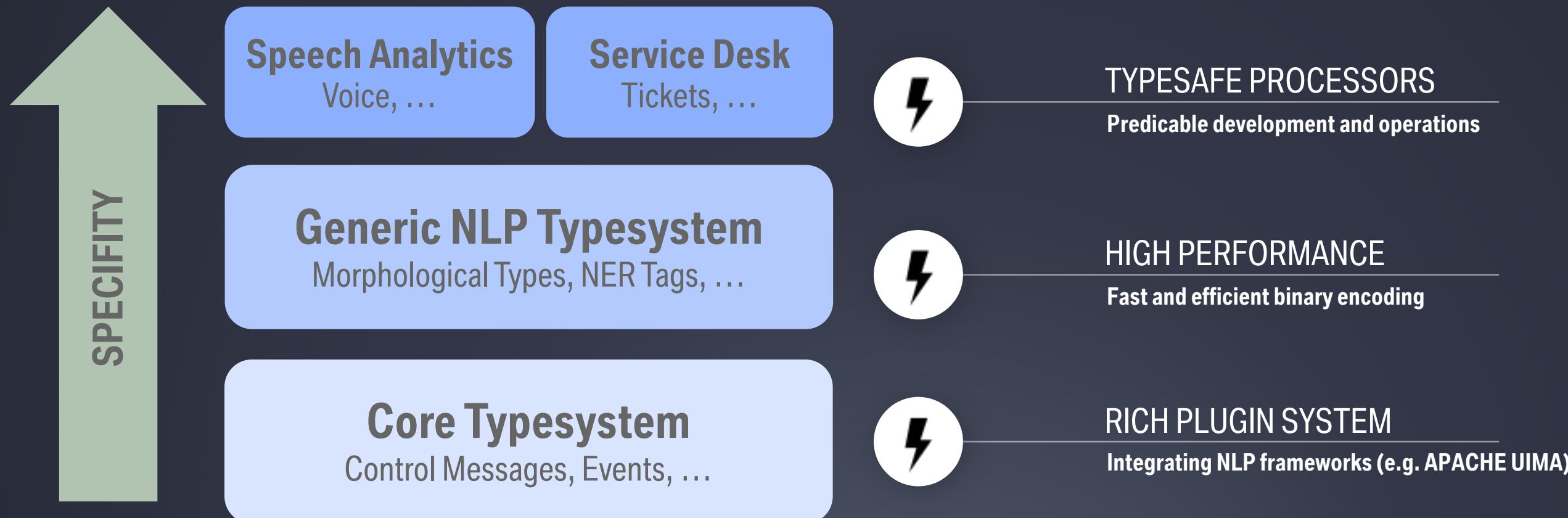


CONFIGURABILITY

high degree of configurability for each deployment scenario



PROTOBUF BASED TYPESYSTEM



WHY KAFKA?

KAFKA IS FAST

pressure of fast sources onto slow NLP processors is handled automatically

KAFKA IS FLEXIBLE

connecting services via Kafka streams is easy and scalable

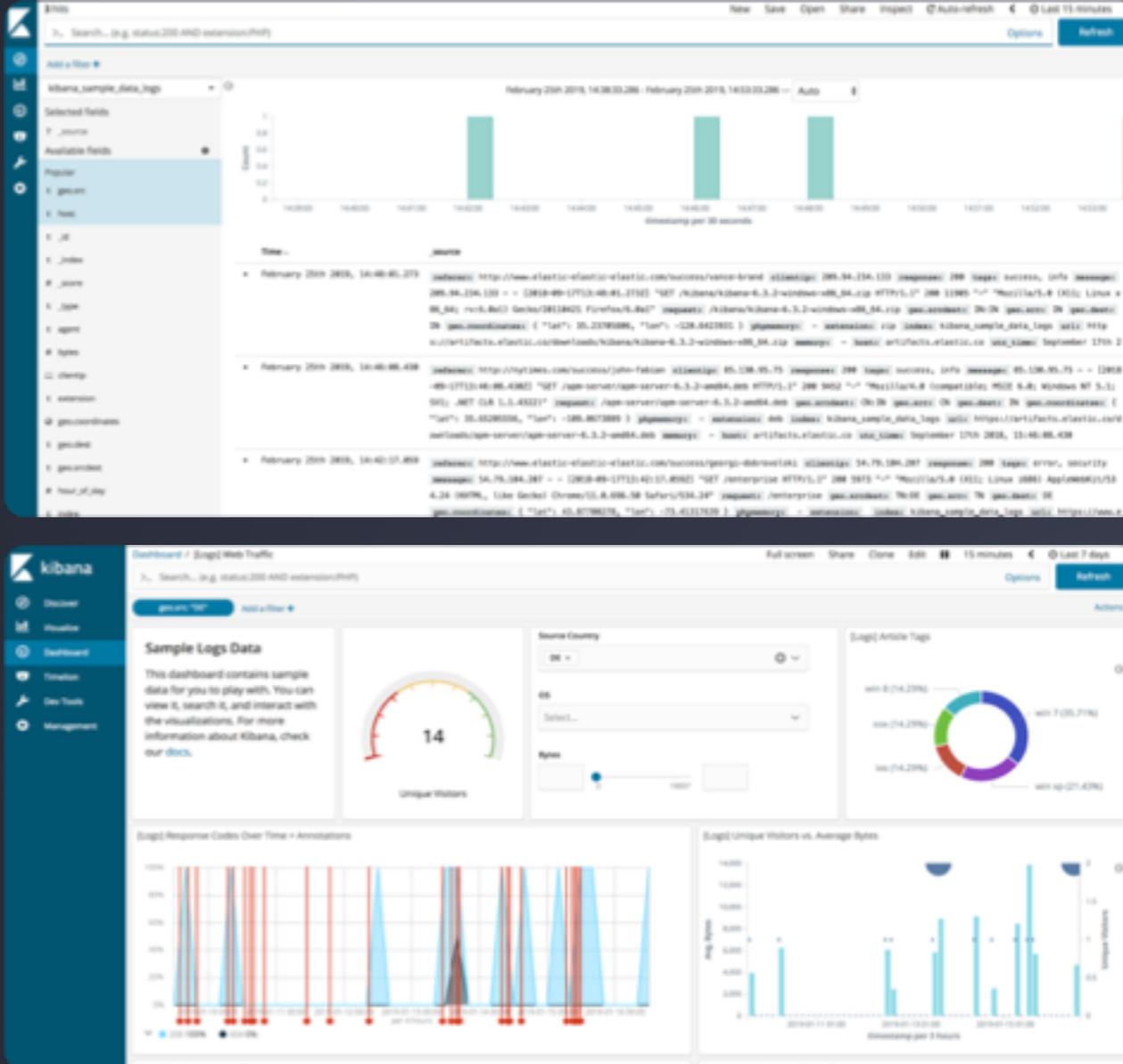
KAFKA PROVIDES THE RIGHT ABSTRACTIONS

Kafka connect, streams and stateful processors enable modularity and reusability

KAFKA IS EASY TO USE AND VERSATILE

the Streams API makes it usable for everyone in many use-cases

WE BUILD PRODUCTS BASED ON KAFKA



REAL-TIME ANALYTICS Unstructured Information



DASHBOARDS AND VISUALIZATIONS Insights into topics, trends, and sentiments



FLEXIBLE AND SCALABLE INFRASTRUCTURE Generic and adaptable architecture



THANK YOU



Bernhard Waltl
Data Scientist, Artificial Intelligence,
Natural Language Processing

linkedin.com/in/bwaltl
Bernhard.Waltl@bmwgroup.com



Georg Bonczek
Artificial Intelligence, Software
Architect, NLP Engineer

linkedin.com/in/gbo
Georg.Bonczek@bmwgroup.com



Bernhard Pflugfelder
Senior Data Science & Big Data Advisor

linkedin.com/in/bernhard-pflugfelder
Bernhard.Pflugfelder@bmw.de