

Leveraging Knowledge Graphs and Generative AI to Transform Enterprise Data into Actionable Insights



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About Today's Speakers

Kai & Andreas



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Lead Data Product
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Key expertise data-driven
innovation, program- &
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Head of Semantic
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Key expertise Machine
Learning, Natural
language processing,
LLMs, knowledge
graphs, enterprise
architecture



Facts ZEISS worldwide



Employees

46,485

Locations worldwide
(rounded)

100

Countries
(rounded)

50

Revenue in €
billion

10.8



**Headquarters:
Oberkochen,
Germany**

Employees incl. Corporate functions and SSCs
Status: September 30, 2024

Facts

ZEISS segments – shaping the future



Semiconductor Manufacturing Technology



4,122 € million in revenue

8,586 employees

Industrial Quality & Research



2,369 € million in revenue

8,591 employees

Medical Technology



2,611 € million in revenue

8,629 employees

Consumer Markets

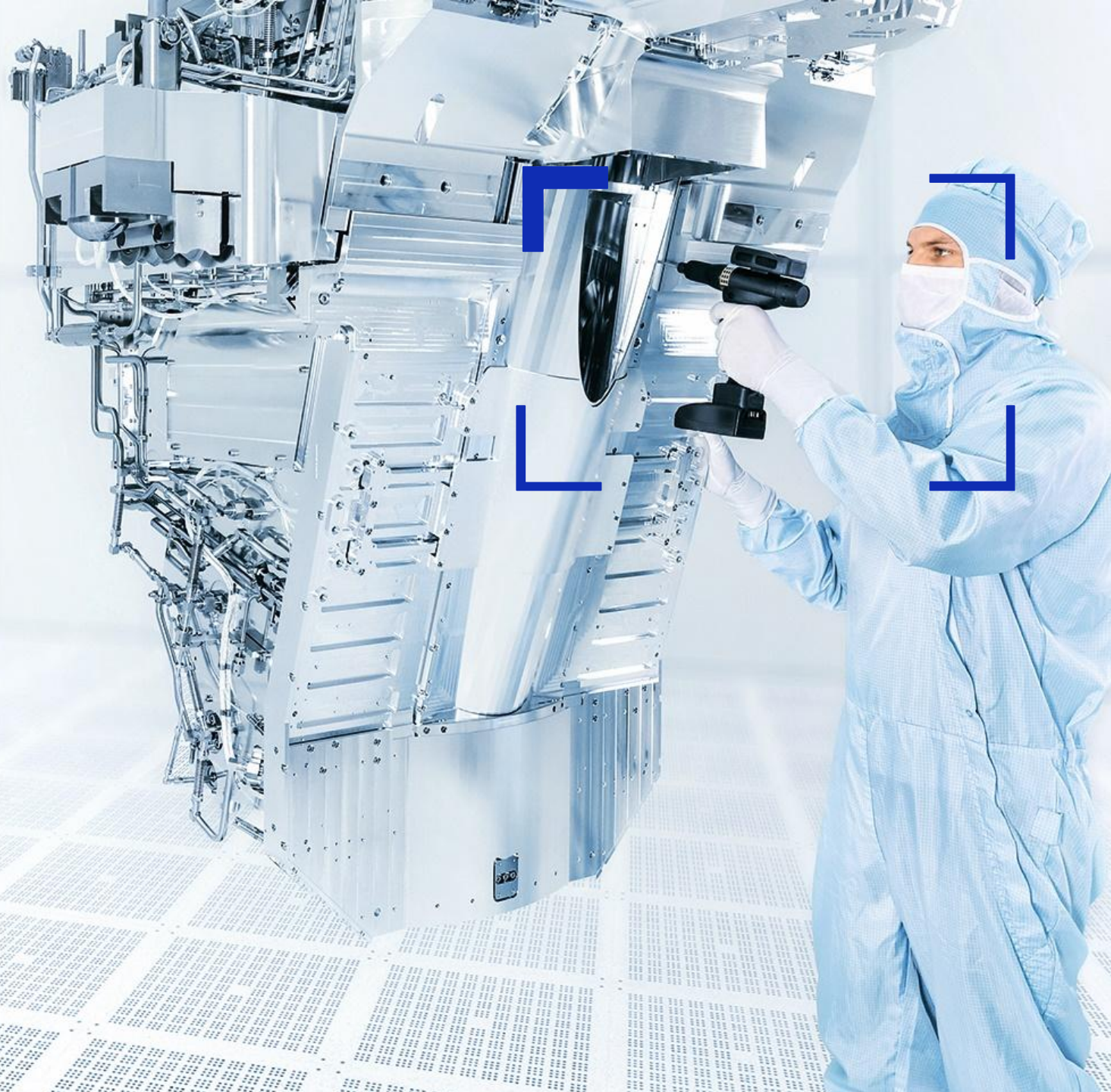


1,666 € million in revenue

13,008 employees

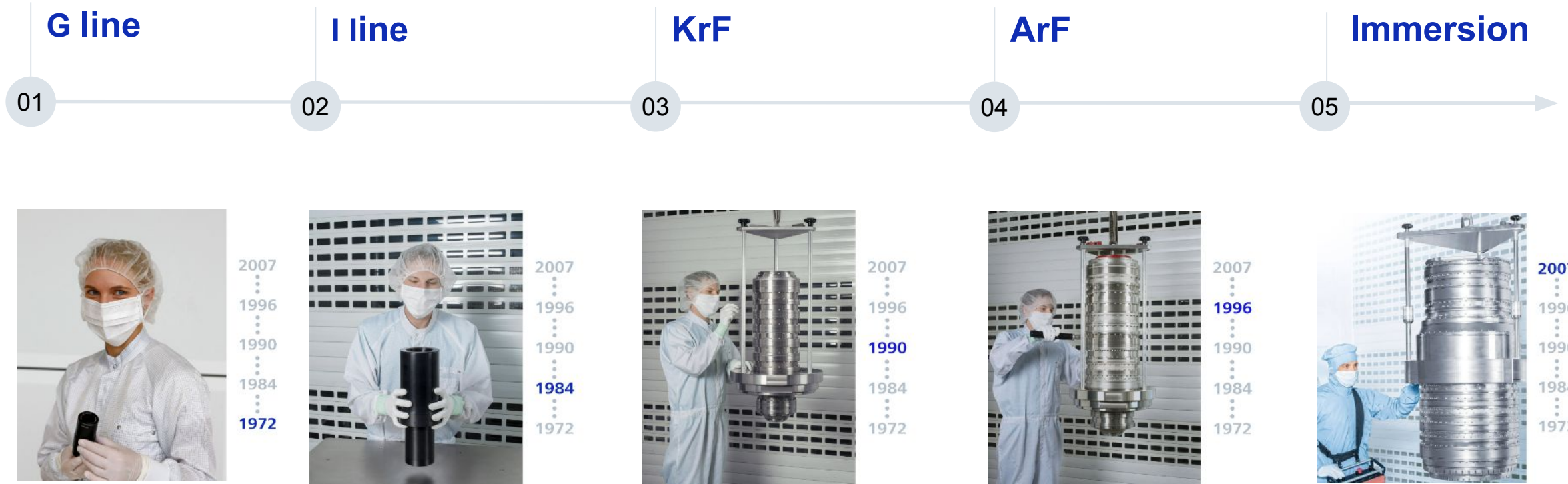
ZEISS Semiconductor Manufacturing Technology

Enabler for smaller, more powerful
and energy-efficient microchips



The evolution of (D)UV lithography optics

Bringing down resolution means blowing up the size



Theory

Abbe equation (1873)

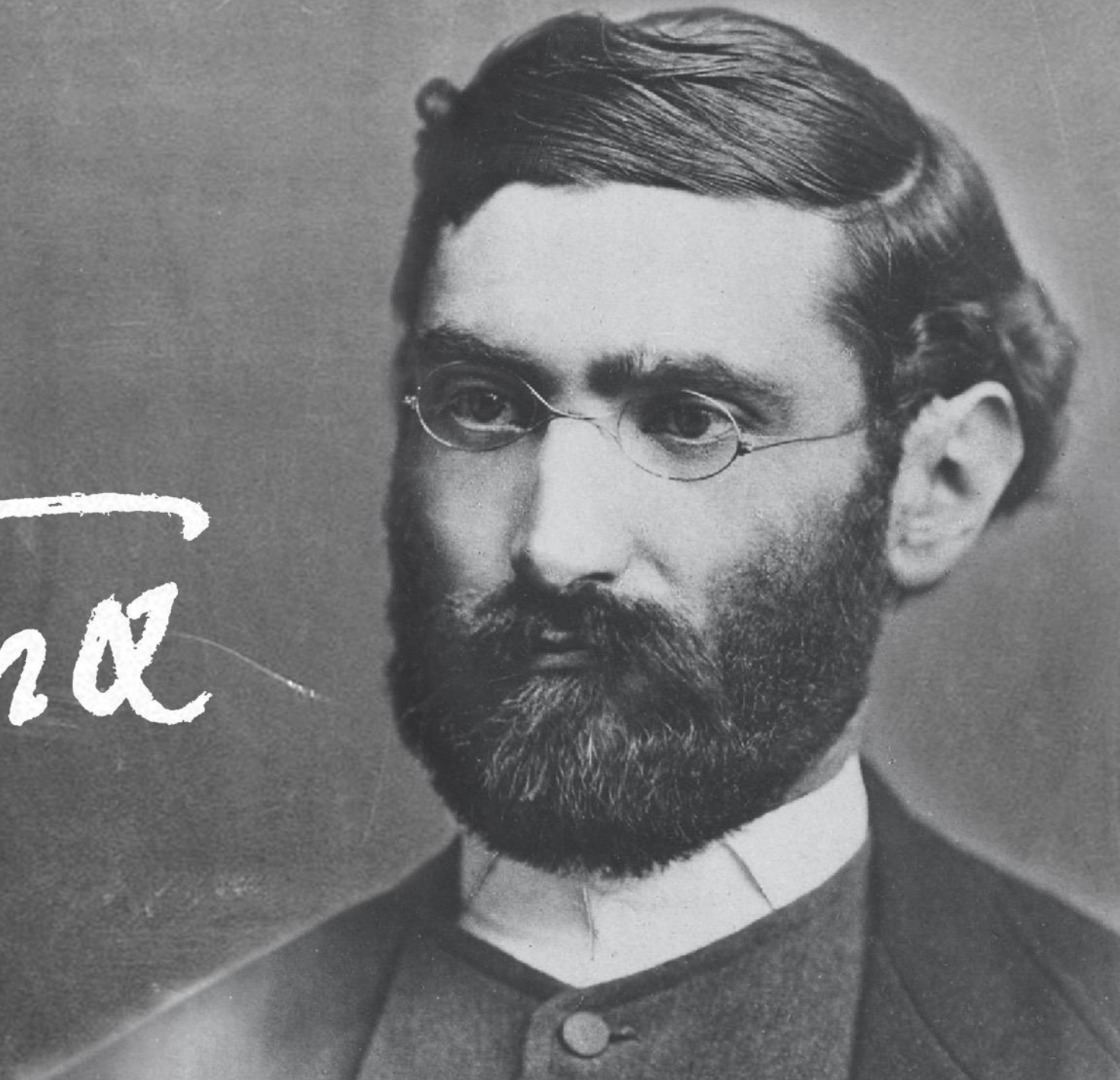
$$d = \frac{\lambda}{2n \sin \alpha}$$

d = Resolution

λ = Wavelength

n = Refractive index of the medium

α = Half aperture angle



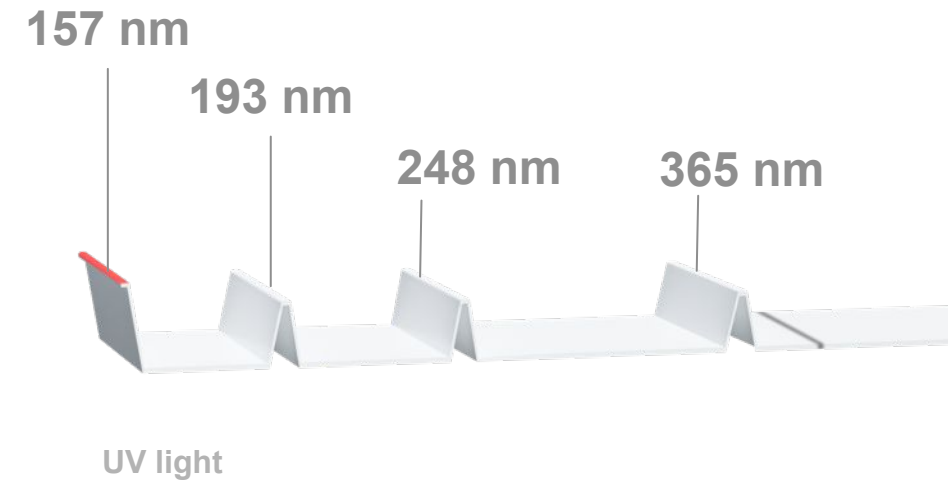
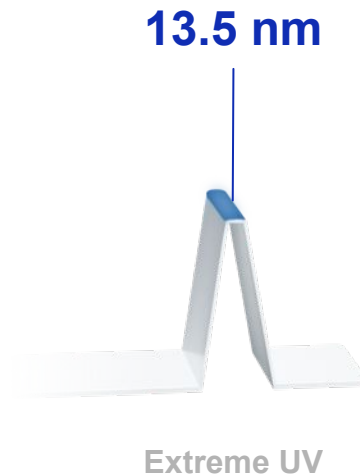
From DUV to EUV technology

Pushing the limits of what is technologically possible



Previous DUV lithography systems use light with a minimum wavelength of **193 nanometers**.

Extreme ultraviolet light (EUV) has a **wavelength 15 times shorter** (13.5 nanometers) and thus enables chip structures 5,000 times thinner than a human hair.

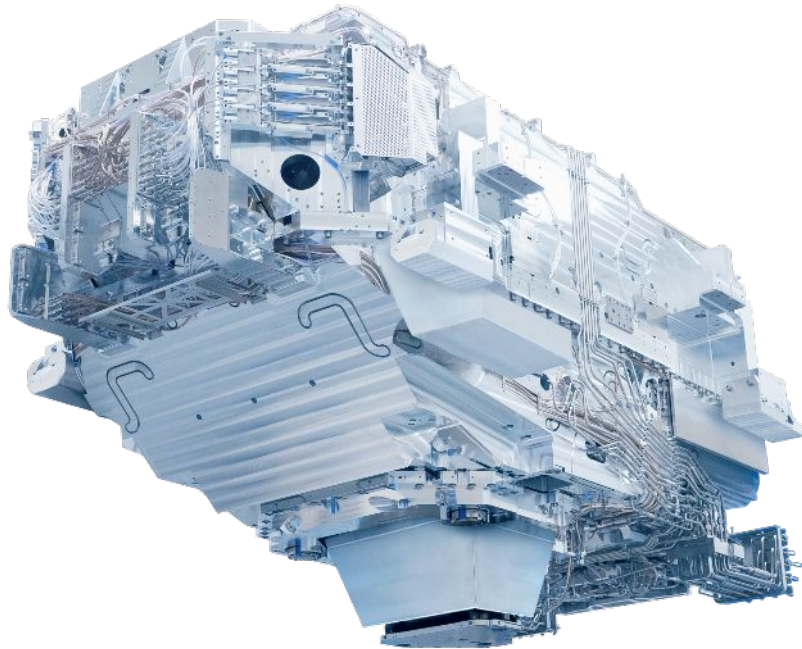


The heart of High-NA-EUV technology

High-precision optics with two function modules

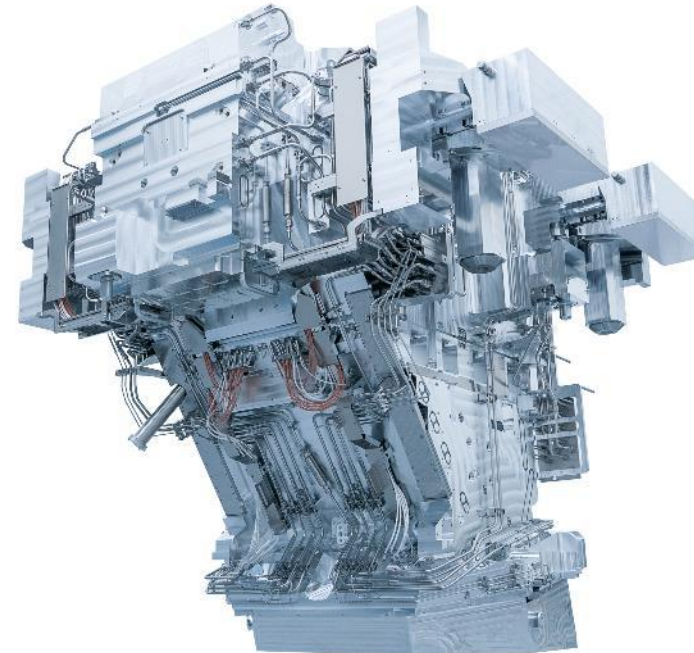


Projection optics



> 40.000 individual parts
~ 12 tons weight

Illumination system



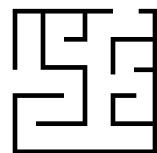
> 25.000 individual parts
~ 6 tons weight

Complex systems generate decentralized data

Unlock the full potential of available data

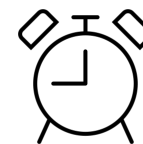


Situation



- Highly specialized data
- Combinations of various complex data sources

Complication



- Identifying data takes a lot of time
- Know-how split across multiple divisions

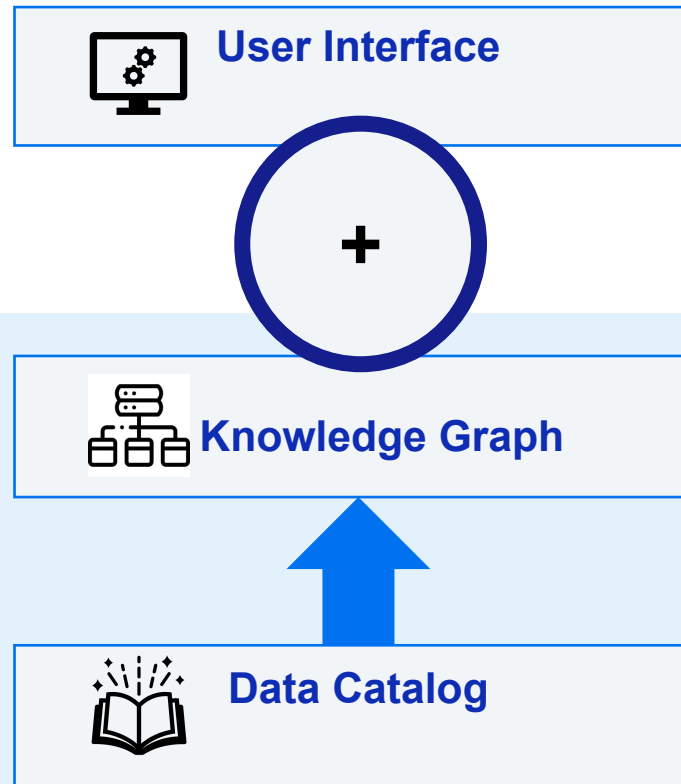
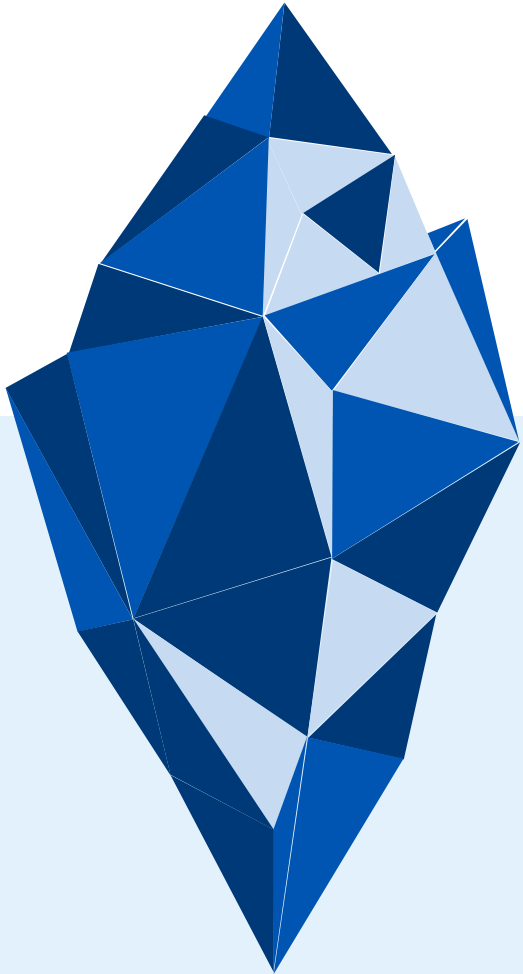
Solution



- Enable self-serve data exploration
- Allow easy scaling and publication of data products

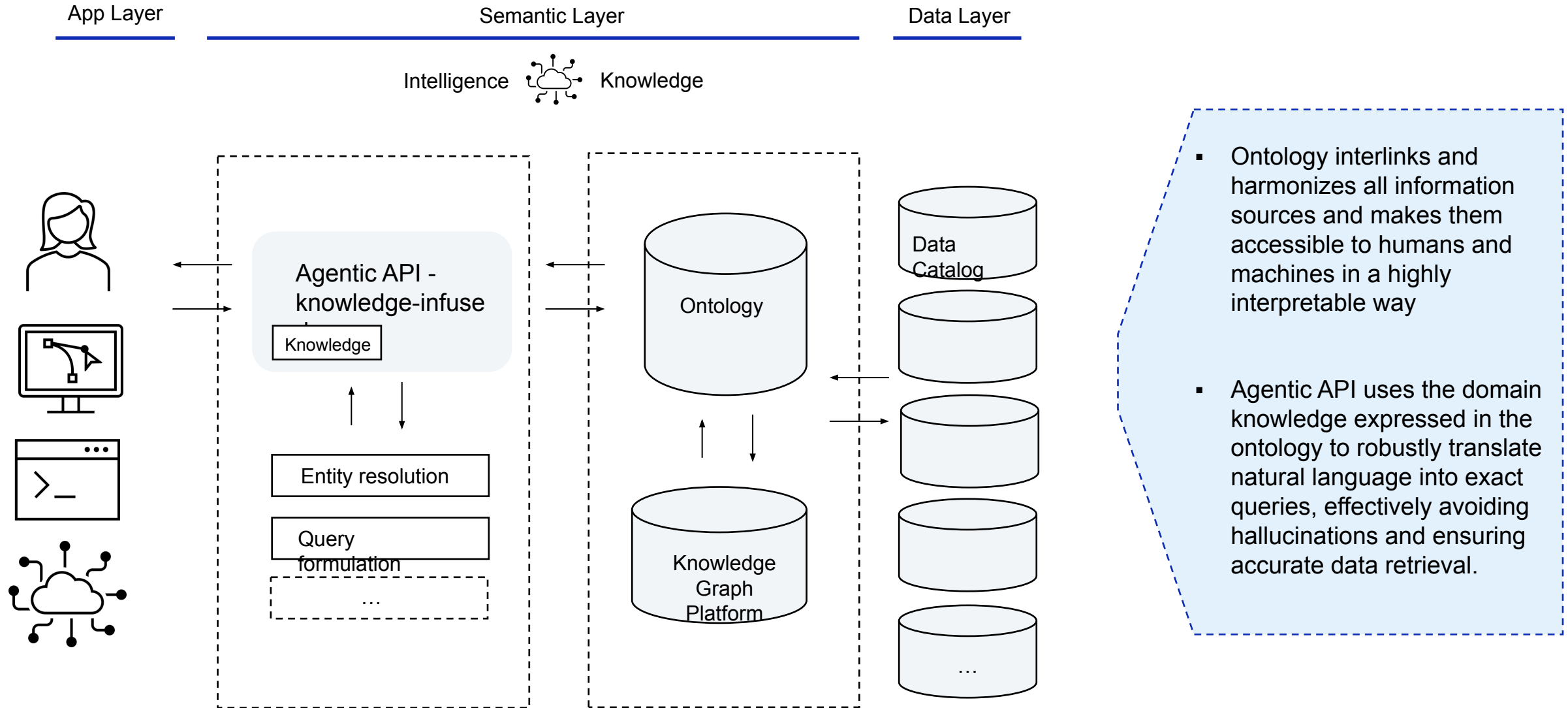
The Solution Framework

An innovative combination of different technologies



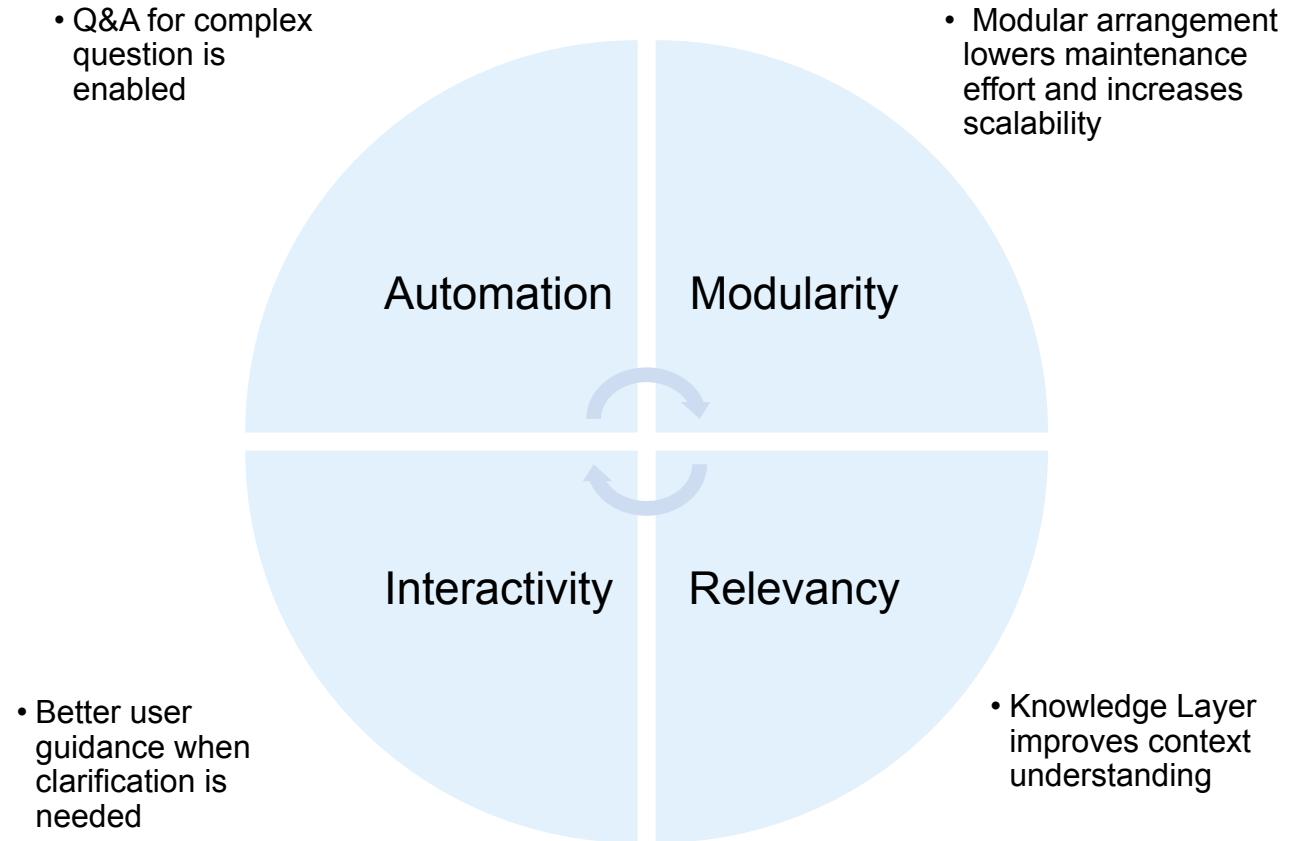
- + Intuitive exploration of available datasets
- + Semantic search powered by LLM
- + Scalable integration of data with their logical dependencies
 - ~ Difficult to use
- + Full transparency over databases and schemas
 - ~ No details on logical dependencies

Ontology-centric architecture enabling knowledge-infused agents



Unlocked Capabilities

- Scalable use of domain knowledge (abbreviations, synonyms, augmentation, etc)
- Effective solutions for complex multi-step problems
- Seamless integration of structured and unstructured information



“It’s 95% engineering, 5% AI”

01

Engineering vs. AI

- Integration is essential for seamless functionality
- Prioritize automated testing for quality assurance

02

Not everything needs to be automated in the beginning

- Prioritize value and feedback
- Ensure enterprise wide integration

03

Custom Solutions vs. Off-the-Shelf Products

- Build custom solutions for immediate needs
- Focus on domain knowledge as products evolve



Innovation thrives at the intersection of engineering & collaboration

Build an architecture that empowers your domain experts



I need effective tooling for developing GenAI agents and User Interfaces on top of knowledge graphs



**Application
developer**

I am an expert in my team's taxonomies but lack experience with formal ontologies



**Domain
modeller**

I need to map data into domain models and integrate it in applications but rdf is new to me



**Data
Engineer**

I am not a graph expert but like to analyse connected information and infer new insights.



**Knowledge
Worker**

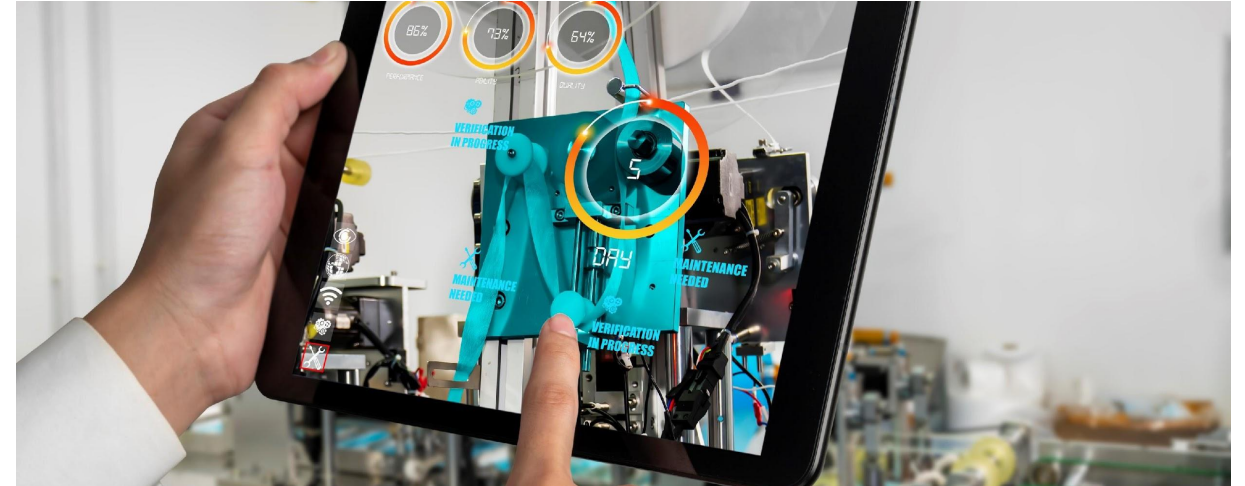
**Scale-out
Architecture**

What's next?

Some roadmap highlights

Technical scalability

- Multi-agent Architecture
- Universal Semantic Layer



Technical maturity

- From Pilot to MVP
- From solution to platform





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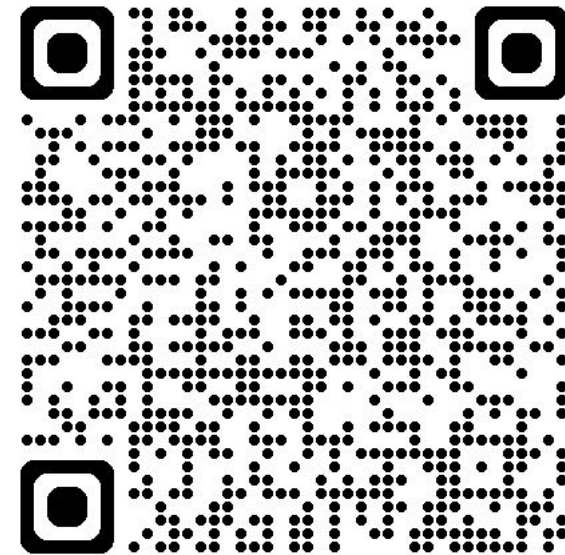


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Seeing beyond