



 **BASF**

We create chemistry

Digitalization in R&D – the BASF Perspective

Allotrope Connect, Ludwigshafen May 15th, 2024

Stefan Dreher, SVP Digitalization of R&D and Data Science

The digitalization of BASF started in 2015 and along the journey became a strategic action area for BASF

Get started

2015 - 2019

**BASF 4.0
ROM**

- ✓ Wake-up
- ✓ Awareness
- ✓ Vision

Professionalize & Scale

2020 - 2022

**Digital + IT
Digital Roadmaps**

- ✓ Build a solid foundation
- ✓ Decentralize & multiply
- ✓ Improve quality

Harvest & Accelerate

2023 -

“The New Normal”

- Implement broadly
- Focus on value
- Drive innovation

Top-down steering, Push

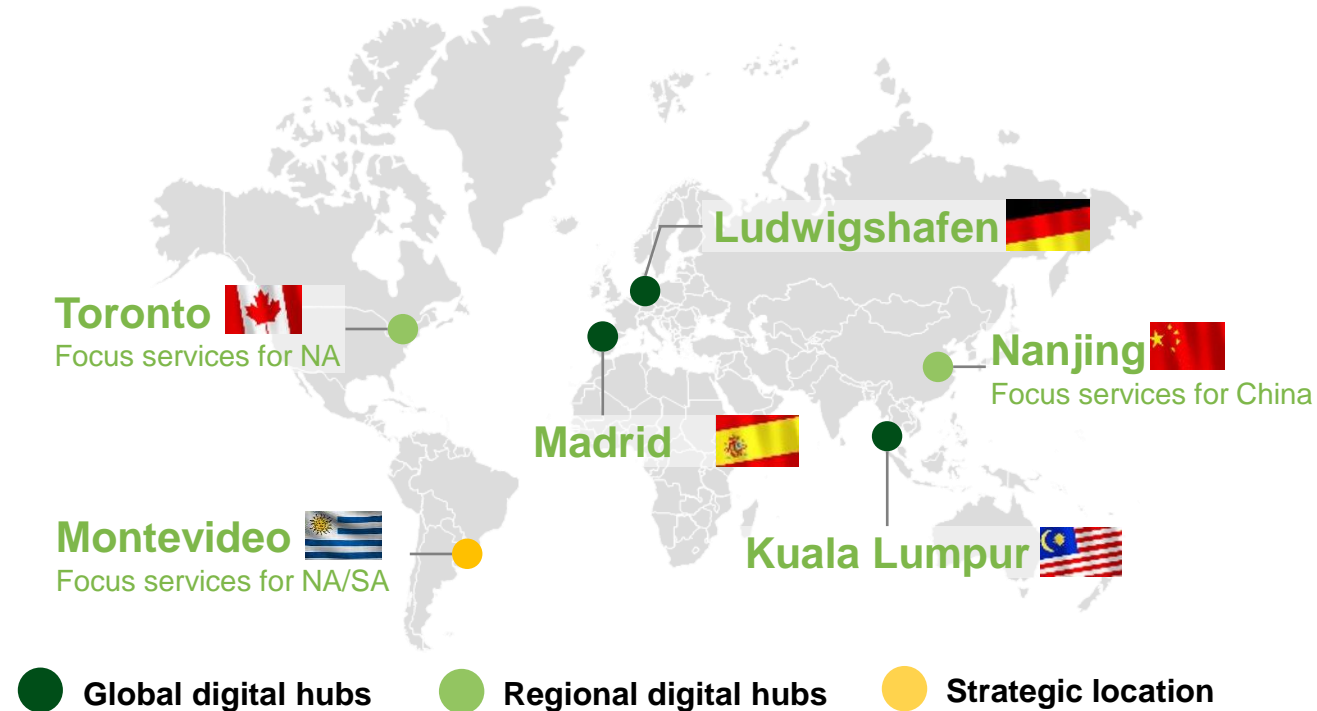
Bottom-up development, Pull

Global Footprint: Our target is to find the optimum balance between global standardization and local flexibility

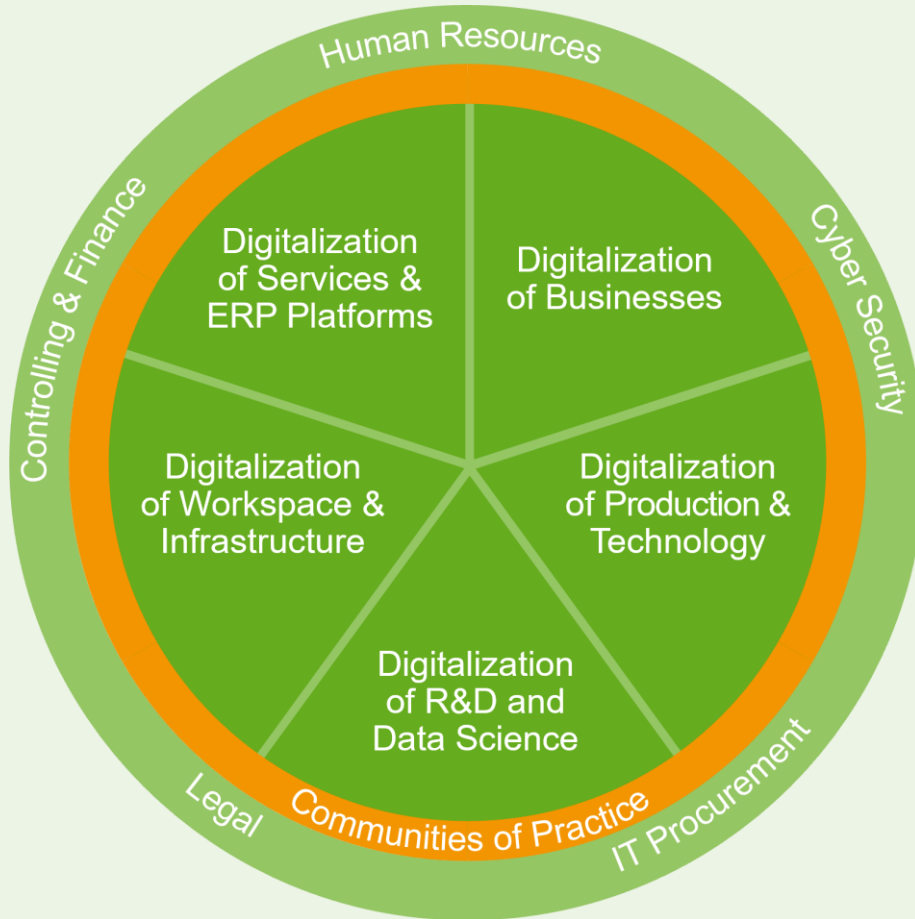
Key Elements

- **Digital Product Teams** in the lead for global steering
- **Digital Hubs** as cluster of experts from product families offering relevant capabilities for the digitalization of BASF
- **Digital Hubs enable the Make-over-buy** strategy by **insourcing** of high margin application development

Current global distribution of digital hubs



How we are organized in Global Digital Services



5 Segments

with

48 Product Families

with

248 Digital Products

Data & AI Powerhouse

Leading the journey to a data-centric organisation

Analytics & AI

- Differentiation
- Innovation
- Enablement

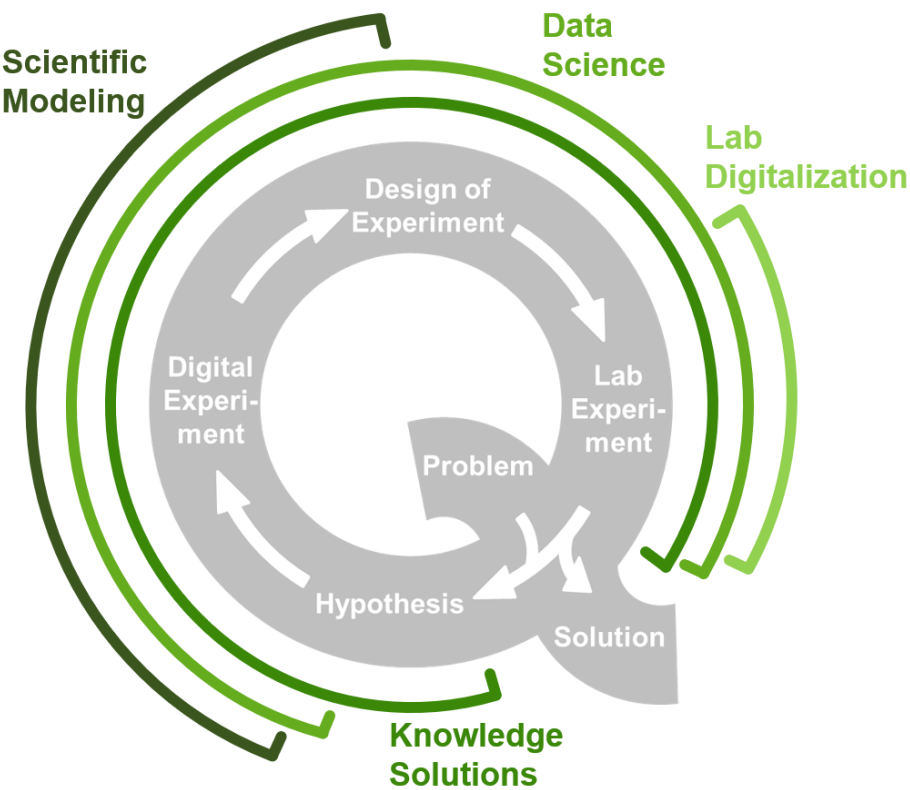
Data Excellence

- Content & Context
- Standardization
- Convenient Provisioning

Data Foundation

- Cost Efficiency
- Robustness
- Cyber Security

BASF Vision for R&D - Digital R&D with impact

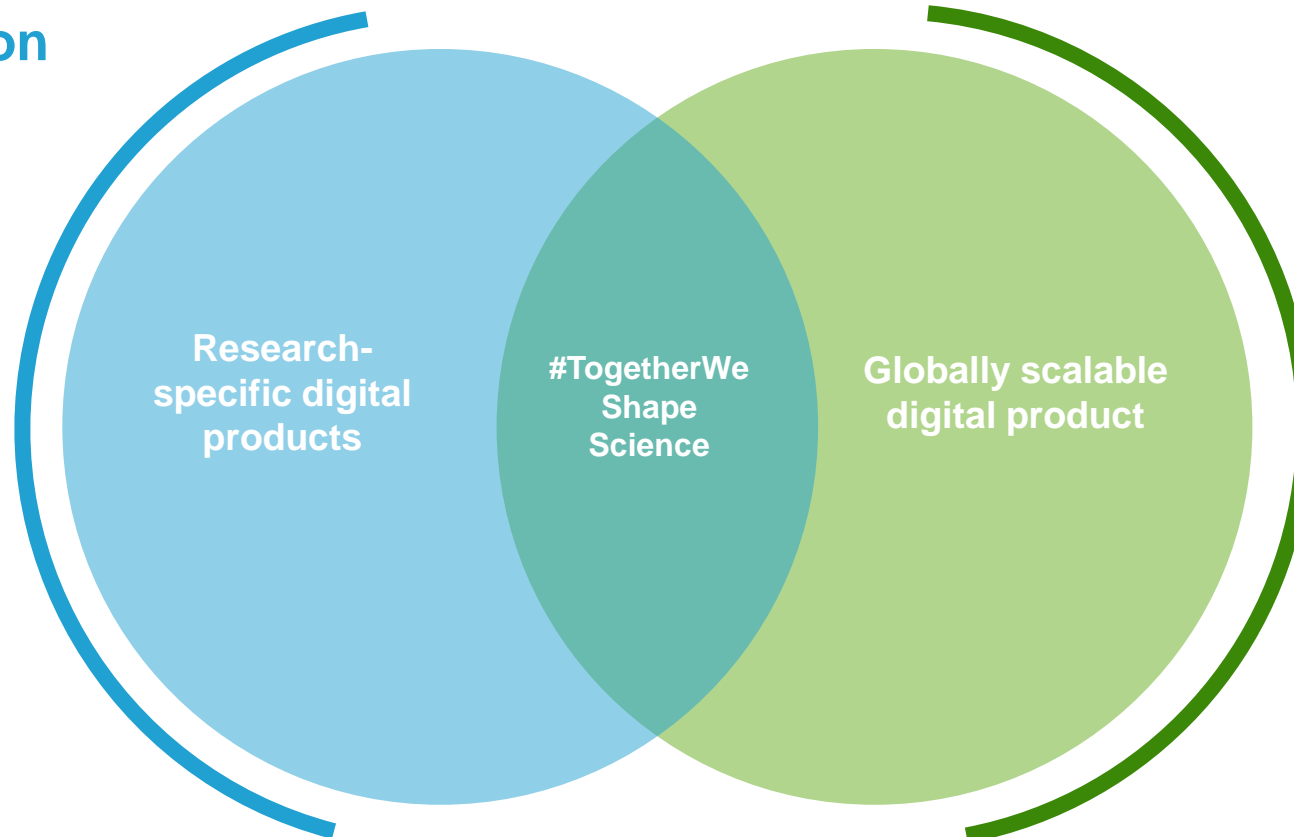


Our goal: Further enhance BASF's innovation performance and enable the digital transformation of BASF

Digitalization, Automation & Innovation Mgmt.



Alice Glättli



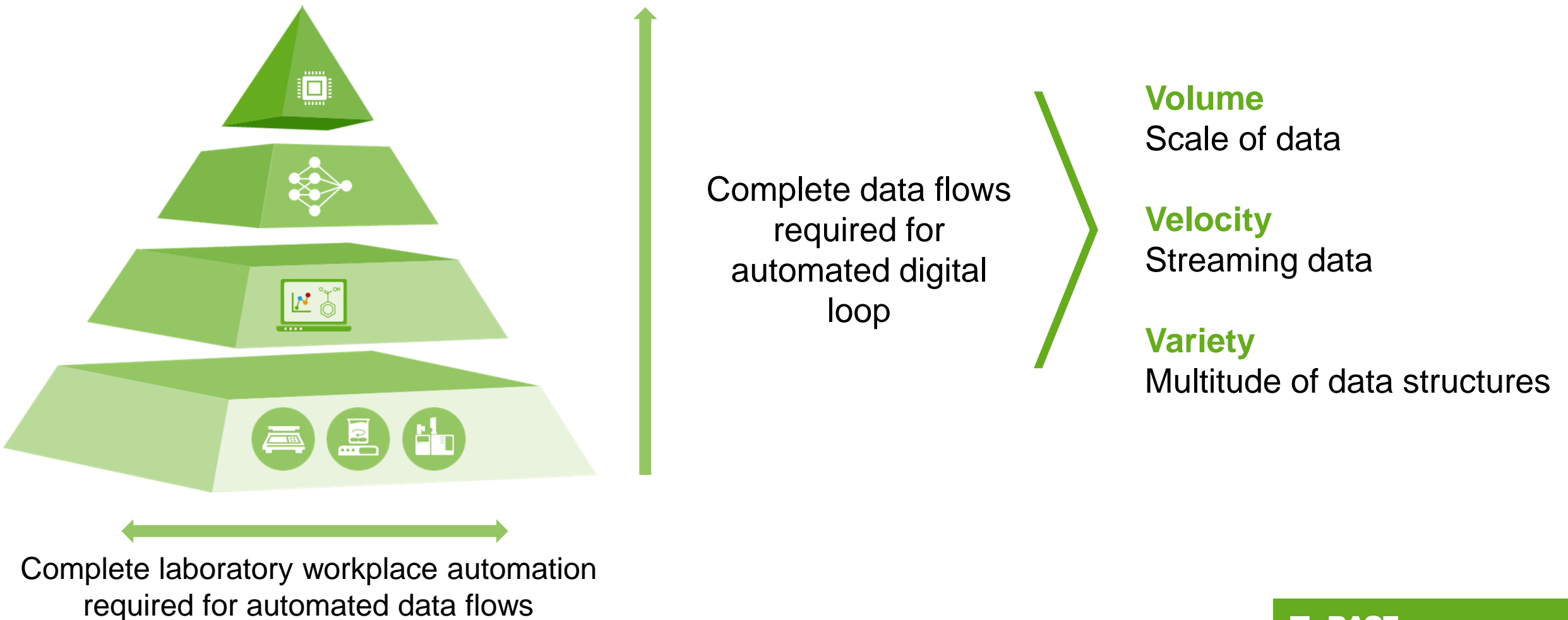
Digitalization of R&D and Data Science



Stefan Dreher

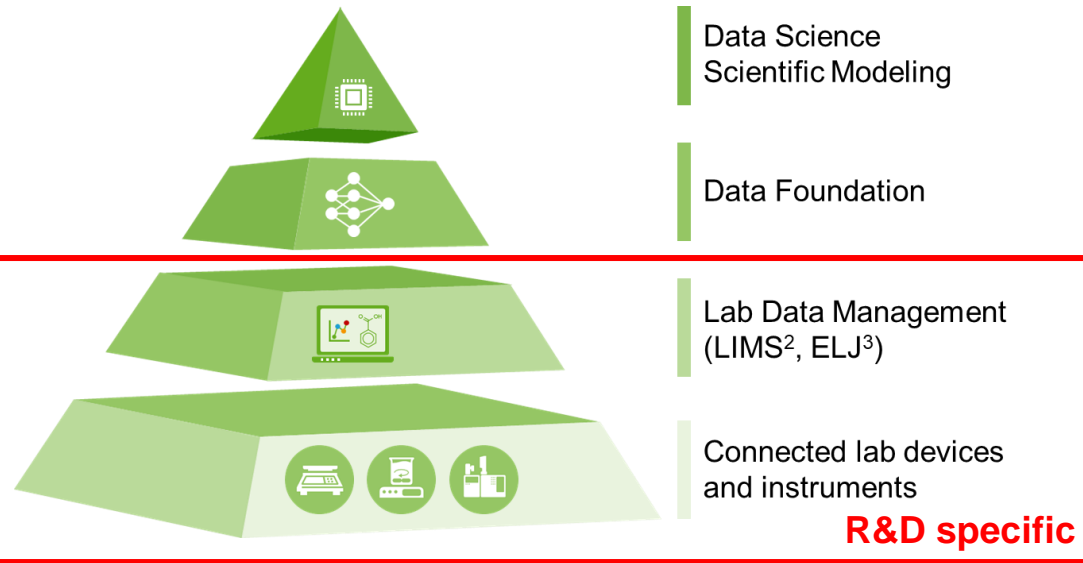
From laboratory digitalization to data science and modelling

Scaling challenges within the lab and along the data chain



From laboratory digitalization to data science and modelling

R&D Systems Verbund and Digital Lab enable seamless data flow



Optimization and innovation of digital solution landscape and laboratory support

Automized data capture and seamless data flows

Tailored solutions to meet specific¹ R&D needs

Together with the R&D Community we constantly enhance and optimize our digital solution space to streamline workflows and to generate new insights.

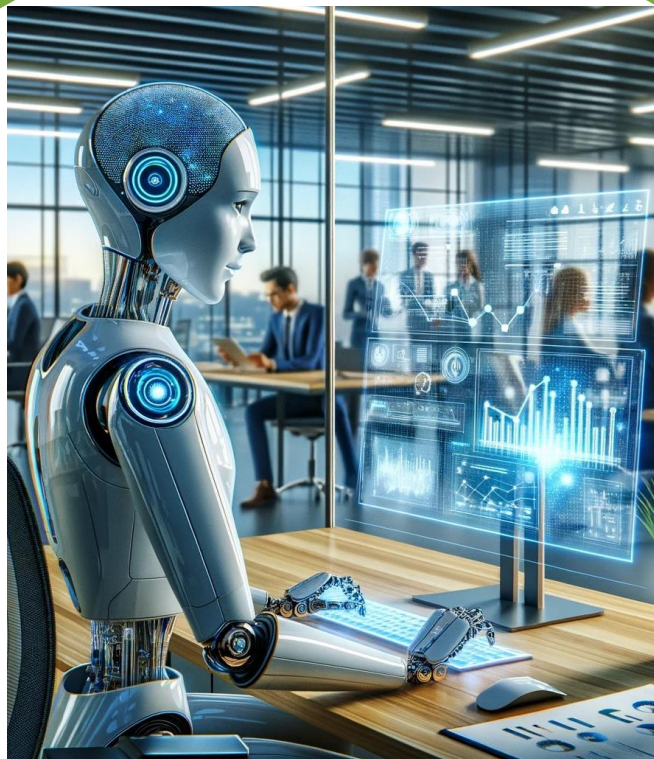
- 1) Incl. validated environments (esp. GLP *Good Laboratory Practice*)
- 2) Laboratory Information Management Systems
- 3) Electronic Laboratory Journals

How will R&D in future look like ?

Digital technologies are major change drivers

knowledge
assistants

lab
automation



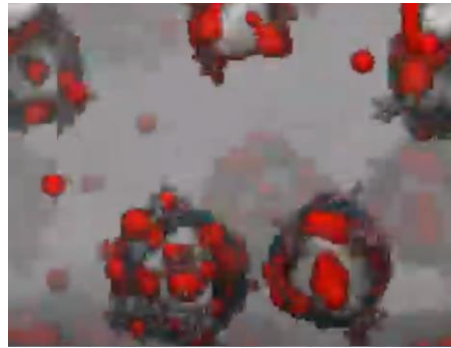
next-generation
computing

in-silico
chemistry

Next-Generation Computing

High-Performance Computing enables scientific excellence in-silico

With our supercomputer Quriosity, we are able to offer our researchers and developers computing power like no other company in the chemical industry.



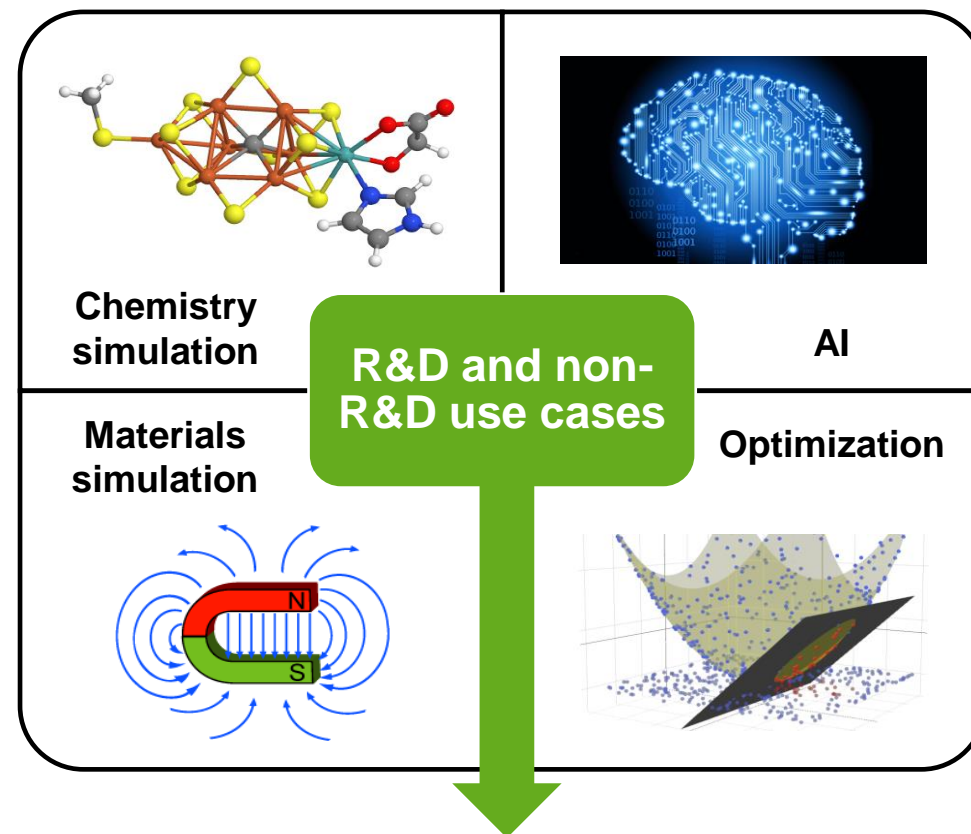
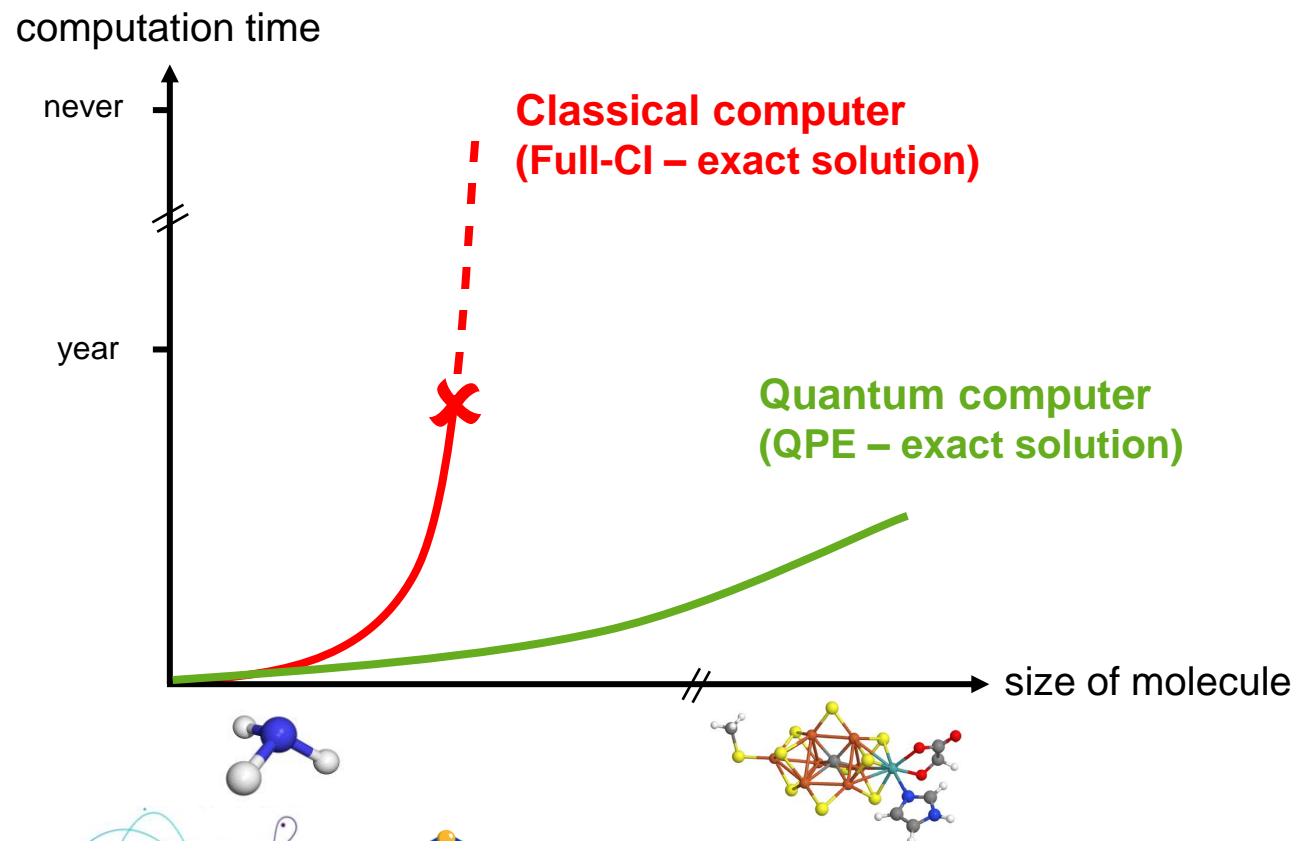
3
PetaFLOPs

For example, Quriosity supports our R&D teams in:

- explaining at molecular level how **detergent ingredients** work to better understand its properties which enables us to achieve greater innovation in a shorter period of time
- the **registration process of crop protection** products by calculating complex environmental simulations
- in predicting the quality of **new battery materials** earlier thus accelerating research

Next-Generation Computing

Quantum Computing will open up new frontiers in simulation & optimization



Accurate chemical reaction prediction, financial portfolio optimization, logistics, scheduling, ...



QKnows AI

Ask QKnows AI a chemistry question and it will analyze BASF research reports for an answer.

What do you want to know?



Examples

How can I thermally stabilize polyamide 66 at temperatures above 200°C?

What approaches have been used to formulate beneficial bacteria for agricultural applications?

Which industries use PAM flocculants?

What are galantine-free formulations for Vitamin A?

What are some examples of common HTPAs?

How can the bitter taste of ibuprofen be masked?



**"Nothing is more powerful
than an idea whose time
has come"
(Victor Hugo)**



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