4OPCM - #CMMASTERS

Vibration Monitoring @ Bayer

E&T - Asset Life Cycle Management &
IT - Digital Manufacturing

„Health for all, hunger for none“

Bayer‘s organizational structure

Vorstand

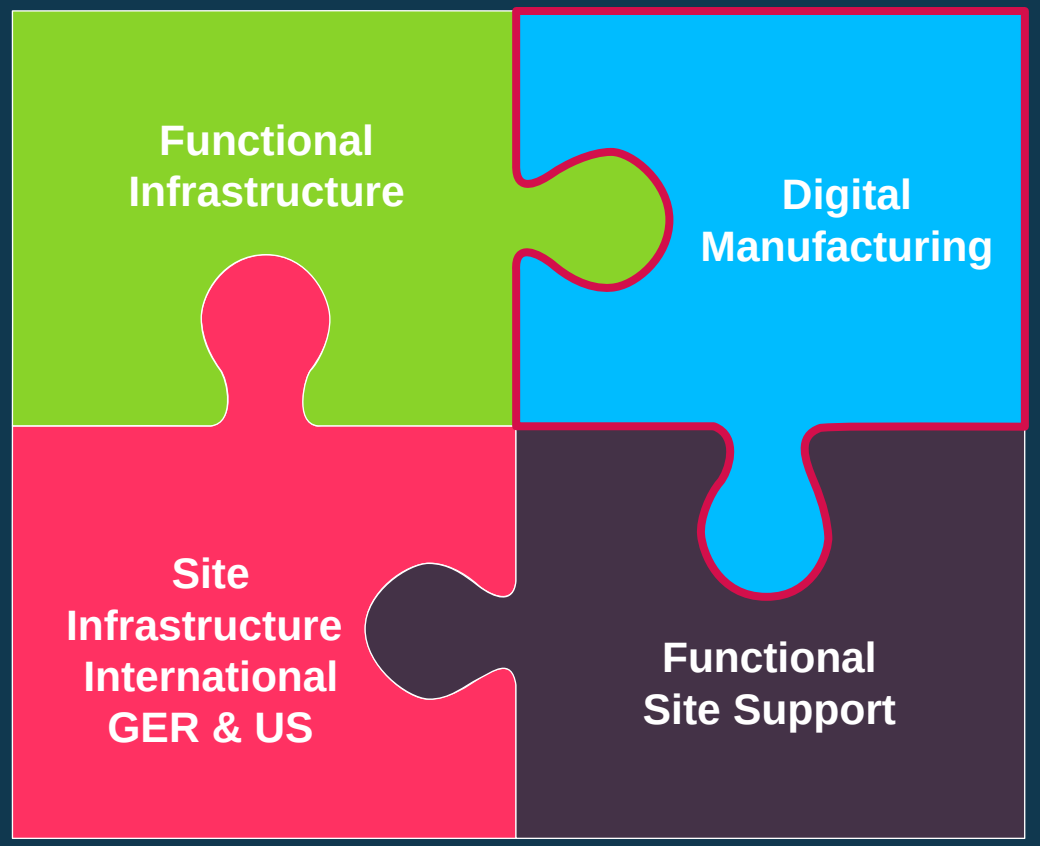
Crop Science | Pharmaceuticals | Consumer Health

Enabling Functions

Communications	Controlling	Corporate Health, Safety and Environment	Corporate Office
Corporate & Pharmaceuticals Quality	Enabling Functions Transformation and Controlling	Engineering and Technology	Group Finance
Human Resources	Internal Audit & Risk Management	IT	Law, Patents and Compliance
Mergers, Acquisitions and Licensing	Procurement	Public Affairs & Sustainability	Regional Coordination
	SSCDN	Strategy & Business Consulting	

Bayer‘s Site Digitalization ensures the Product Supply and R&D sites are provided with the right IT for OT and Digital Transformation

Digital Manufacturing supports the digital transformation of all Bayer PS sites through:



Site Digitalization teams

- Digital maturity assessments
- Digital roadmap development
- Data integration shop floor to cloud
- Operator focused applications (self service analytics, digital checklists)
- Center of Competence for AR/VR
- IoT applications like energy monitoring, electronic labels, and smart labels

Unit ALCM - Asset Life Cycle Management within E&T

Collaborating with our partners we support production sites in growing work processes, best practices/tools and skills.

CS

one PSS

PSS

PH & CH

- Design for Reliability
- Shop Floor Orchestration
- Standardization & Spare Parts

→ **Reliability & Maintenance**

- Condition based Monitoring
- Predictive Maintenance
- Downtime Analytics

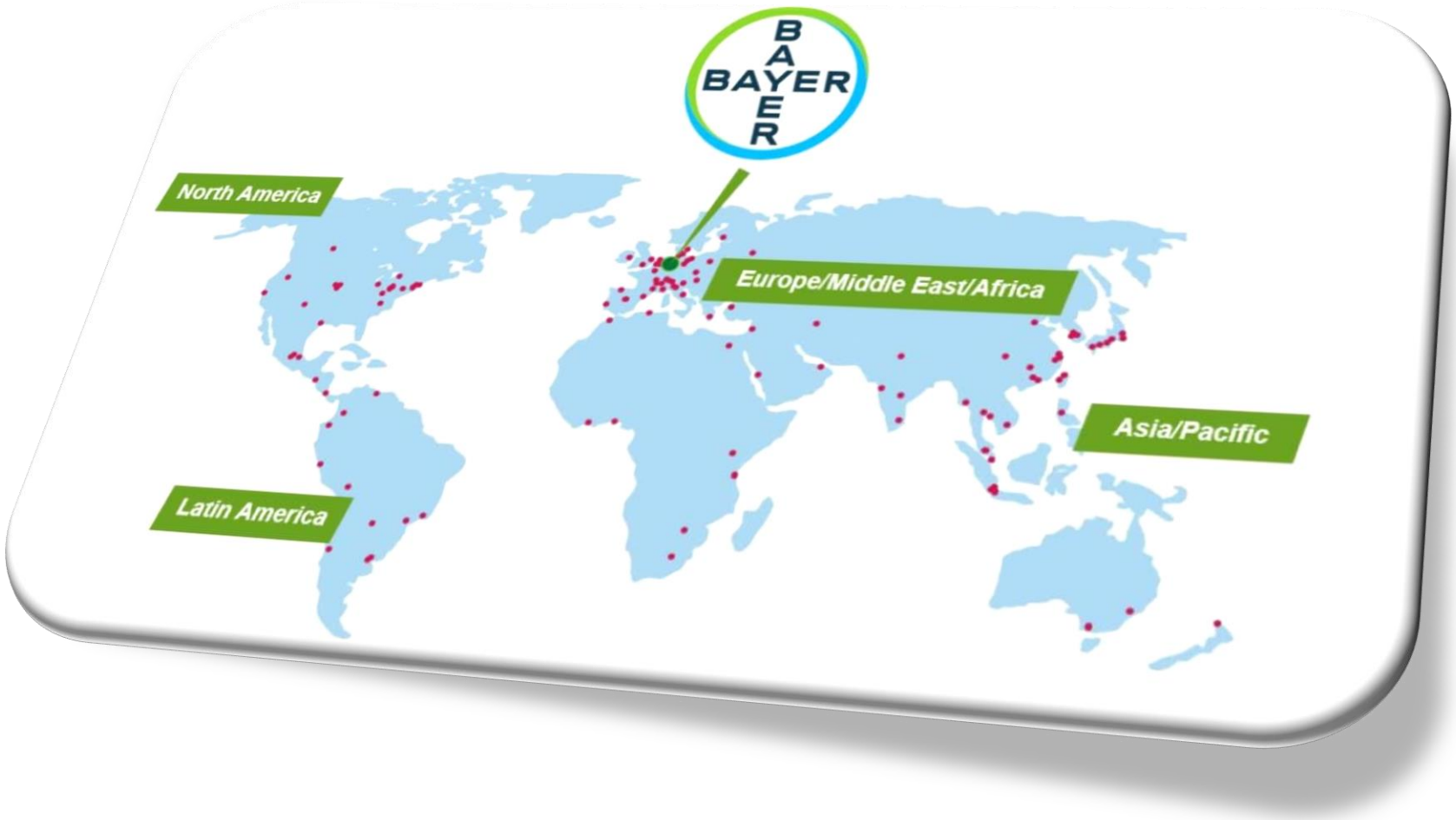
→ **Digitalization**

- Materials Selection
- Defect Analysis
- Inspections

→ **Materials Engineering**

→ ***Optimum asset availability and total cost of ownership***

Bayer is a Multinational Company in Life Science with a Variety of Locations, Sites and Assets



Sources: York, Piller, Hürner Funken, Gebhardt, Klaus Union, Reitz

We Started in 2021 with a Goal and a Vision…

Pilot Project: Concept for Predictive Maintenance in Leverkusen Pharma HVAC

Primal Goal

- Ensuring availability of HVAC fans with condition monitoring
- Vibration measurement
- Integration of vibration data into different systems

Vision

- Enable new data analytics dimensions to make predictive maintenance possible
- Develop a **flexible** and **scalable End-to-End** solution for all Bayer divisions

Source: Gebhardt

…Created an Approach for an End-to-End Solution for Condition-based and Predictive Maintenance...

What sensors should we use?

How can we identify anomalies and create corresponding events in SAP Facility and Asset Management?

Sensor Hardware/ Software → **Data Integration** → **Event Handling & Data Analytics** → **Operator Notification**

How to connect devices compliant with the network blueprint and IT security?

How can we inform operators about anomalies & events concerning their equipment?

..Our Journey leads to Intensive Test and Evaluation Series…

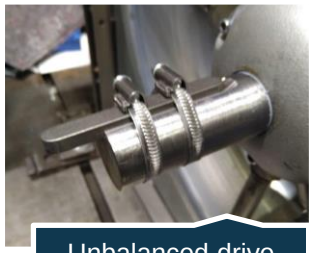
Evaluation of different vibration measurement solutions from different suppliers

- Seven different supplier solutions
- We considered:
  - Technical features and capability
  - Economic perspective
  - Service packages
  - IT – Connectivity

Test Fan Failure Scenarios

Outer ring damage

Ball bearing damage

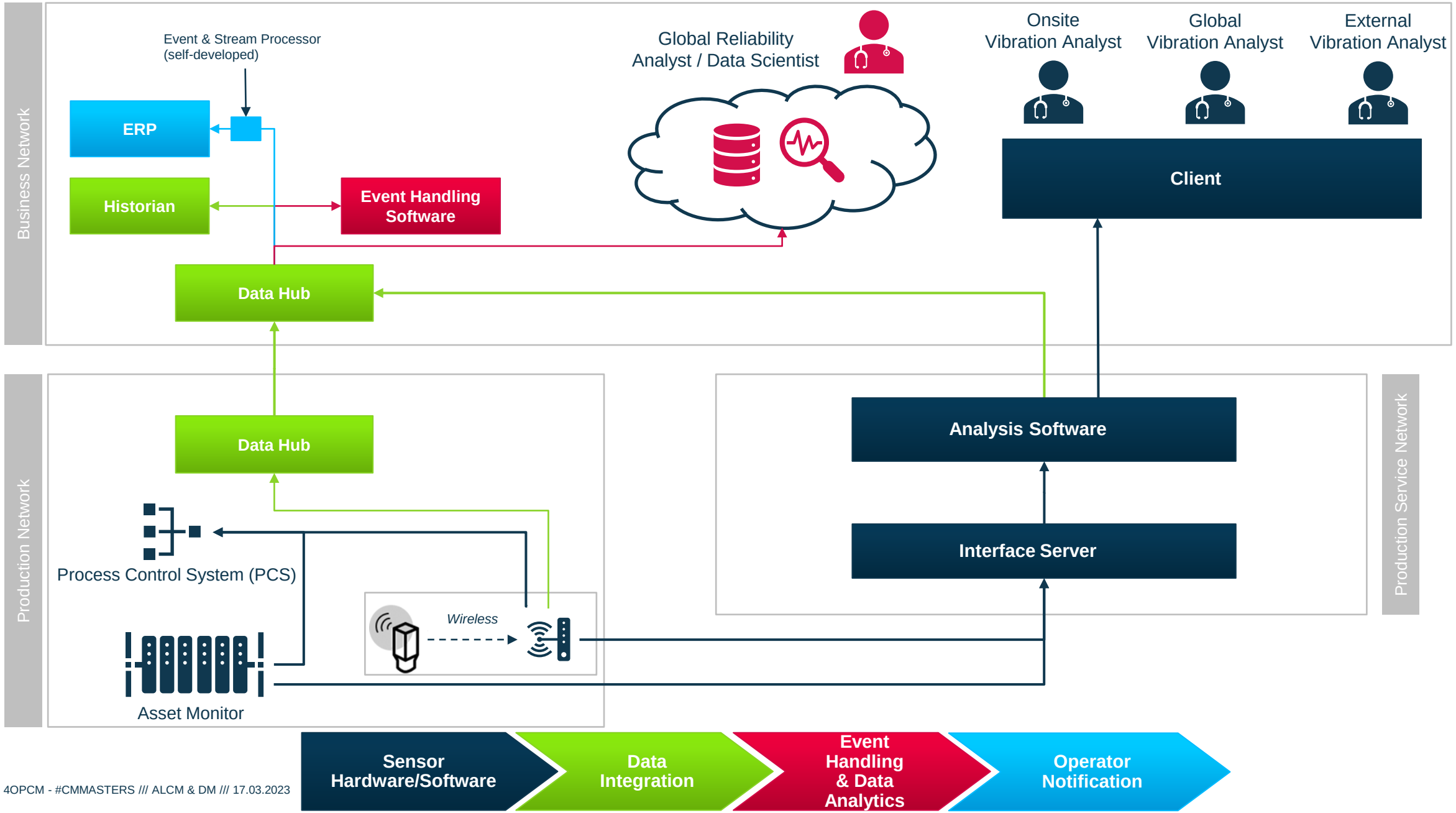


Unbalanced drive shaft

Loose belt

Sensor Hardware/Software

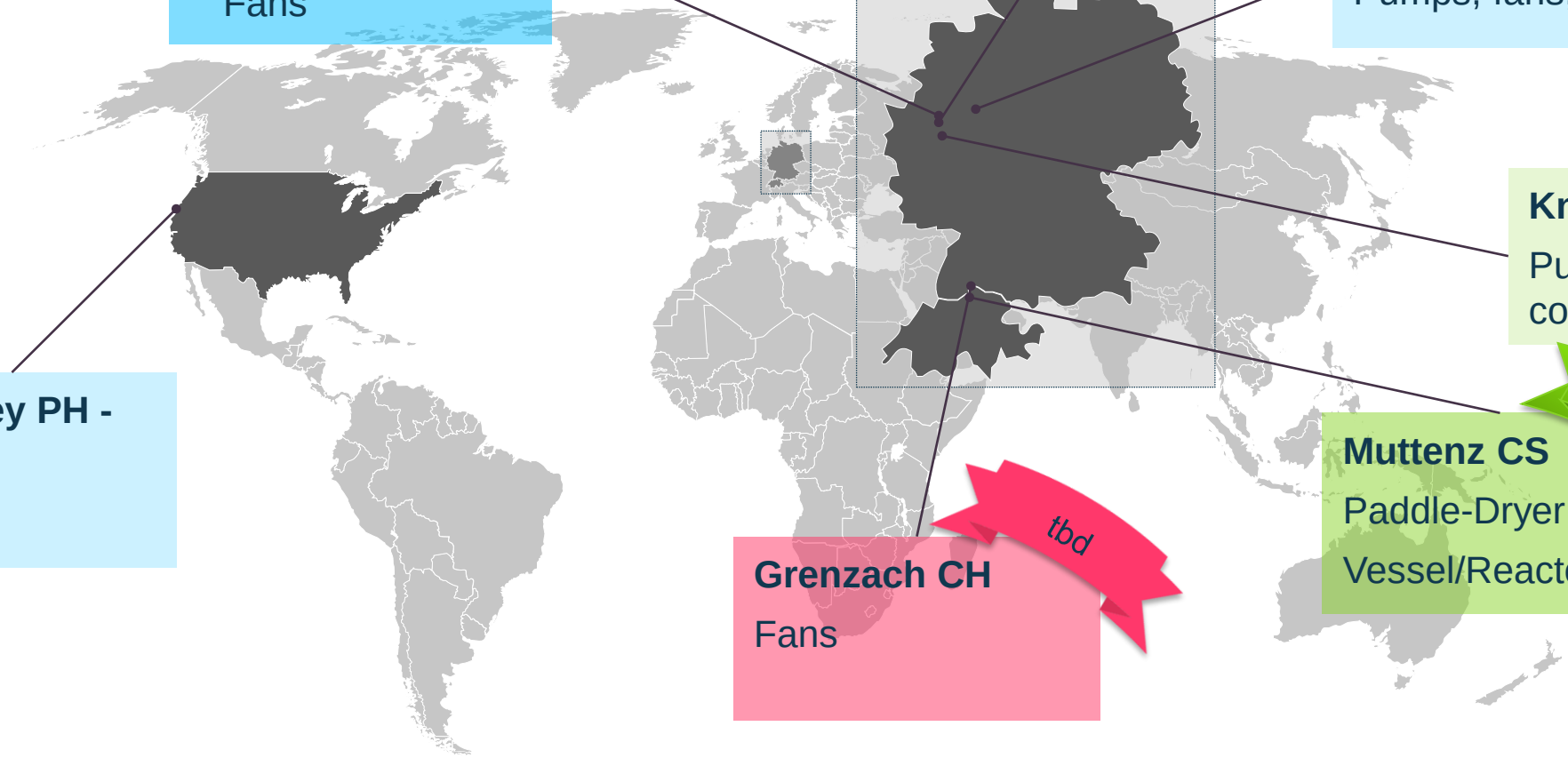
…And we Developed a Global IT-Architecture for Vibration Monitoring…



Status Quo: We are Working on a Vibration Service Solution for Bayer…

- **Prevention and reduction** of **unplanned downtimes** for assets (production stops)
- Support in **planning what assets to monitor to the final operation** including an automated operator notification (**End-to-End**)
- A **flexible**, **fast, cheap, and easy deployment** of different **online vibration measurement** solutions across all **divisions, sites & regions**
- An **easy & user-friendly IT integration process** into the Bayer network, supported by ALCM, DM and Service Provider
- **A compliant IT integration** according to Bayer **IT-Security** requirements

.. Different Sites at CS, PH and CH Working with us together



Leverkusen C207
PH - Operations
Fans

Pilot Site

Leverkusen SOL-1
PH – Operations
Pumps, fans

Bergkamen PH – API
Pumps, fans, centrifuges

tbd

Knapsack CS
Pumps, fans, compressors

Pilot Site

Muttenz CS
Paddle-Dryer
Vessel/Reactor

Berkeley PH - Biotec
Fans

Grenzach CH
Fans

tbd

Thank you

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