AVEVAWORLD

Future proof blueprint for industrial excellence through data analytics

AVEVA World 2025 / Christiane Billing / April 2025

Bayer at a glance

Group key data

3 divisions
// Crop Science
// Pharmaceuticals
// Consumer Health

Represented by 291 consolidated companies in

80 countries

92.8k
employees worldwide in 2024*

6.2 *Mrd. €*
investment in R&D in 2024

46.6 *Mrd. €*
sales in FY2024

Tackling two of the most pressing challenges of our time: **health & nutrition**

Diverse, international focus with cross-border and cross-division **people development**

Health for all, Hunger for none

* As of December 31, 2024; employees in full-time equivalents

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Uncover hidden potential to initiate process improvements directly on site

Business requirements

Data

// Fast and historical **access** to data

// **Collected** from plants **globally**

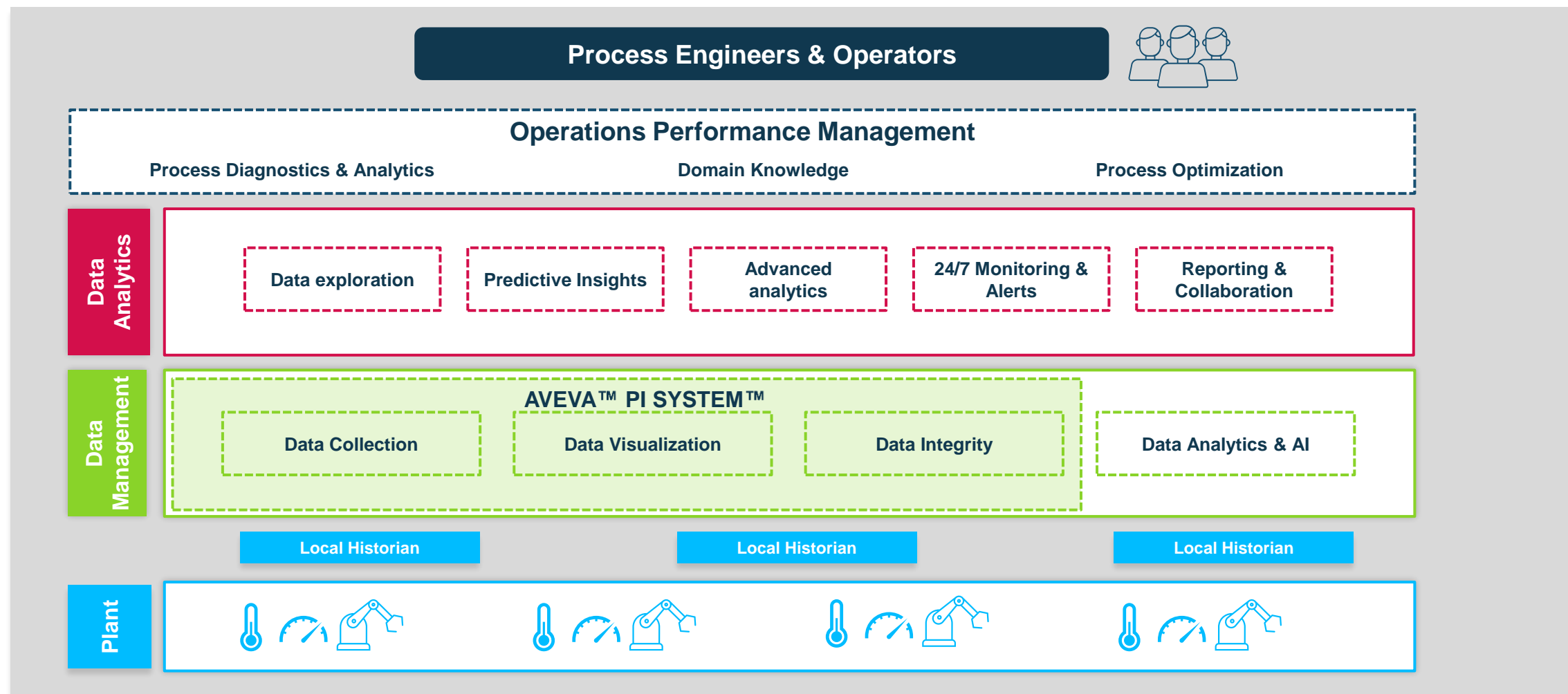// Easy **visualization** and **exploration** (navigating & search)

People

// Usable by plant **operators** & **engineers**

// Empowering production shopfloor with data analytics without relying on scarce data experts

// Utilizing domain knowledge of users
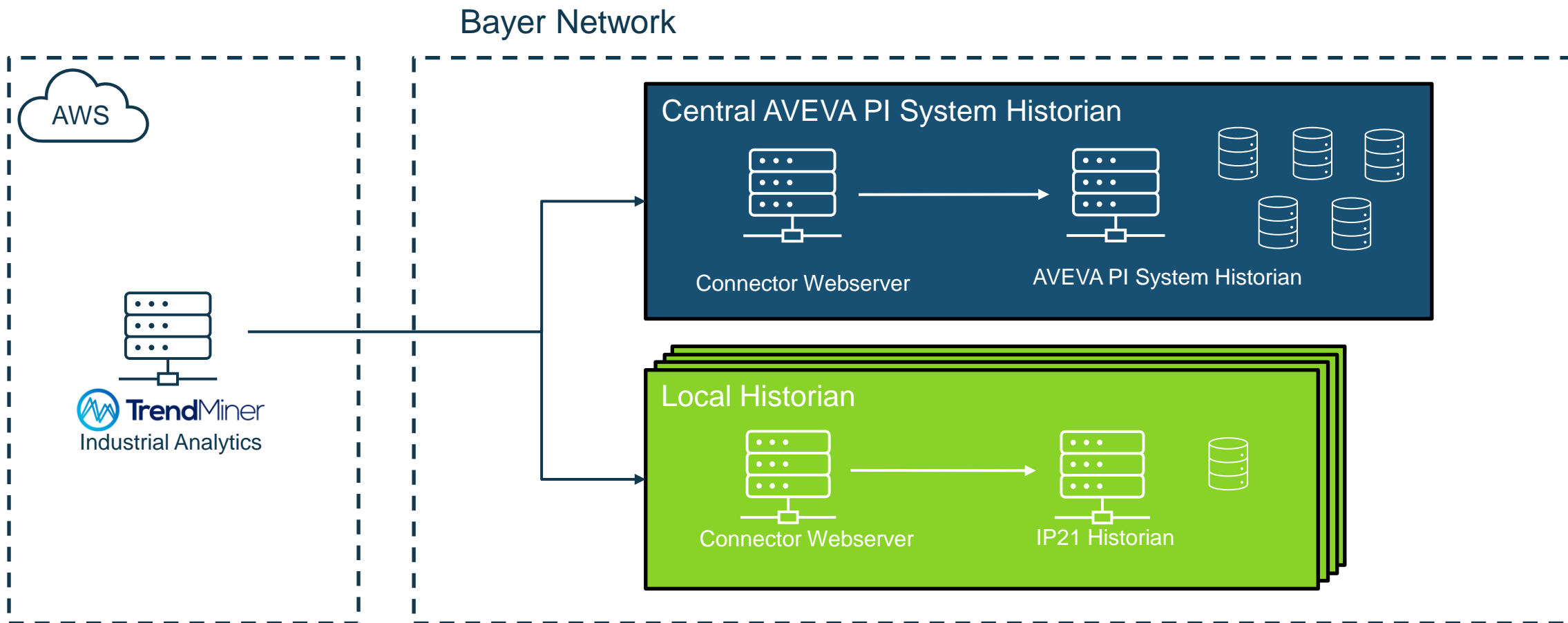
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Three layered blueprint / approach to empower production teams to make data driven decisions

Process Engineers & Operators

Operations Performance Management

Process Diagnostics & Analytics | Domain Knowledge | Process Optimization

Data Analytics

| Data exploration | Predictive Insights | Advanced analytics | 24/7 Monitoring & Alerts | Reporting & Collaboration |

Data Management

AVEVA™ PI SYSTEM™

| Data Collection | Data Visualization | Data Integrity | Data Analytics & AI |

Local Historian | Local Historian | Local Historian

Plant

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Connecting the dots: data infrastructure from site to cloud

Scalable data infrastructure ensures fast roll-out

Bayer Network

AWS

TrendMiner
Industrial Analytics

Central AVEVA PI System Historian

Connector Webserver

AVEVA PI System Historian

Local Historian

Connector Webserver

IP21 Historian

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Transformative roll-out: Implementing successfully the blueprint for comprehensive Site Integration

Implementation approach with strong focus on site-specific use cases and immediate value

First information:

// Content:

   // Approach

   // System live demo

   // Use case examples

Definition of participants

// Use case related

// Site organization (e.g. maintenance, quality, HSE)

Stabilize adoption

// Support use cases

// Advanced training

// Benefit tracking

// Community

Preparation → **Training** → **Hypercare**

Identification of potential use cases

// Use case selection for training

// 1-Pager per use case

Initial training

// Typically takes 3 days (depending on predefined use cases)

// Day 1: Tool introduction
Day 2+3: Solving first use cases

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Successful global roll-out of TrendMiner confirmed by multiple use cases realizing process optimizations and cost reduction

27
Production plants

500 +
Users working data driven

500 K +
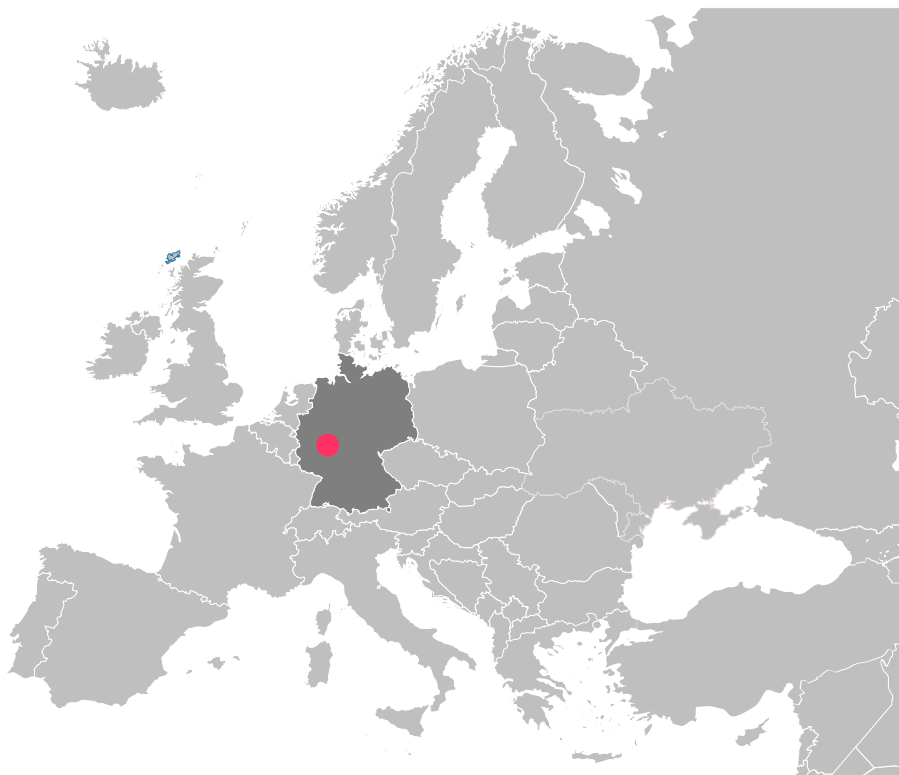Connected Tags

90 +
Use Cases

450 +
Monitored assets / processes

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High-value generating use cases were achieved across all regions

Example of one of the latest fully implemented use cases

Knapsack (Germany)
Active Ingredients - fungicide

Increased demand
Established process

Process optimization required

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Optimizing a continuous distillation

Starting conditions

// Batch distillation with Propanol
// Cycle time correlated to distillation
// Reflux ratio to control quality of distillated propanol

Challenge

// Reduce steam consumption
// Minimize cycle time to increase output

Reflux

Distillate
(Propanol)

Reaction
mixture (feed)

Steam

Residue
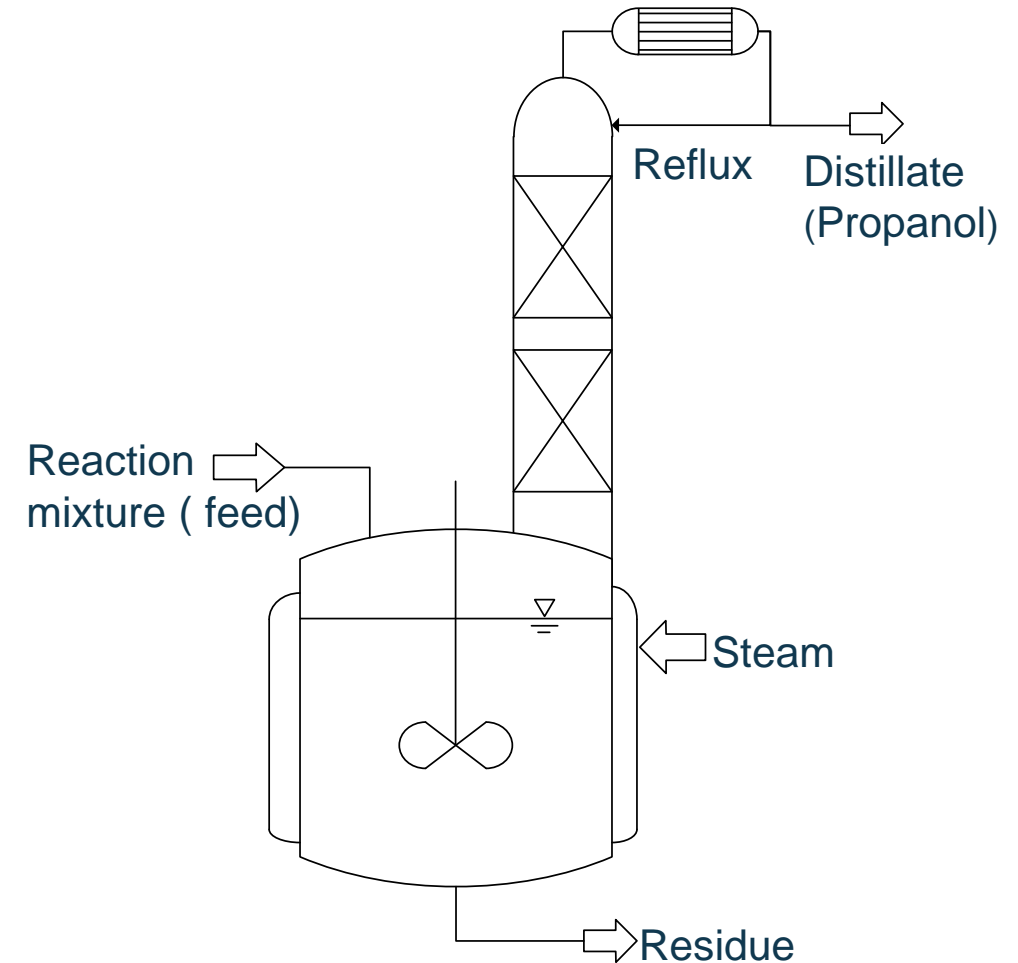
# Analyzing 2000+ batches to enhance efficiency and identify root causes

Analysis Phase

// Analysis of > 2000 batches (good & mediocre)

// Statistical data analytics to understand correlation and various states

Observations

// Process varies significantly between different batches

// Two distinct states identified

Possible root causes

// Amount of propanol in reaction mixture too high

// Incorrect measurement of distillate

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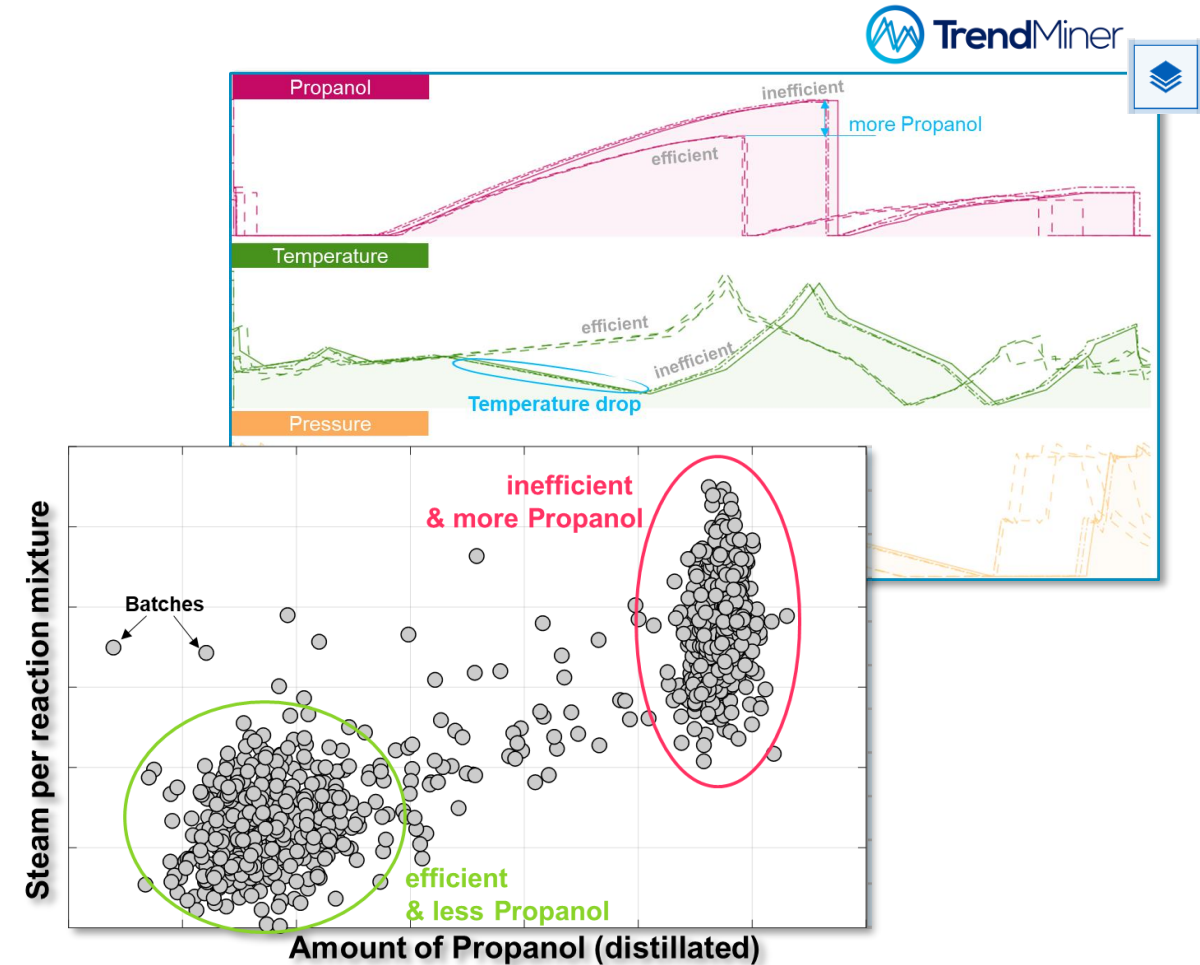
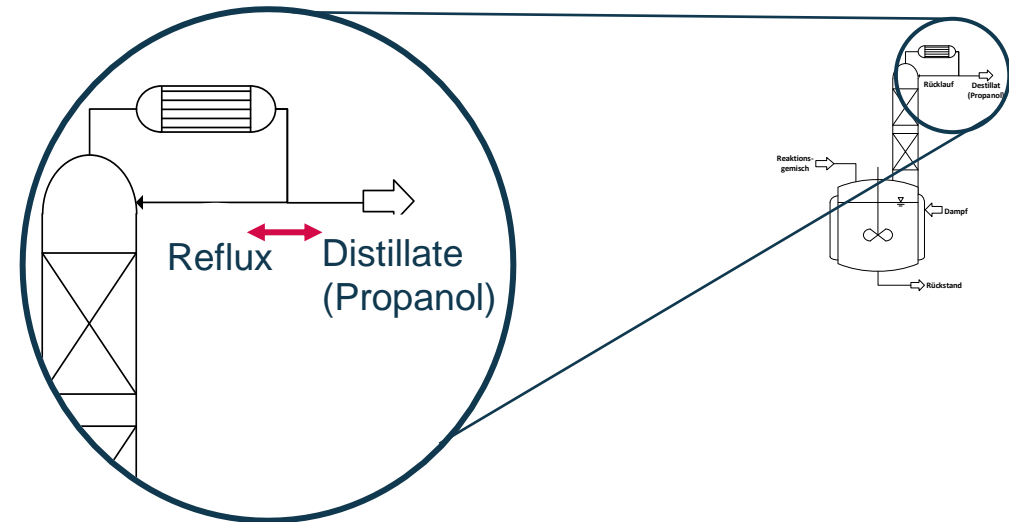# Modifying process control to optimize steam quantity

Process Optimization

// Independent process control

    // decoupling the process control from the measurement of distillate

// Reflux regulation based on steam quantity

Monitoring

// Definition of Golden Batch

// Set up dashboards to monitor at a glance

// Set up monitors to for alerts in case of deviations

Improvements

// Capacity increase by **36 %**

// Energy efficiency increase by **26 %**

Reflux   Distillate (Propanol)

Rücklauf   Destillat (Propanol)

Reaktions-gemisch

Dampf

Rückstand

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Global impact of rolling-out the blueprint since 2021

Kansas City

Soda Springs

Muscatine

Luling

Tlaxcala

Antwerp

Dormagen

Knapsack

Frankfurt

Muttenz

Vapi

Camacari

Seed ProductionTeam

FFP LATAM group

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Empowering production teams to tackle future challenges

High adoption rate ensures discovery of further optimization use cases

Next Steps

// Integrating additional data sources for a comprehensive 360° view of operations.

// Enhancing skills through advanced training to expedite data-driven decision making.

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Bayer maximizes production efficiency without capital investment
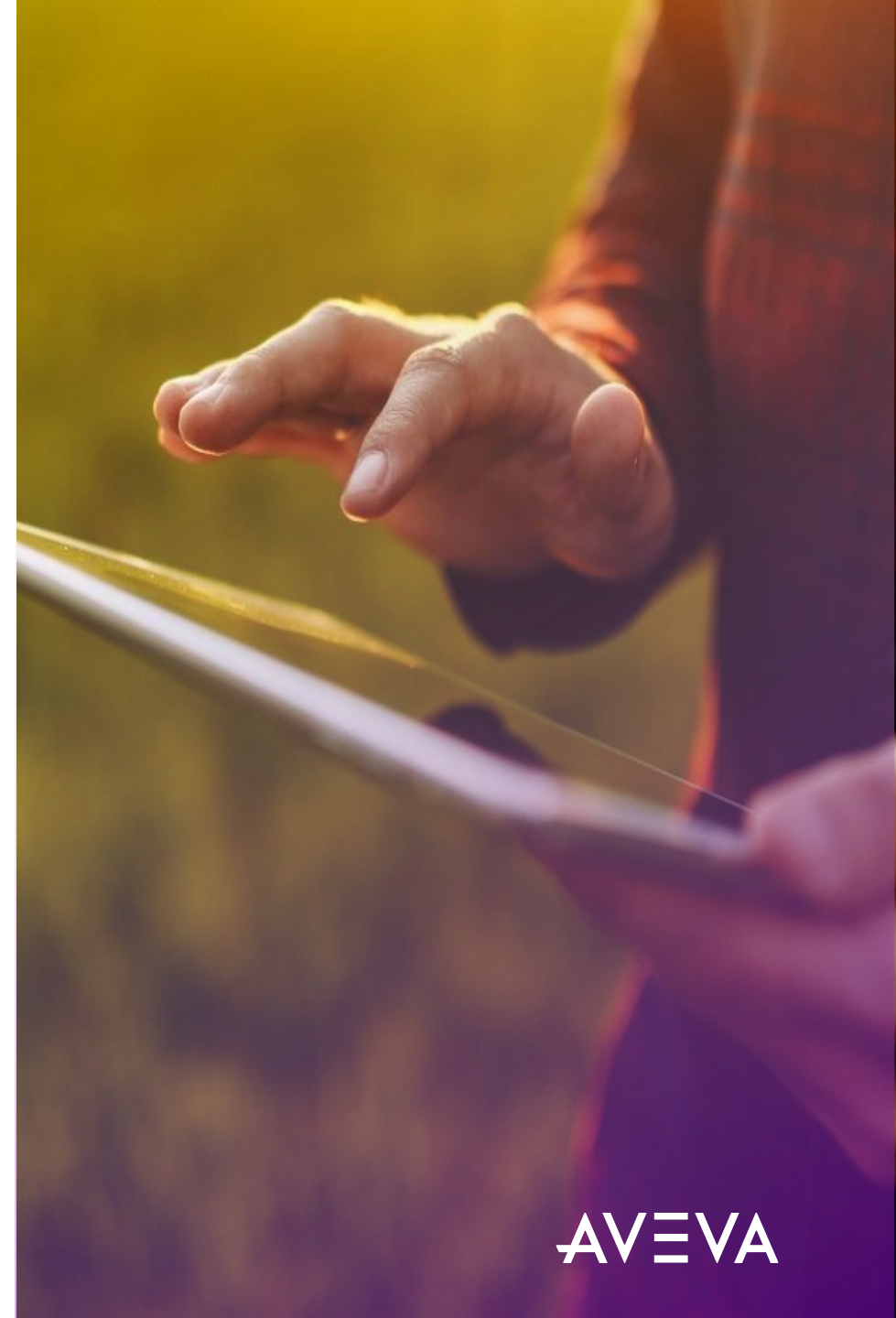
Challenge

- Demand exceeding production, increase needed while remaining compliant
- Globally located and remote sites
- Production data often used in a descriptive manner

Solution

- Global data management with AVEVA™ PI System™, combined with TrendMiner industrial analytics to drive data driven decision-making for everyone in operations.

Results

- **Globally connected 27+ production plants
  Unlocking better process understanding at operational level and driving data driven decision-making**
- **Increased production capacity by 36% and improved energy efficiency by 26%** (Germany)

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