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PROCESS MONITORING & CONTROL
#allin

Monitoring Fermentation Plant Batch Cycle Times in Real-Time

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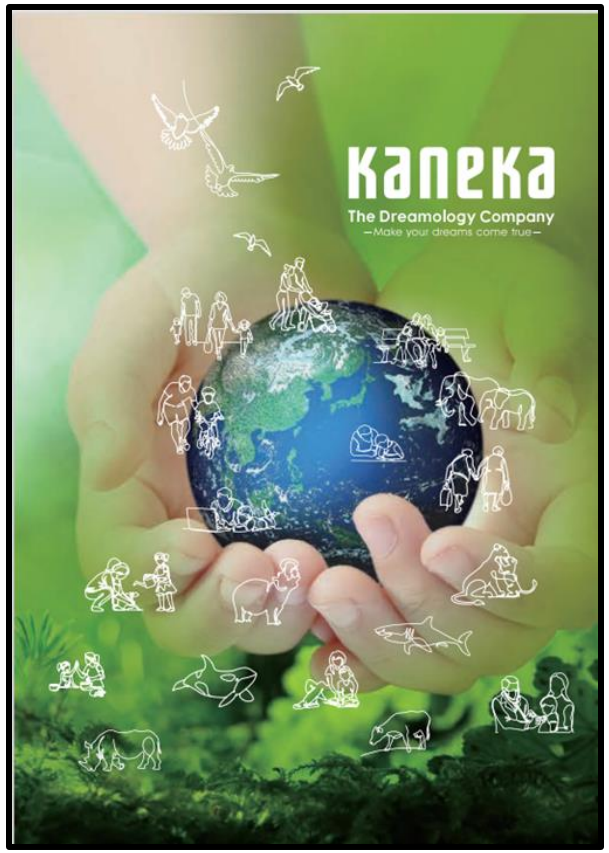
Kaneka



- We are a Japanese multinational manufacturing company established in 1949 with a global revenues of $5 billion. We manufacture chemical products including resins, pharmaceutical intermediaries, food supplements, synthetic fibers, fine chemicals, polymers, fermentation, biotechnology and electronics, and other fields.

- Our 8,400 employees are meeting our customer needs on all continents; Our company has operations in Japan, United States, Belgium, Germany, Singapore, Malaysia, Australia, China, Vietnam, India, Taiwan and South Korea.

- We started operations in the United States in 1984, our manufacturing facilities are located Pasadena, Texas; Benicia, California; & Cincinnati, Ohio.

Presentation Focus: Real-time monitoring of a fermentation process

Presentation Overview

- Introducing the challenge & benefits
  - Real-time process monitoring

- Solution Development
  - Initial status: Manual monitoring
  - Initial solution: Monitoring using Excel macros
  - Final solution: Real-time monitoring using Seeq w/ auto-generated reports

- Solution Deployment
  - Seeq tool highlights, Tips for successful implementation

- Conclusion

Process Monitoring of Batch Cycle Times

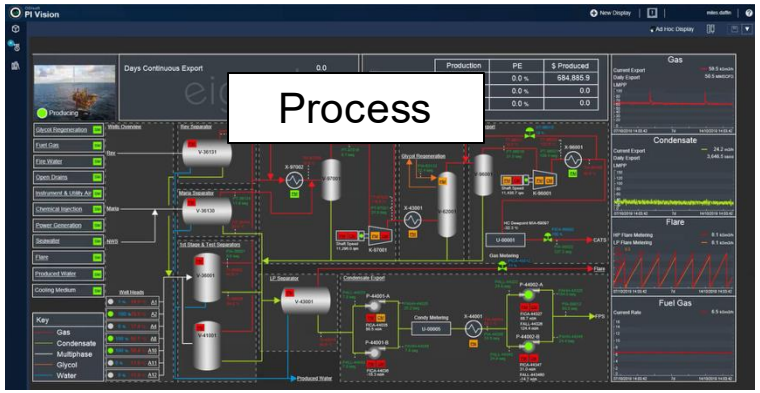
- How many operate batch processes?

- Benefits of real-time monitoring of batch processes?
  - Overall visualization of plant operation and status
  - Identification of process anomalies
  - Quicker process troubleshooting
  - Predictive maintenance opportunities
  - Impurity identification and elimination
  - **Proactive vs reactive action**

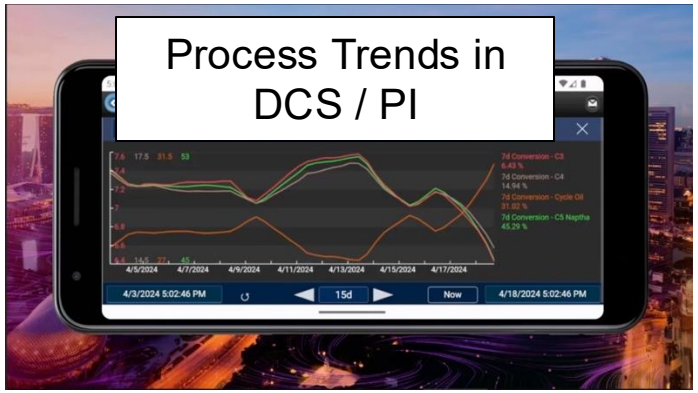
- DCS is great for day-to-day operation, but overall plant visualization integrating data from multiple data-sources provides several benefits

- **Sample benefits**: 25% reduction centrifuge cycle time through filter washes, AI for translation / quicker implementation of tasks, reduction in DCS support

Process Monitoring – Traditional Approach (Manual)



Source: https://www.aveva.com/en/products/aveva-pi-vision/



Source: https://www.aveva.com/en/products/aveva-pi-vision/

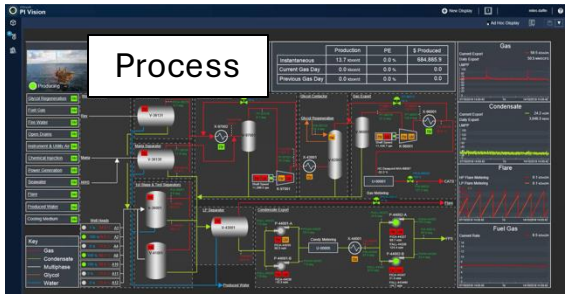
Lot No.	Start Time	End Time	Cycle Time	Threshold
230XX-XXXX				

Excel Tracking Spreadsheet

Process Engineer / Technical Expert

- **<u>Issues?</u>**
  - Manual, tedious, time-consuming, resource intensive (expert), reactive rather than proactive
- Automation can **<u>aid fault detection & management</u>** ($ savings) and **<u>save time</u>**

Process Monitoring – Traditional Approach (Manual)



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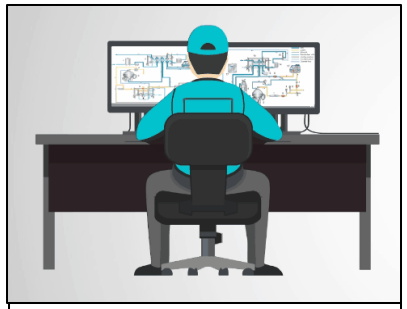
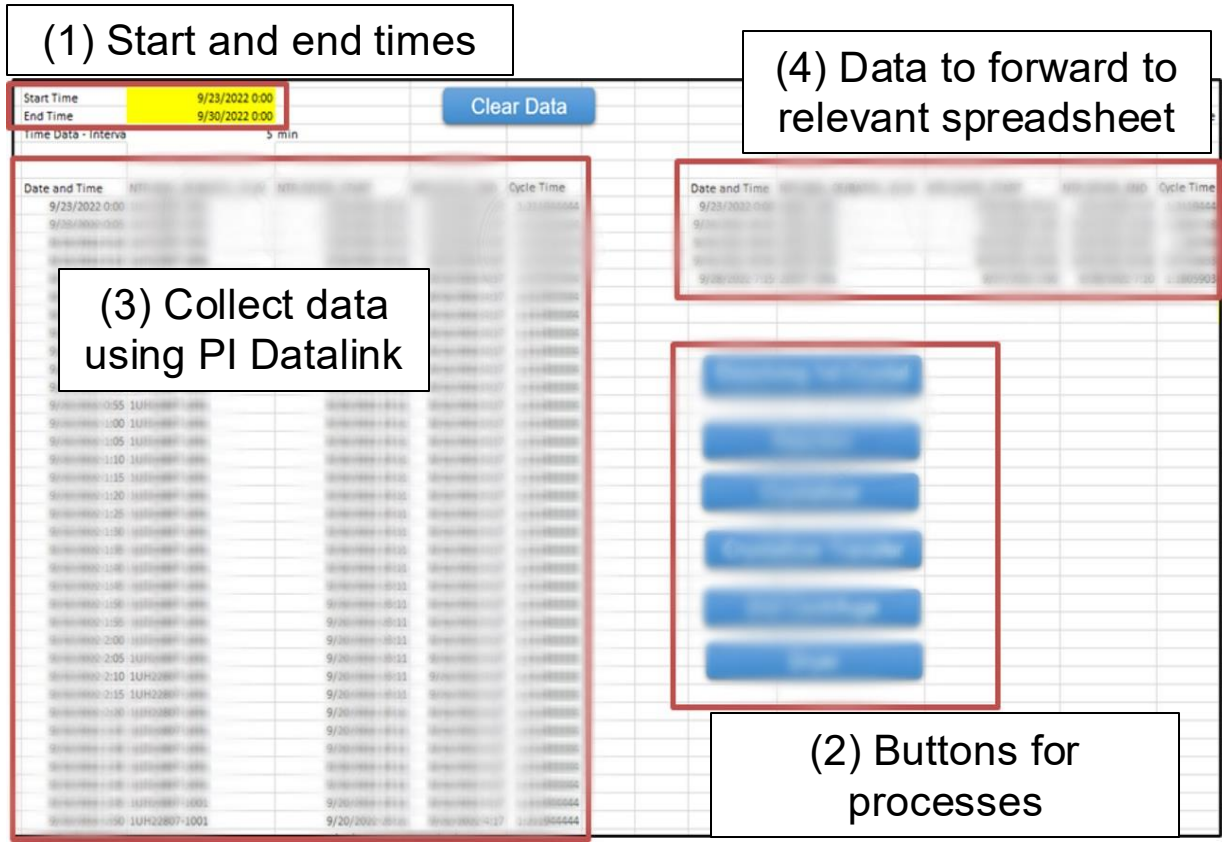
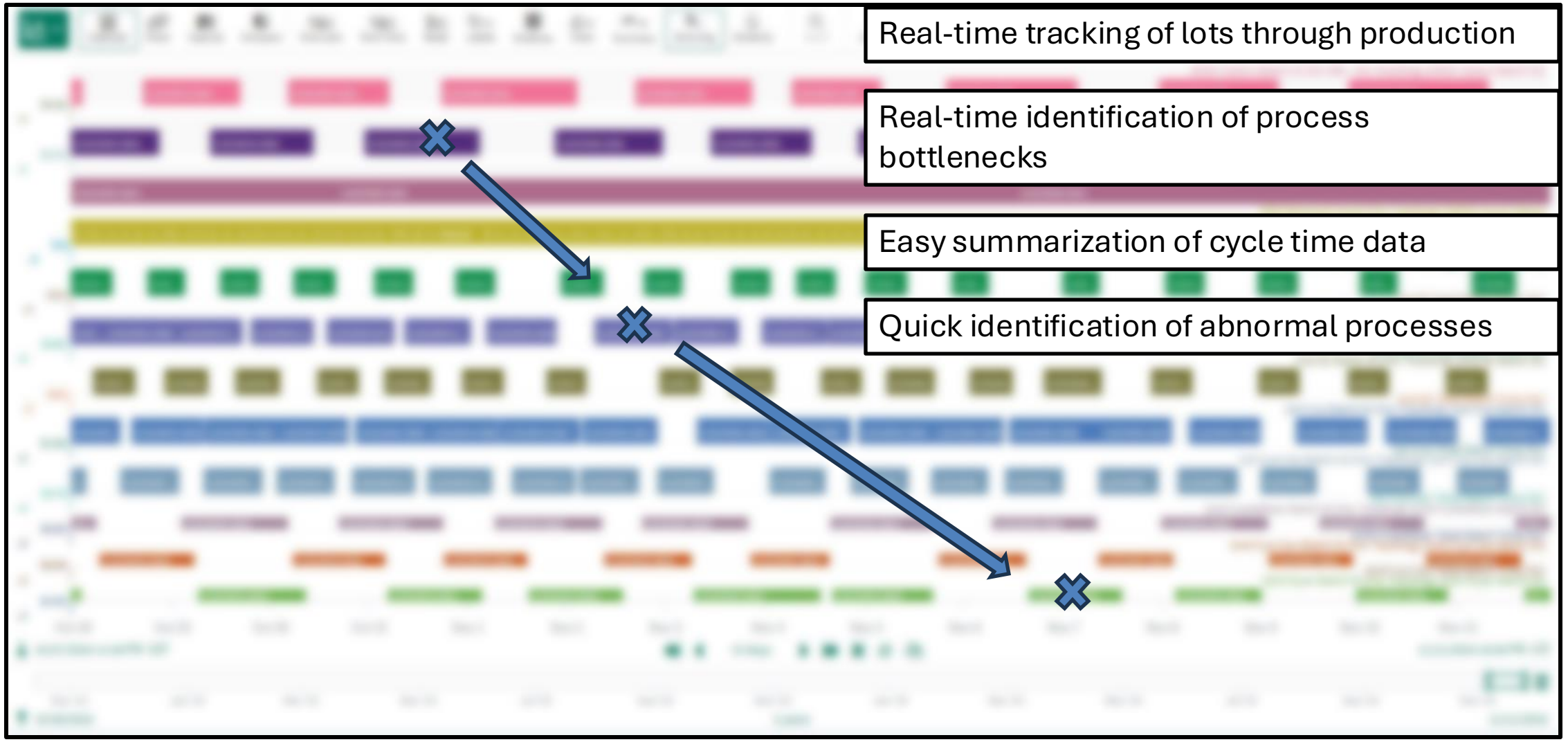


DCS Markers & Corresponding PI tags

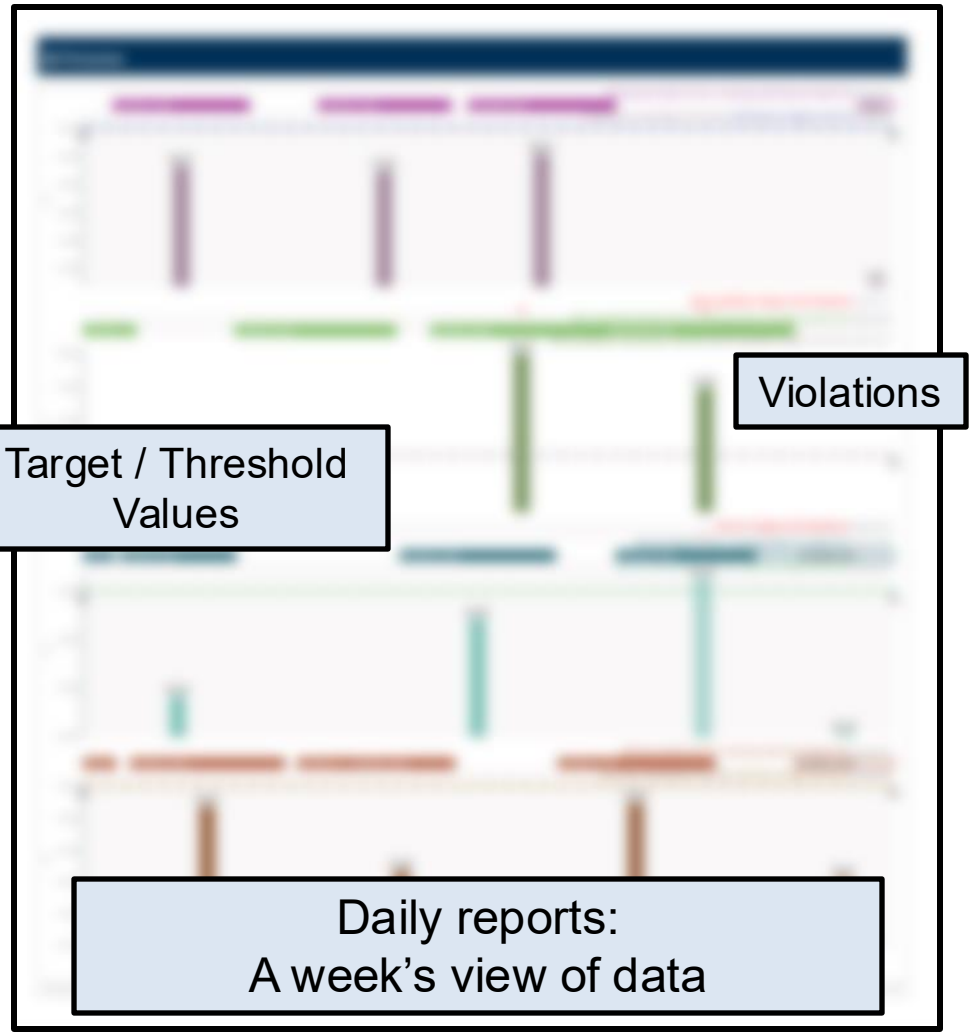


- Not real-time, limited scalability and maintenance
- Limited overall plant visualization

Process Monitoring – Seeq (Overall Visualization)



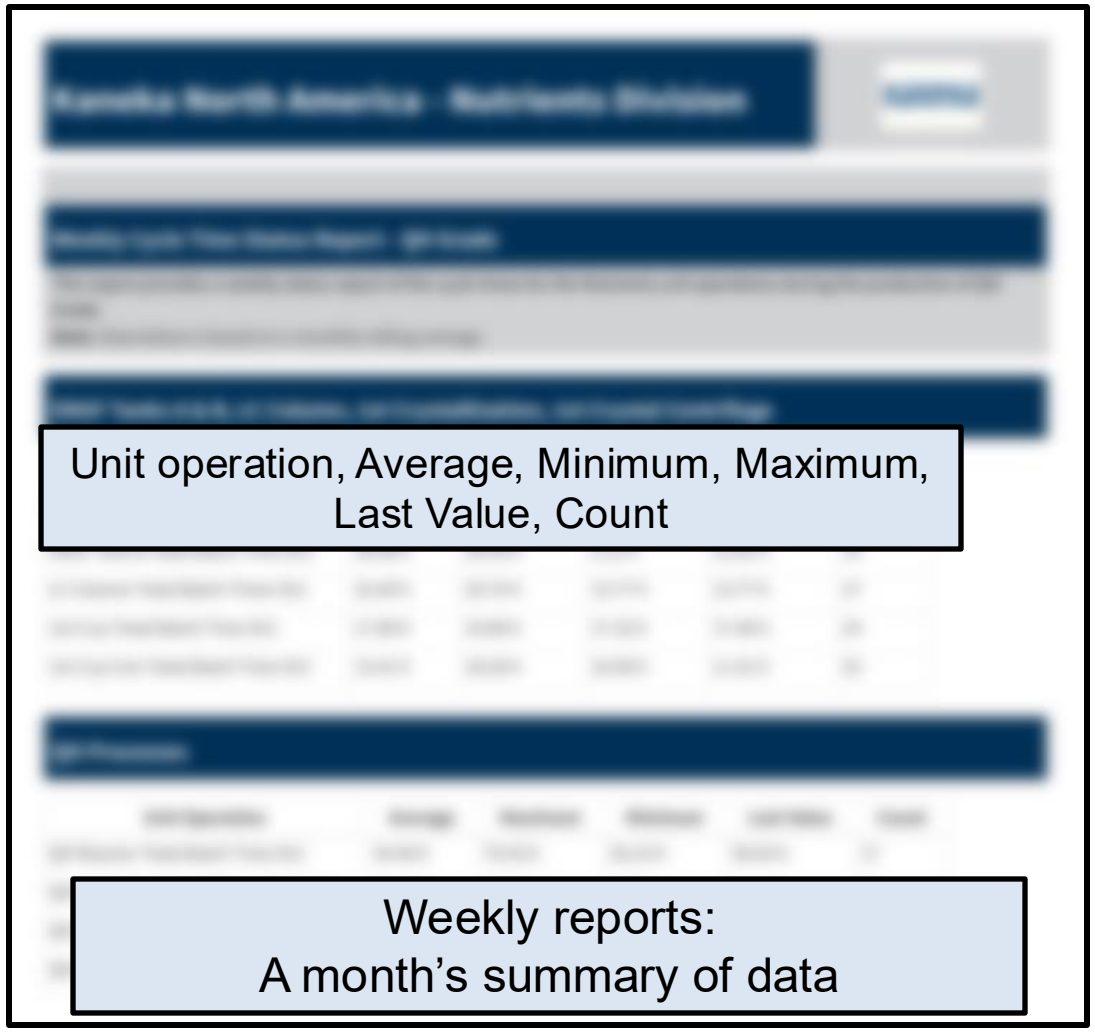
- Real-time tracking of lots through production
- Real-time identification of process bottlenecks
- Easy summarization of cycle time data
- Quick identification of abnormal processes



Violations

Target / Threshold Values

Daily reports:
A week's view of data

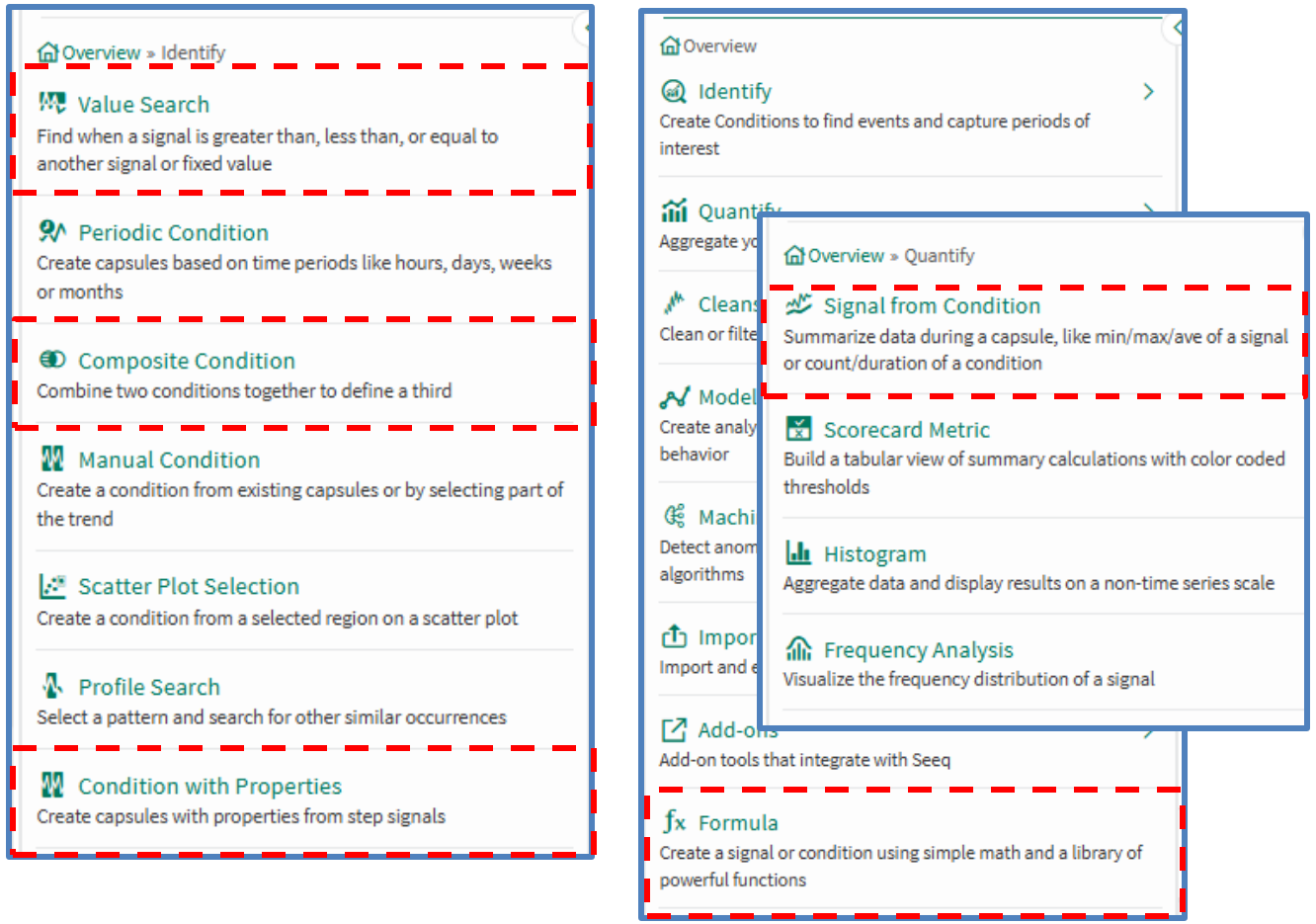


Unit operation, Average, Minimum, Maximum, Last Value, Count

Weekly reports:
A month's summary of data

Solution Deployment: Seeq Tools

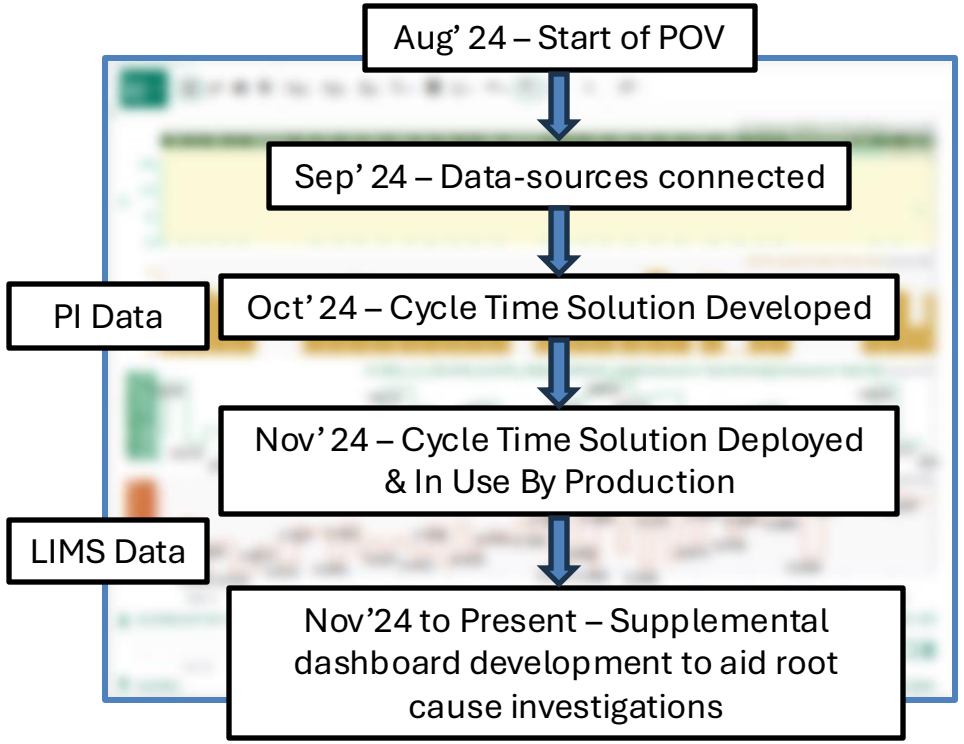
- Identify → Conditions with Properties
  - Identify and keep relevant stages
- Identify → Composite condition
  - Combine Batch ID and stage information
- Identify → Value Search
  - Flag timer target / threshold violations
- Quantify → Signal from Condition
  - Timer information and end-values
- Custom Formulas
  - Advanced data manipulation, e.g., merge etc.
- AI Feature: For translation and quicker implementation of tasks



Solution Deployment: Seeq Journey

- Deployment Timeline
  - Brainstorming: 2 weeks
  - Development: 1 week
  - Monitoring / Refining: 2 weeks
  - **Go Live**: 5 weeks from start

- Benefits of Seeq Solution
  - Quicker and increased access to data for end-users
  - Real-time plant status visibility and summary
  - Low maintenance requirement
  - Reduction in DCS support needs
  - Identification of bottlenecks / areas to focus
  - Further root cause investigations through separate dashboards



Strategy: Outcome-Driven End-User Centric Use Cases

Conclusion

Challenge Implement a real-time monitoring solution for a fermentation process

Solution Develop a capsule-focused dashboard to provide end-users with a bird's eye-view of the production process

Results Real-time tracking of process bottlenecks and identification of opportunities for improvement

E.g., 15-20% reduction in batch cycle time for centrifuge, through opportunity to optimize filter washes

Thank You!

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THANK YOU!