








Lonza's PIVOT

Productivity Improvements via Operations Technology

Isabelle Lacaille
Data Infrastructure Engineer

Lonza

-  Who is Lonza Specialty Ingredients?
-  The Challenge: Data Visibility
-  PIVOT: Productivity Improvements via Operations Technology
-  PIVOT Pilot: RCIP (Red Carpet Incubation Program)
-  Implementing PIVOT (post-RCIP)
-  Results and Beyond
-  Conclusion



Who is Lonza Specialty Ingredients?



The Challenge: Data Visibility



PIVOT: Productivity Improvements via Operations Technology



PIVOT Pilot: RCIP (Red Carpet Incubation Program)



Implementing PIVOT (post-RCIP)



Results and Beyond



Conclusion

Lonza at a Glance



¹Lonza Continuing Operations
excluding Water Care business as
discontinued operations

Lonza at a Glance

Capitalizing on our global footprint (overview of our manufacturing and R&D sites and our sales offices)



Global Footprint



*Octane Biotech – a Lonza Subsidiary

Lonza Pharma Biotech & Nutrition (LPBN)

- **Drug substance and drug product development and manufacturing for**
 - Chemicals – small molecules
 - Biologics – large molecules
 - Biologics – cell and gene technologies
- **Consumables and research tools**
- **Consumer health and nutritional ingredients and delivery systems**

Lonza Specialty Ingredients (LSI)

- **Microbial Control Solutions for**
 - Consumer home & personal care
 - Professional hygiene
 - Paints, coatings, wood and industrial material protection
 - Crop protection
- **Enabling Technologies**
 - Fine Chemistry
 - White Biotechnology

Delivering Innovation in Microbial-Control Applications

Specialty Ingredients' focus on strengthening its market leadership



Some recent examples

Next Generation Antidandruff Active

Strengthening position as world's leading antidandruff active supplier

Commenced manufacturing of Piroctone Olamine (PO) to broaden portfolio



Keeping our World Healthy®

New additions to regulated Professional Hygiene offerings

Introduction of hydrogen peroxide-based hard surface disinfectants and FDA-approved non-alcohol hand sanitizers



Regulatory Support

Introduction of microbial-control alternatives, e.g. Triclosan-free antibacterial personal care, Creosote-free protection for timber, regulatory approved fungicides for open system metalworking fluids



Bioactives

Product launches for personal care “aspirational” consumers

Introduction of naturally derived polyglycerol esters for non-ionic emulsifiers and surfactants, and bioactives for scalp and skin



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Overcoming Data Challenges in a global Organization



Overcoming Data Challenges in a global Organization



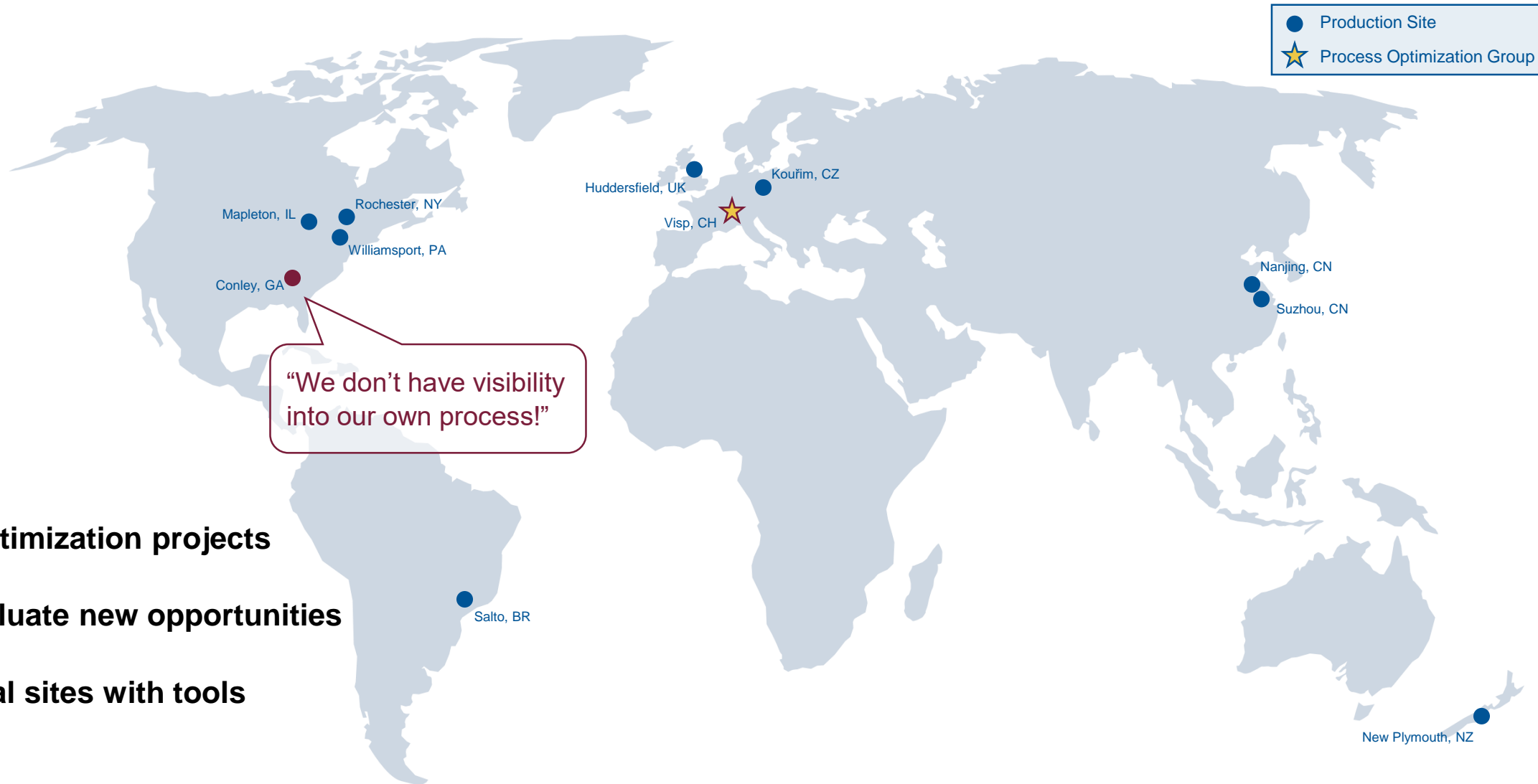
1. Accelerate optimization projects

Overcoming Data Challenges in a global Organization



1. Accelerate optimization projects
2. Identify & evaluate new opportunities

Overcoming Data Challenges in a global Organization



1. Accelerate optimization projects
2. Identify & evaluate new opportunities
3. Empower local sites with tools

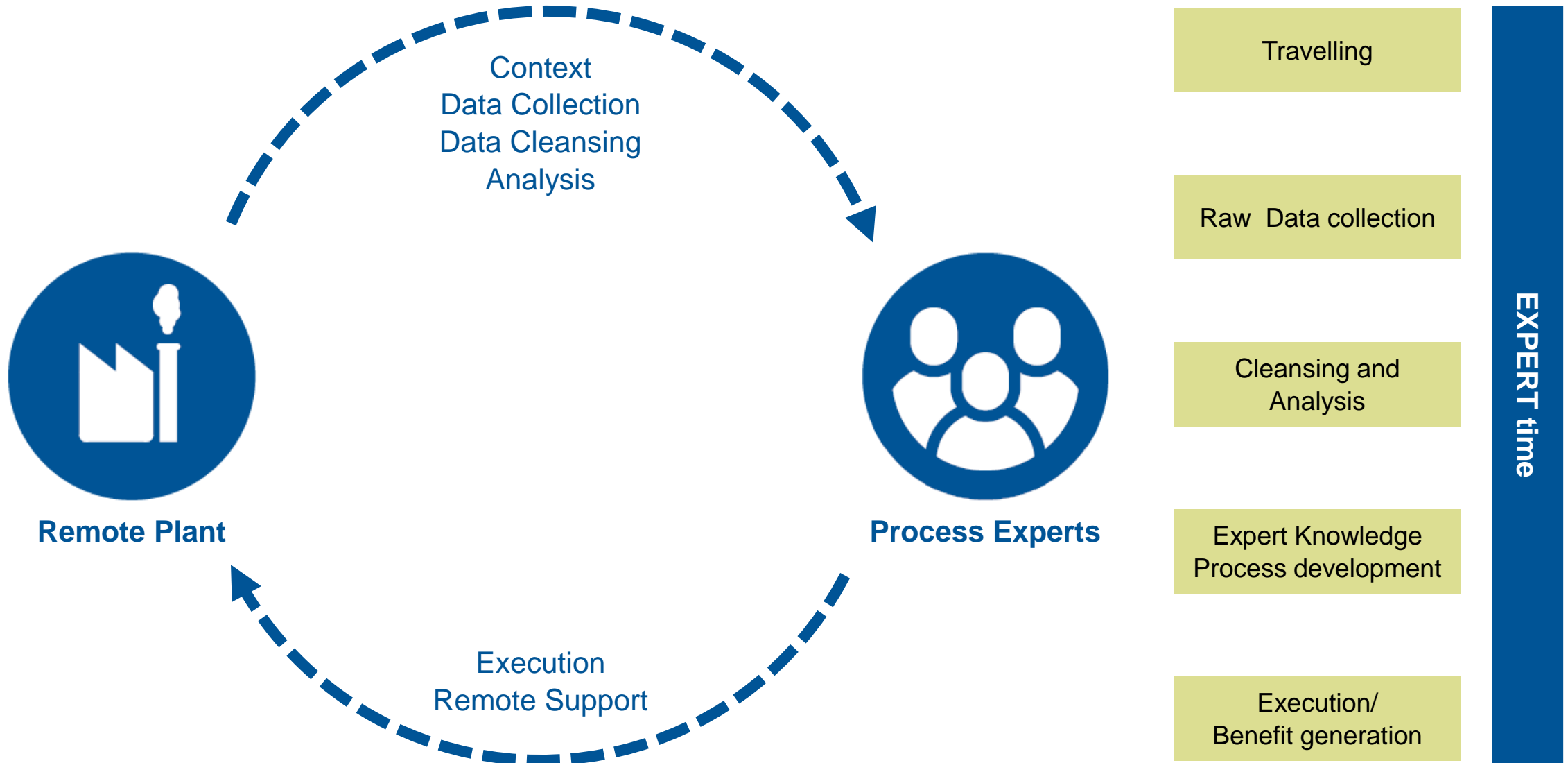
Overcoming Data Challenges in a global Organization



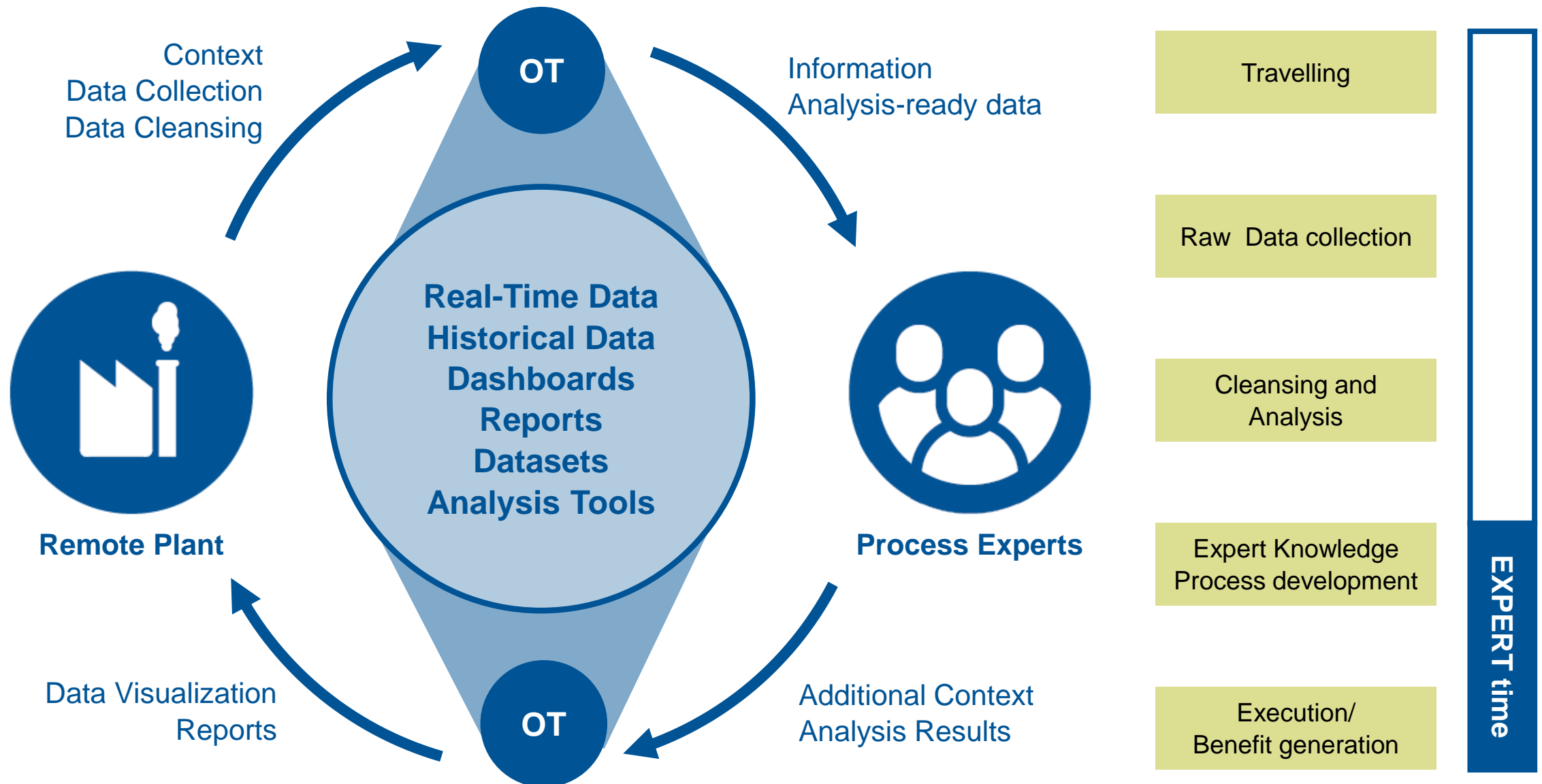
1. Accelerate optimization projects
2. Identify & evaluate new opportunities
3. Empower local sites with tools
4. Increase overall visibility



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Before PIVOT



PIVOT Concept



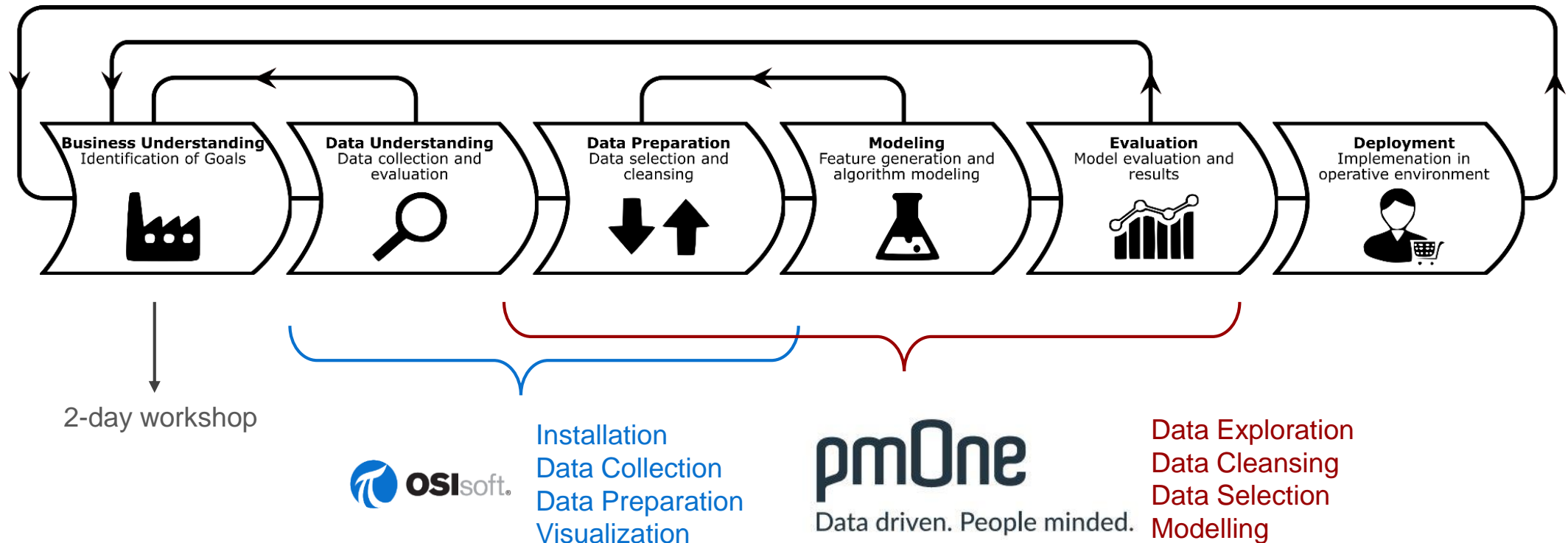
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What is an RCIP?

Joint offering by Microsoft and OSIsoft to jumpstart a data science initiative



- Validate the technology
- Evaluate the potential of a use case



Mapleton, IL

Conley, GA

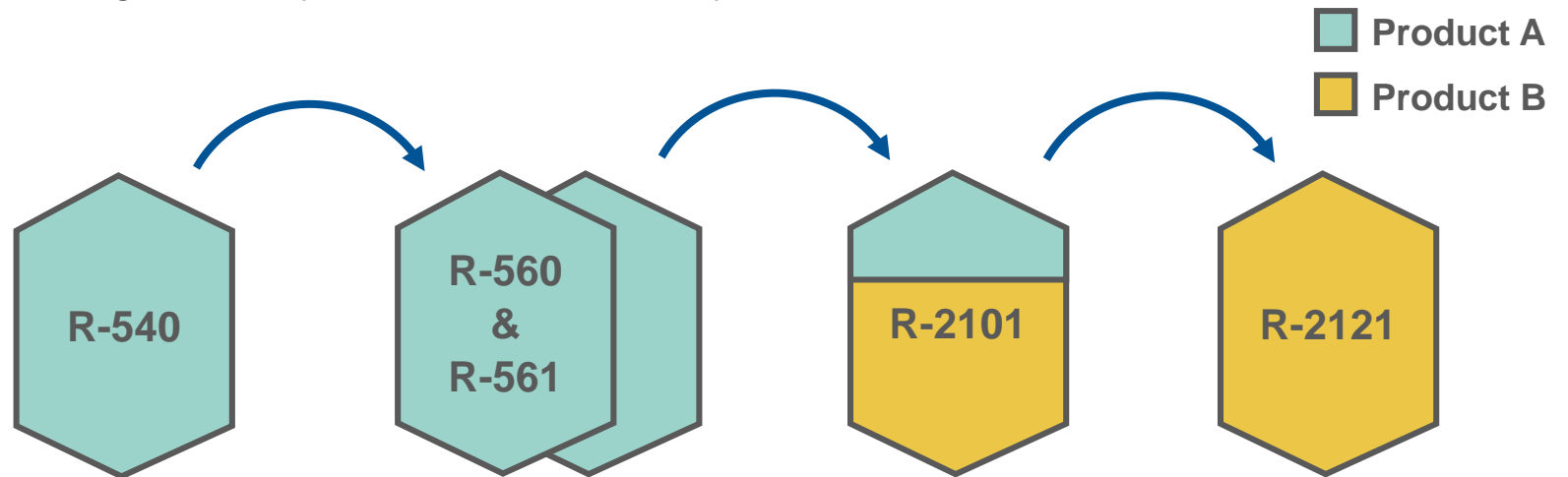
Rochester, NY

Williamsport, PA

Salto, BR

Business Objective:

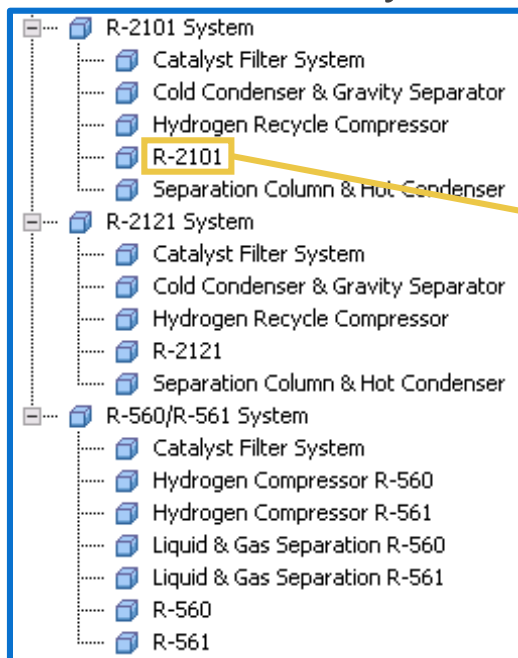
Shift production away from older, more expensive reactor system by increasing capacity in newer reactor systems



Data Science Objective:

Create a model of batch time, understand batch time variance to ultimately reduce average batch time

Asset Hierarchy



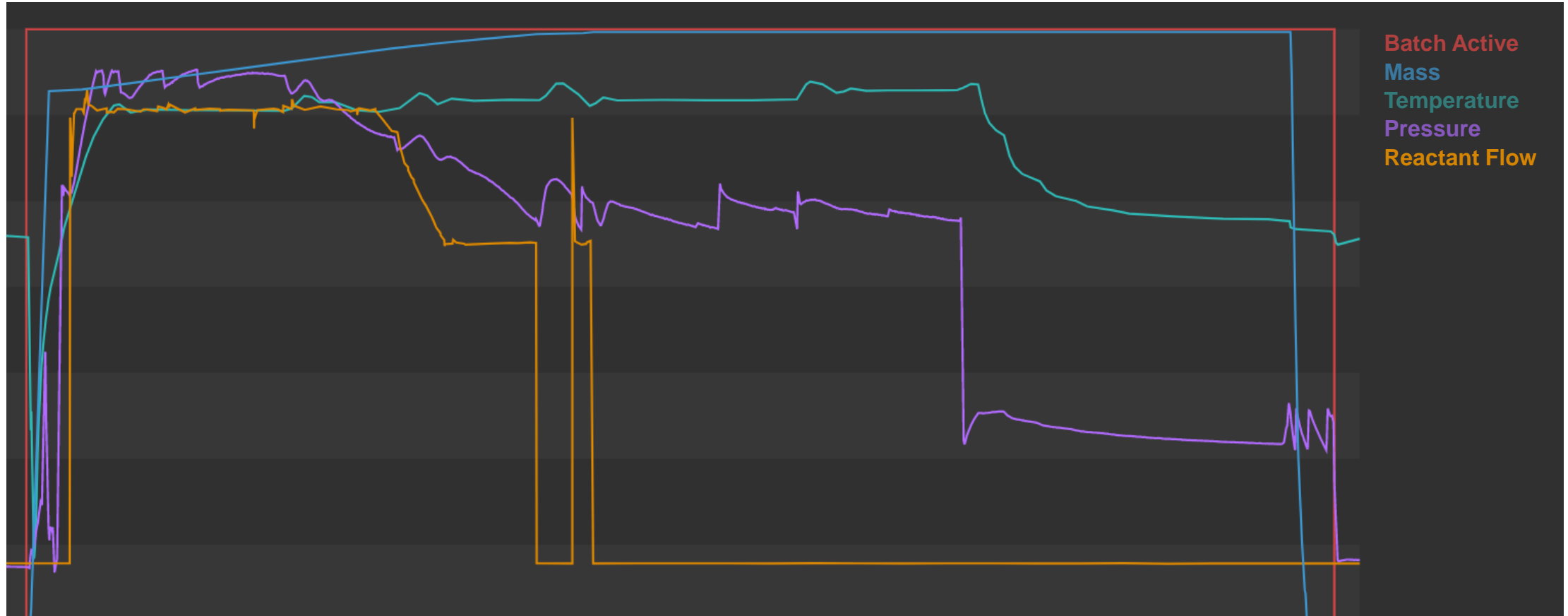
Asset Context

Category: Batch Context		
	Batch Active	On
	Batch ID	X23
	Batch Operation	Reaction
Category: Process Data - Reactor Conditions		
	Agitator power	17.39227 kW
	Hot oil to Reactor temperature control	456.814 %
	Nitrogen to Reactor	Closed
	Nitrogen to Reactor vent line	Open
	Percent hydrogen	99.76114 %
	QC Sample Valve	Closed

Event Context

Name	Duration	Start Time	End Time
X23	15:54:00	5/16/18 3:27:00 PM	5/17/18 7:21:00 AM
X24	15:44:00	5/17/18 9:01:00 AM	5/18/18 12:45:00 AM
X25	15:23:00	5/18/18 2:52:00 AM	5/18/18 6:15:00 PM
X26	14:25:00	5/18/18 7:35:00 PM	5/19/18 10:00:00 AM
X27	14:59:00	5/19/18 11:39:00 AM	5/20/18 2:38:00 AM
X28	15:42:00	5/20/18 4:08:00 AM	5/20/18 7:50:00 PM
X29	16:59:00	5/20/18 9:44:00 PM	5/21/18 2:43:00 PM
X30	18:24:00	5/21/18 2:49:00 PM	5/22/18 9:13:00 AM
X31	21:16:00	5/22/18 9:17:00 AM	5/23/18 6:33:00 AM
X32	15:25:00	6/2/18 10:40:00 AM	6/3/18 2:05:00 AM
X33	14:16:00	6/3/18 3:56:00 AM	6/3/18 6:12:00 PM
X34	15:42:00	6/4/18 11:37:00 AM	6/5/18 3:19:00 AM
X35	15:05:00	6/5/18 5:04:00 AM	6/5/18 8:09:00 PM
X36	19:16:00	6/5/18 9:55:00 PM	6/6/18 5:11:00 PM
X37	20:00:00	6/6/18 6:53:00 PM	6/7/18 2:53:00 PM

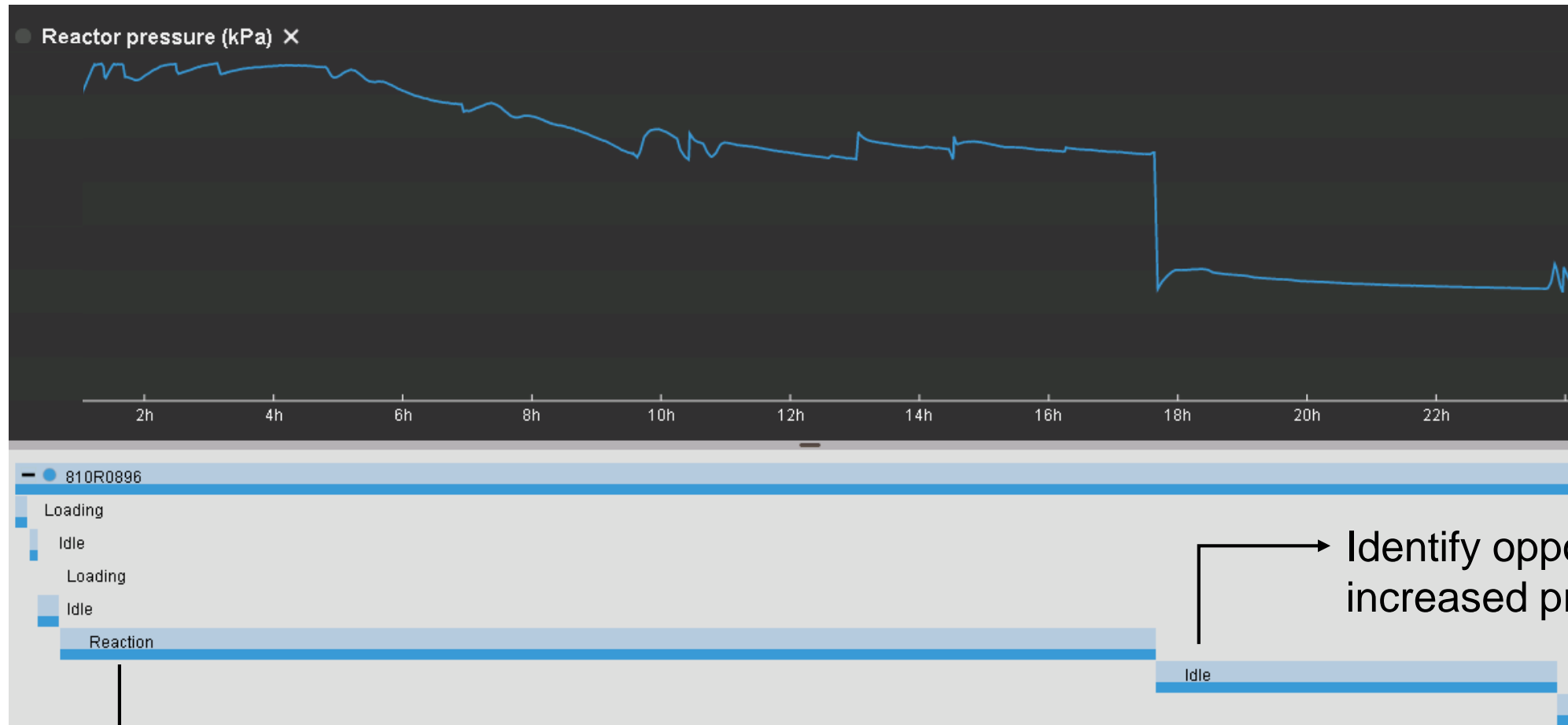
Challenge: Batch time included idle time



Batch is “Active”, but reaction is complete

Challenge: Batch time included idle time

Solution: Use asset analytics to capture sub-batch operations



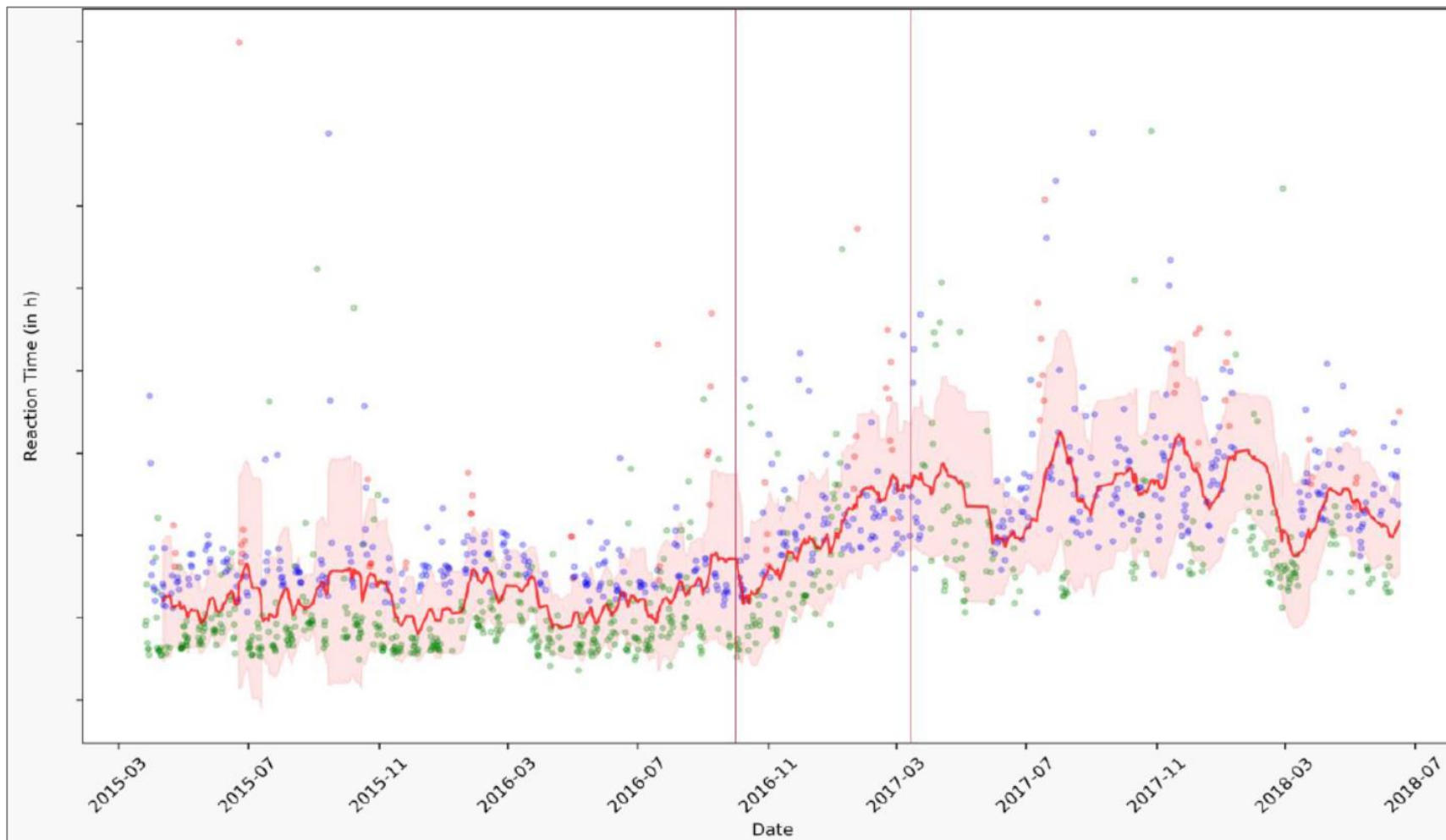
Compare true reaction time between batches

Identify opportunities for increased productivity*

*we'll come back to this later!

RCIP Outcomes

Discovered optimization potential



- Increase in reaction time near the end of 2016
- Root cause: removed trays in distillation column never replaced
- No production disruption, coincided with start-up of second reactor system

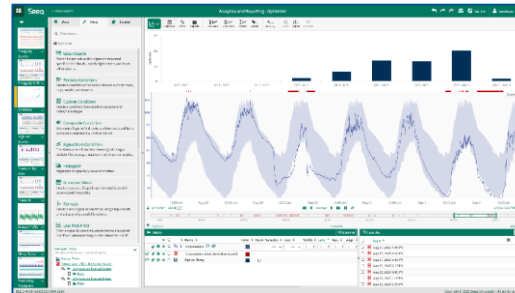
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Infrastructure & Tools Needed for PIVOT

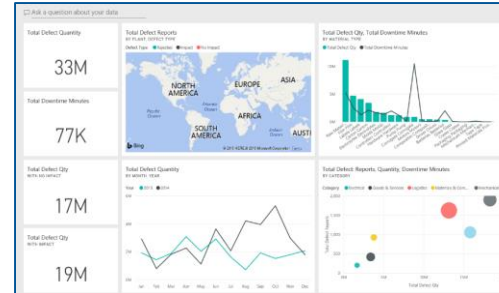
PI Vision



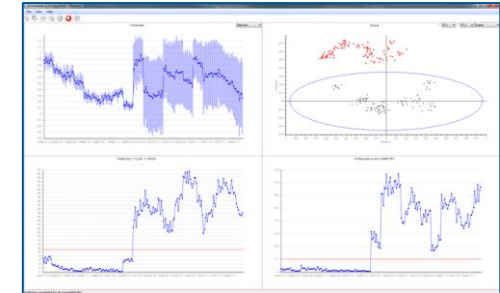
SEEQ



Power BI



Unscrambler



Global PI System Infrastructure



Roles & Skills Needed for a successful PIVOT

Knowledge gaps identified during RCIP



OT & Automation



Data Engineering



Data Science



Development Skills



Process Knowledge



Chemistry Knowledge

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Overcoming Data Challenges in a global Organization!



- ✓ Accelerating optimization projects
 - ✓ Identified & evaluating new opportunities
- ✓ Empowering local sites with tools
 - ✓ Increased overall visibility

For more information, attend our second presentation!

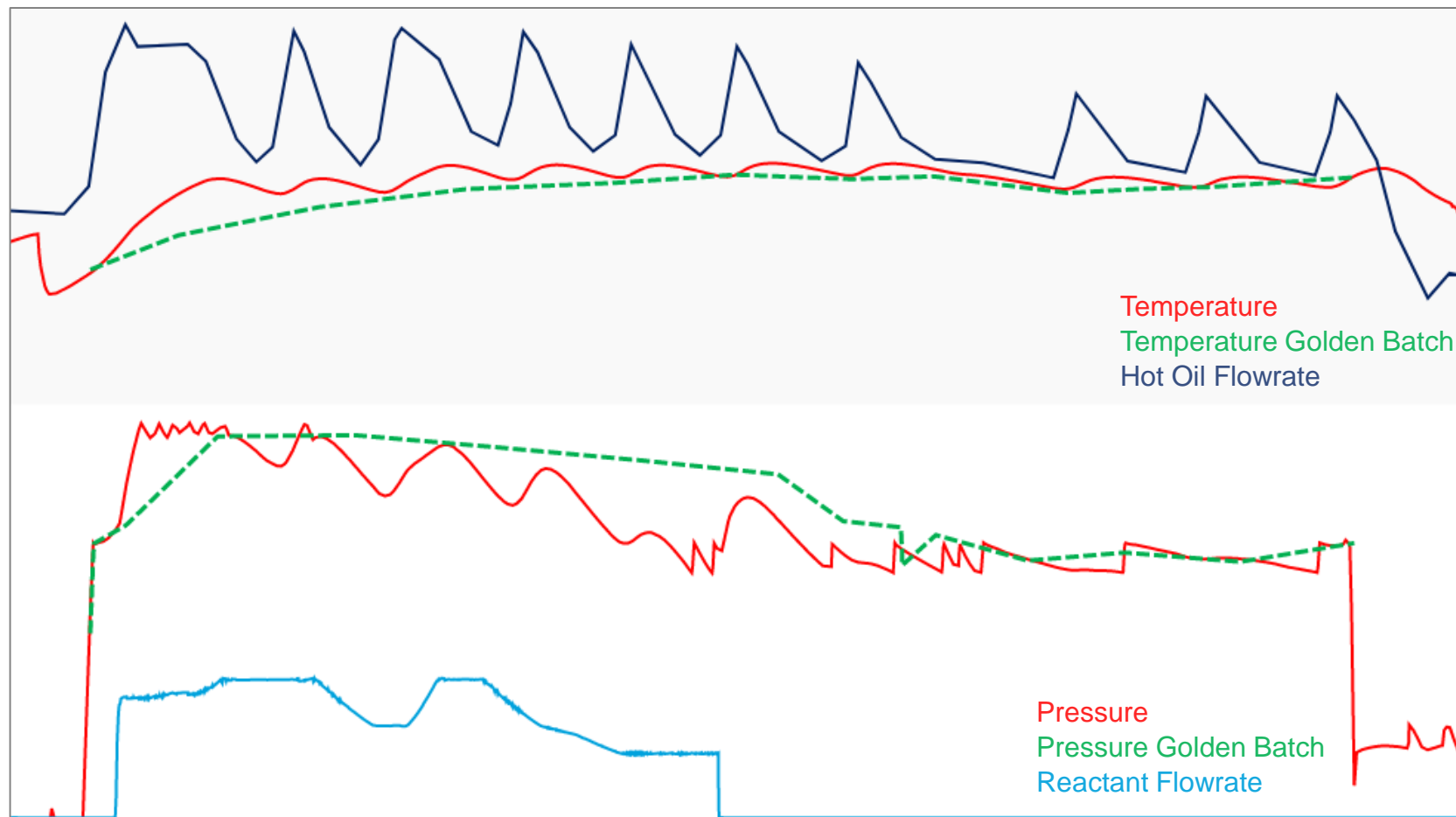
Journey Deploying Data Analytics for Manufacturing Insights

Tobias Merz & Brian Crandal (SEEQ)

13:45 - 14:30 Life Sciences Track

✓ Accelerating Process Optimization Projects

Example: Mapleton Batch Time Reduction

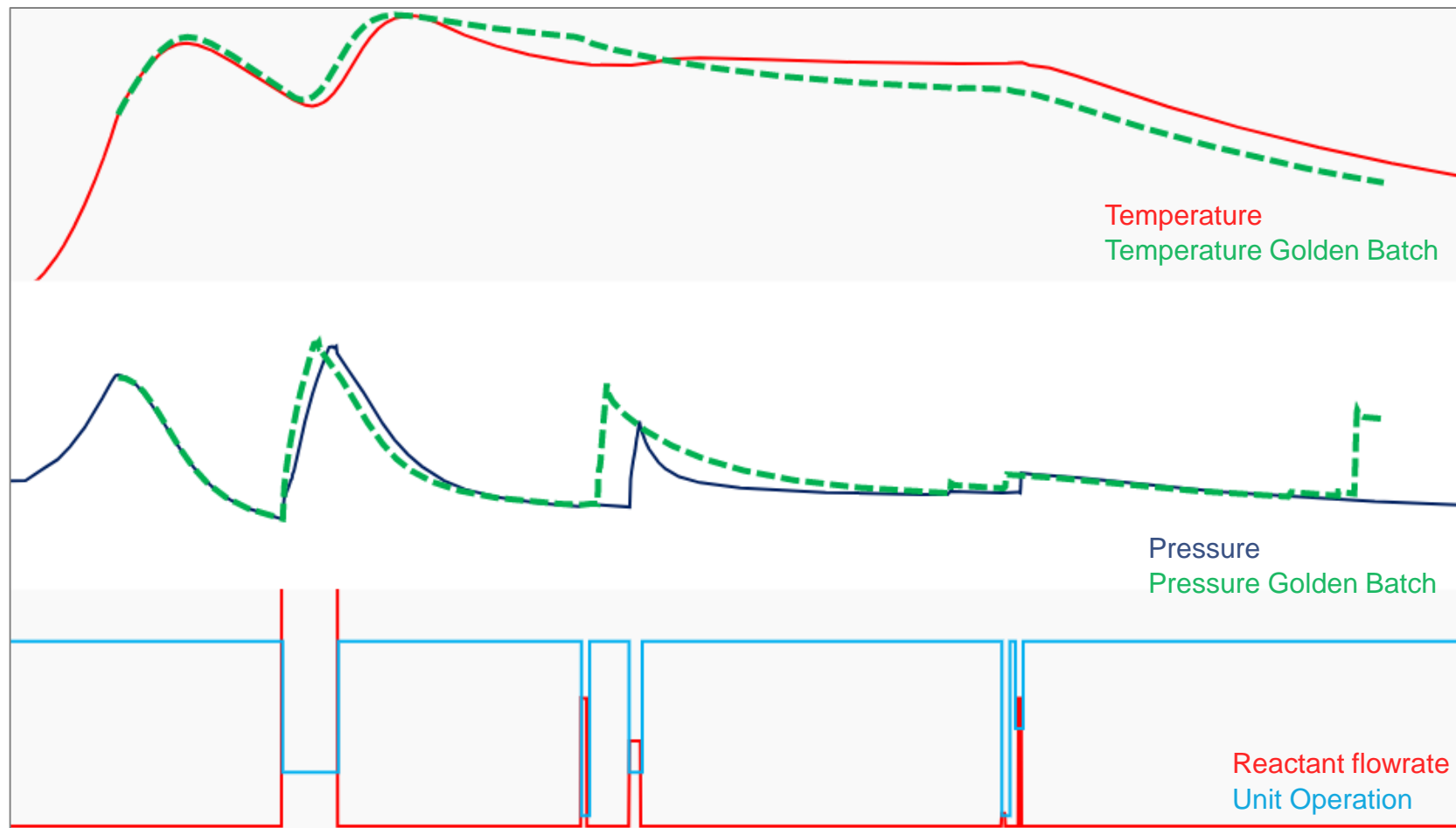


Opportunity #1: Optimize temperature increase during reaction

- Data mining revealed golden batches with different temperature profile
- High temperature causes evaporation of reactant, leading to slower reaction
- Potential capacity increase of **15-18%**

✓ Accelerating Process Optimization Projects

Example: Mapleton Batch Time Reduction

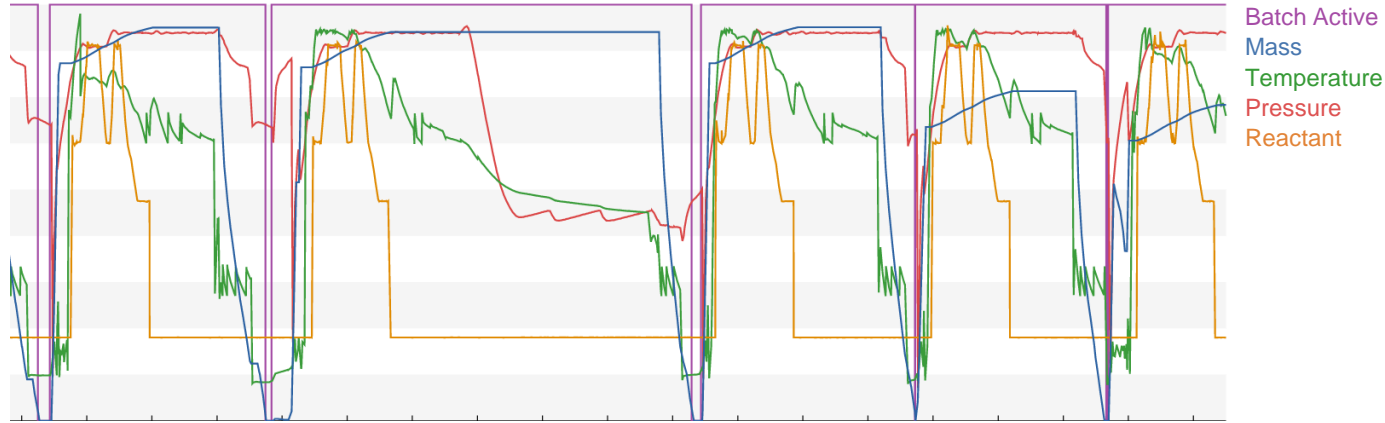


Opportunity #2: Optimize timing of reactant dosing

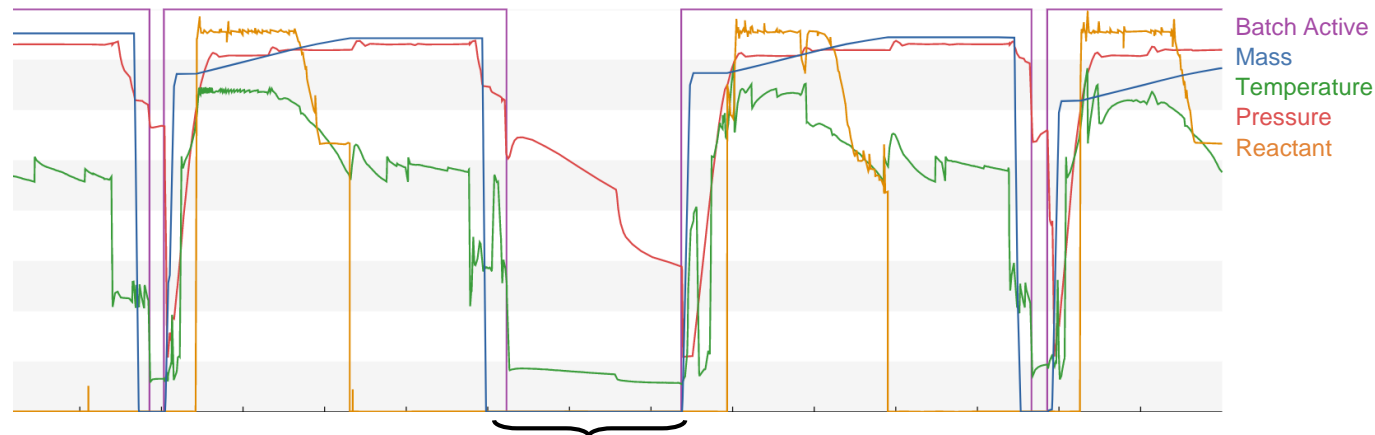
- Data mining revealed golden batches with different pressure profile, correlating with reactant
- Precise timing of reactant dosage decreases the occurrence of side-reactions
- Potential capacity increase of **16-20%**

✓ Identified & Evaluating new Opportunities

Example: Reason Codes for pounds lost during production



Long Batch, reaction complete



Idle Time between batches

No visibility about the reason!

What is the greatest cause of lost pounds?

✓ Identified & Evaluating new Opportunities

Example: Reason Codes for pounds lost during production



Cycle

	Name	Duration	Hours Above Target
[-]	X78	1:2:23:03	15.4 h
[+]	Batch	1:1:48:40	14.8 h
	Idle	0:34:23	0.573 h

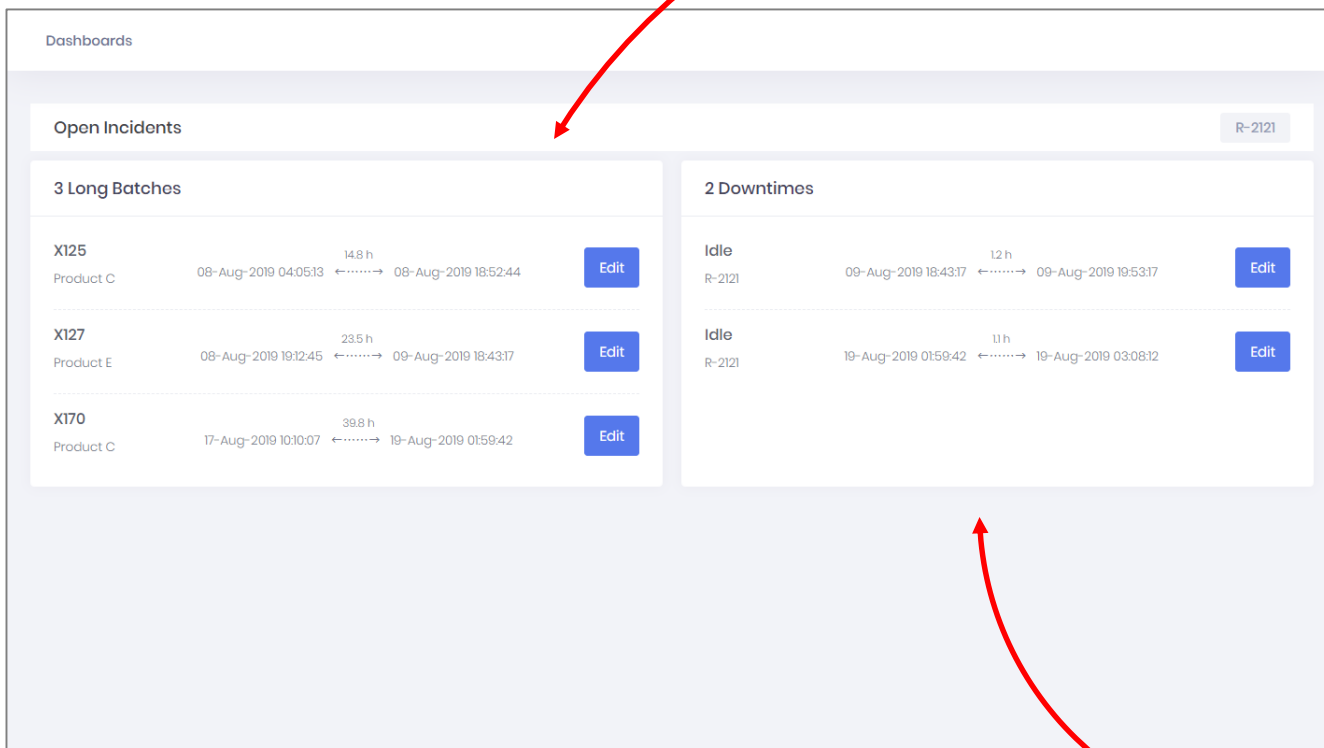


Cycle

	Name	Duration	Hours Above Target
[-]	X45	1:1:21:33	10.1 h
	Batch	16:48:02	1.5 h
	Idle	8:33:31	8.56 h

✓ Identified & Evaluating new opportunities

Example: Reason Codes for pounds lost during production



	Name	Duration	Hours Above Target
[-]	X78	1:2:23:03	15.4 h
[+]	Batch	1:1:48:40	14.8 h
	Idle	0:34:23	0.573 h

	Name	Duration	Hours Above Target
[-]	X45	1:1:21:33	10.1 h
[+]	Batch	16:48:02	1.5 h
	Idle	8:33:31	8.56 h

✓ Identified & Evaluating new Opportunities

Example: Reason Codes for pounds lost during production



Dashboards	
Open Incidents	
All Production Lines	
16 Long Batches	
X93 Product A	02-Aug-2019 14:28:13 ← 18.1 h → 03-Aug-2019 08:31:44 Edit
X98 Product A	03-Aug-2019 08:45:45 ← 18.4 h → 04-Aug-2019 03:10:46 Edit
X101 Product D	04-Aug-2019 03:25:47 ← 19.9 h → 04-Aug-2019 23:20:49 Edit
X108 Product A	04-Aug-2019 23:44:19 ← 18.5 h → 05-Aug-2019 18:14:51 Edit
X163 Product A	14-Aug-2019 21:26:46 ← 19.9 h → 15-Aug-2019 17:21:48 Edit
X166 Product D	15-Aug-2019 17:48:48 ← 19.3 h → 16-Aug-2019 13:06:21 Edit
X168 Product A	16-Aug-2019 13:30:50 ← 19.1 h → 17-Aug-2019 08:37:22 Edit
X169 Product B	17-Aug-2019 09:31:53 ← 18.2 h → 18-Aug-2019 03:41:24 Edit
X170 Product C	17-Aug-2019 10:10:07 ← 39.8 h → 19-Aug-2019 01:59:42 Edit
8 Downtimes	
Idle R-2121	09-Aug-2019 18:43:17 ← 1.2 h → 09-Aug-2019 19:53:17 Edit
Idle R-2121	19-Aug-2019 01:59:42 ← 1.1 h → 19-Aug-2019 03:08:12 Edit
Idle R-2101	20-Aug-2019 08:38:31 ← 8.8 h → 20-Aug-2019 17:23:32 Edit
Idle R-220	20-Aug-2019 19:09:10 ← 5.6 h → 21-Aug-2019 00:45:32 Edit
Idle R-219	20-Aug-2019 20:11:22 ← 2.9 h → 20-Aug-2019 23:05:53 Edit
Idle R-222	21-Aug-2019 13:16:33 ← 31.6 h → 22-Aug-2019 20:54:17 Edit
Idle R-219	21-Aug-2019 15:42:24 ← 2.7 h → 21-Aug-2019 18:26:04 Edit
Idle R-223	21-Aug-2019 21:22:49 ← 1.1 h → 21-Aug-2019 22:25:50 Edit

✓ Identified & Evaluating new Opportunities

Example: Reason Codes for pounds lost during production



● Product A ● Product B



- Largest amount of lost pounds caused by “No Storage | Other”
- No room for production, but exact logistics bottleneck is unknown
- Greatest opportunity is not optimizing reaction time, but rather logistics!



Conclusion

Lonza

CHALLENGES

Global Data Visibility...

- Accelerate optimization projects
- Identify & evaluate new opportunities
- Empower local sites with tools
- Increase overall visibility

SOLUTION

PIVOT Initiative

- Strategy: Process Improvements via OT
- Piloted with RCIP
- Implemented global data infrastructure
- Created Operations Technology team with required skillset

BENEFITS

Global Data Visibility!

- Potential capacity increase of 15-20% on two product lines
- Reason Codes application implemented at 3 sites
- SEEQ, PI Vision, Power BI used at multiple sites
- To be continued!

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the **microphone**

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the mobile app for survey

