



# Advanced Analytics with the OSIsoft PI System

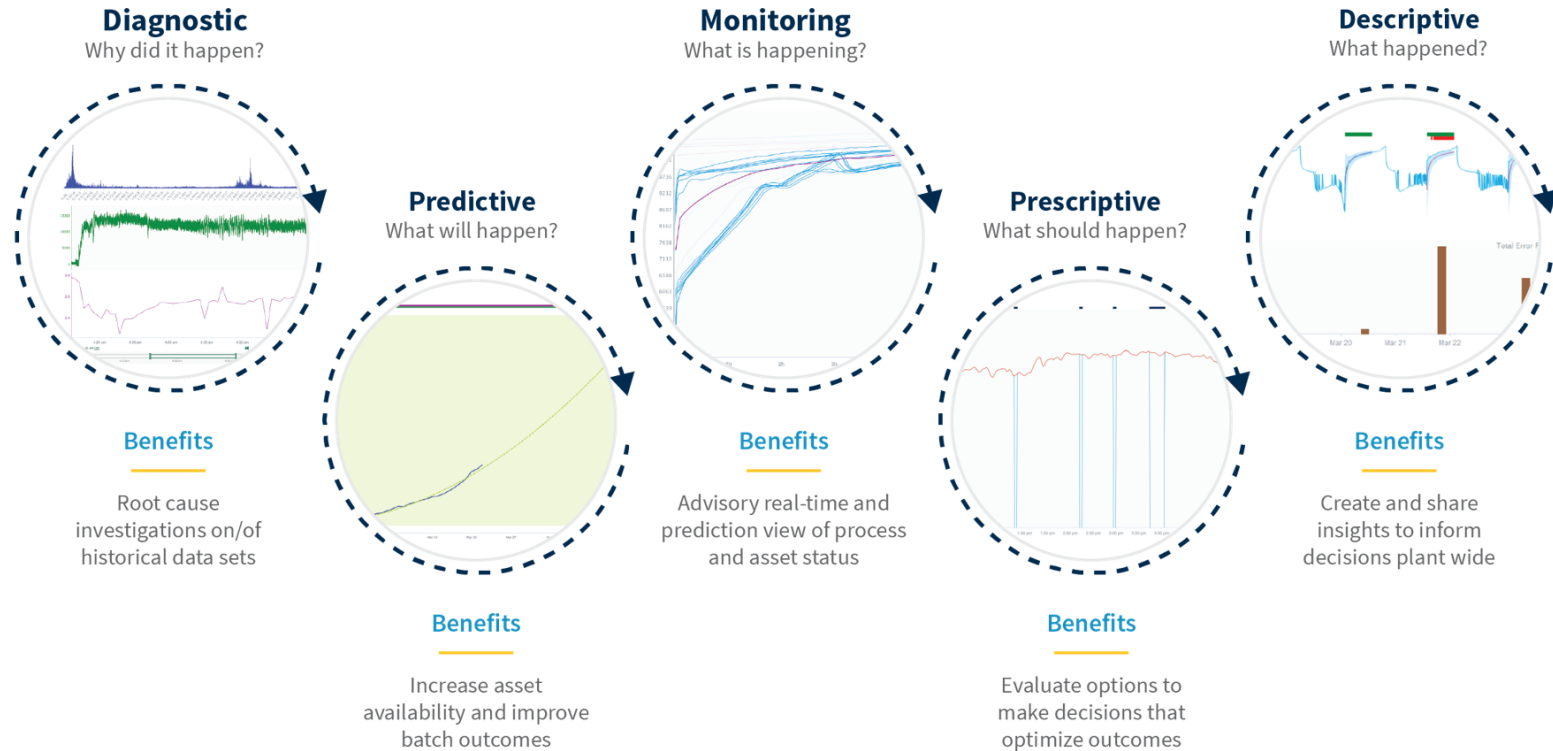
Emily Anderson



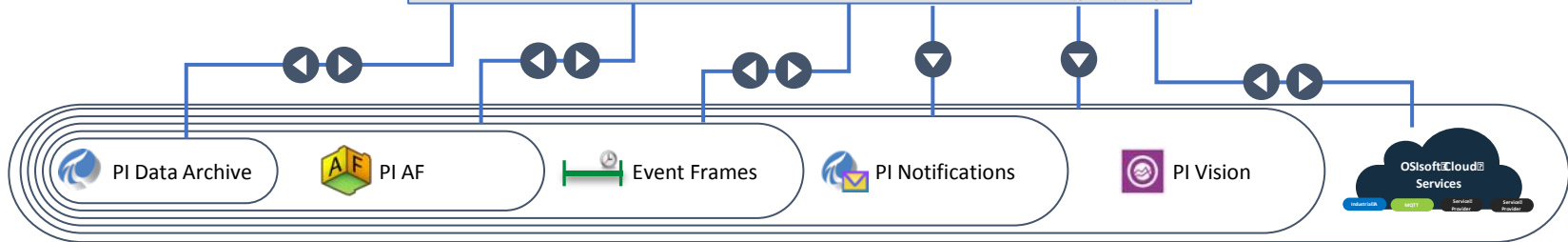
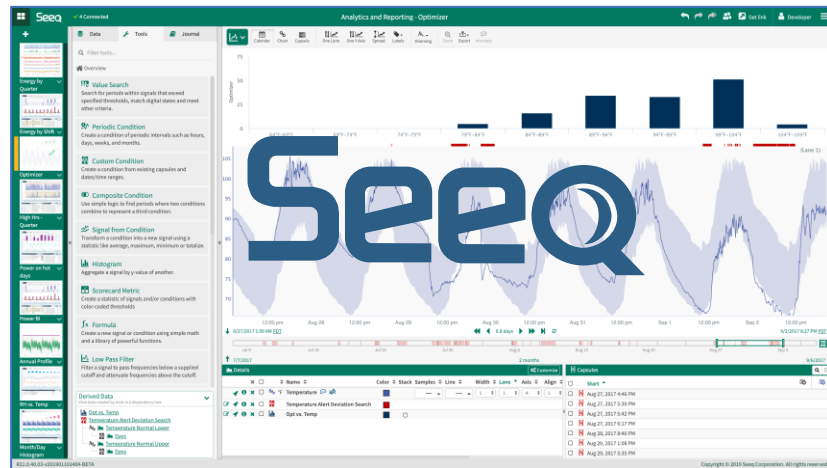
# Agenda

- Introduction to Seeq
  - Predictive, diagnostic, descriptive, monitoring and prescriptive analytics
  - Integration with OSIsoft PI System data, Asset Framework, Event Frames, PI Notifications, and PI Vision
- Use Case Examples
  - Asset Availability – CIP Cycles
  - Yield – Order Fill Analysis
  - Product Quality – Reference Profile Monitoring

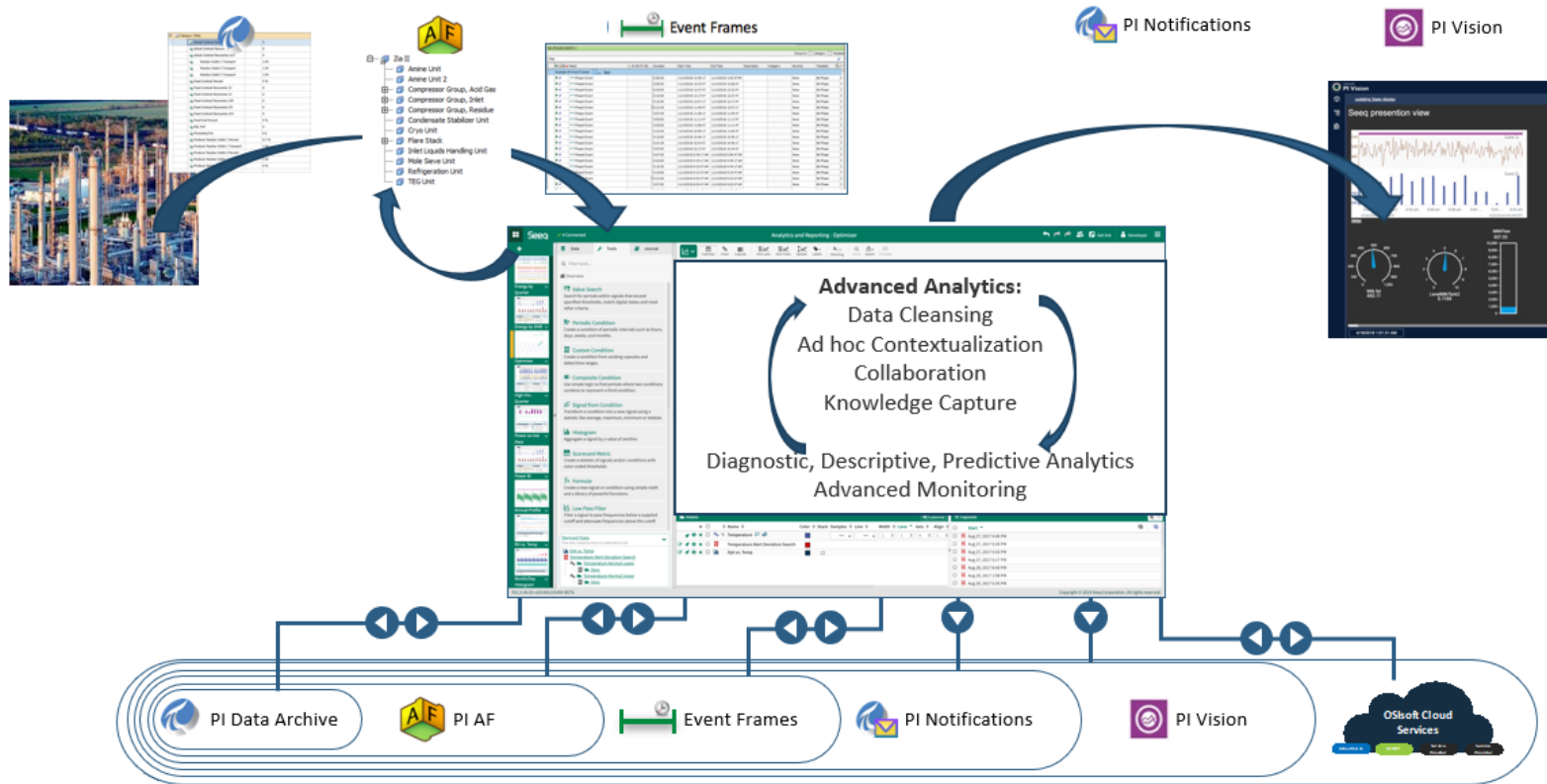
# Analytics Types



# Advanced Analytics for OSIsoft PI System



# Advanced Analytics for OSIsoft PI System



# DEMO

Asset Availability – CIP Cycles

Cycle Duration CPP Comparison x Document 1 - PI World CIP Exam x +

https://explore.seeq.com/workbook/39111AE9-904E-42D7-AF5D-857B85B505E0/worksheet/E7D96FB2-6F1E-48FC-AE65-0972C1027FD7

Seeq 10 Connected PI World CIP Example - Cycle Duration CPP Comparison

Viewing Edit

## Cycle Duration CPP Comparison

Compare CIP cycle duration to the CPP for conductivity to identify opportunities to Optimize CIP cycles.

### Steps

1. Start with [CIP Phases](#).
2. Add [Conductivity and Flow](#).
3. Search for times with [flow](#) and [low conductivity](#).
4. Overcleaning can be identified by times when there is [flow and low conductivity during the CIP phase](#).
5. [Show potential utilities savings](#) by calculating the total Flow during overcleaning.
  - o [Scorecard](#)

3:00 am 3:30 am 4:00 am 4:30 am 5:00 am 5:30 am 6:00 am 6:30 am 7:00 am 7:30 am 8:00 am 8:30 am 9:00 am 9:30 am 10:00 am

4/1/2019 2:46 AM CDT 7.2 hours

3/27/2019 7 days 4/3/2019

#### Details

Name	Assets Lane
Vessel 1 CIP Phases	

#### Capsules

Start	Equipment
Apr 1, 2019 3:36 AM	Vessel 1
Apr 1, 2019 4:52 AM	Vessel 1
Apr 1, 2019 6:07 AM	Vessel 1

Comments 0

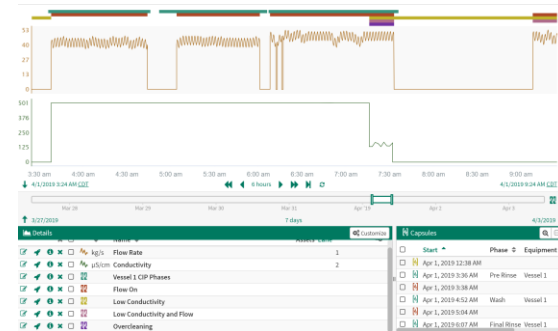
R21.0.40.07-v201903201700 Server load: 13%

Type here to search

10:54 PM 4/8/2019

# Asset Availability

## CIP Cycles



### CHALLENGE

Cleaning based on timers leaves room for overcleaning leading to unnecessary expenditure

- Identify current cleaning cycles
- Determine when desired conductivity is achieved to find periods of potential cycle time reduction

### SOLUTION

Identify overcleaning events

- Determine when desired CPP is achieved
- Compare to current CIP cycle times to find periods of potential savings
- Create key metrics to evaluate improvement opportunities

### RESULTS

Reduce time and resources used in cleaning processes

- Determine optimal cycle times based on CPPs
- Leverage metrics to quantify savings in time and utilities



# DEMO

Yield –Order Fill Analysis



# Yield

## Order Fill Analysis

## Order Tracking

	3/24/2019 - 4/7/2019
Predicted Total Order	1.8e+6
Total Cups Filled To Date	1.2e+6
Current Deviation from Target	-1218

### CHALLENGE

Determine if production is on schedule for shipping

- Missing target delivery dates is costly both for product lifespan and logistics expenses
- Over-producing product leads to additional storage requirements

### SOLUTION

Predict total number of units filled by shipping date

- Use Fill Rate and Days in Order to calculate prediction
- Confirm that prediction meets order requirement and track progress according to forecasted production

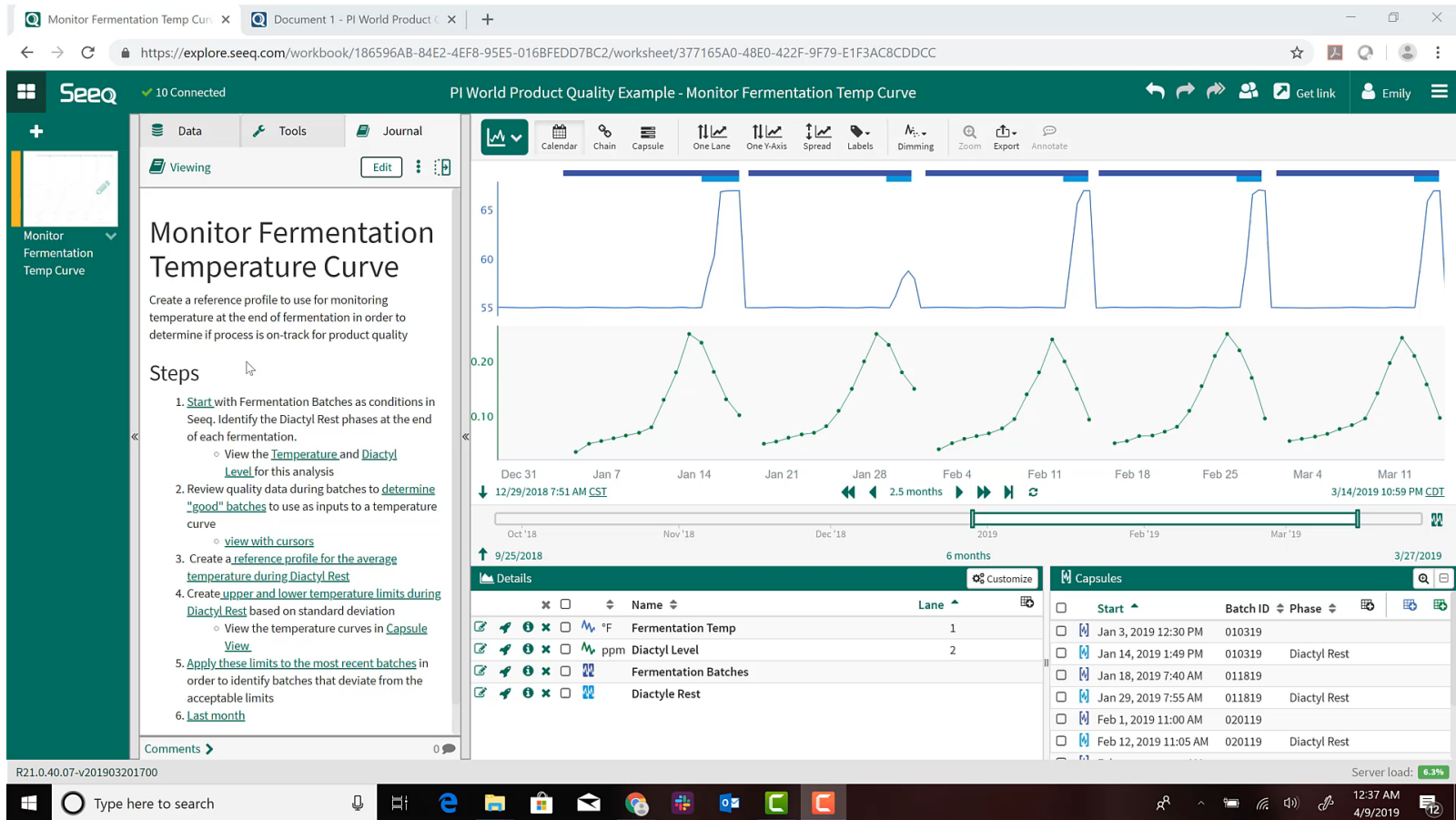
### RESULTS

Continuous monitoring of predicted total units minimizes risk of missed deadline

- Optimize outbound logistics
- Improved productivity through process adjustments to achieve target delivery date

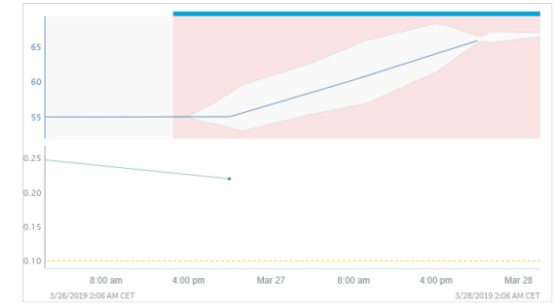
# DEMO

Product Quality – Reference Profile Monitoring



# Product Quality

## Reference Profile Monitoring



### CHALLENGE

Temperature change at the end of fermentation is critical to achieving a quality beer

- Diacyl Rest for lagers requires an increase in temperature at the end of fermentation
- Process related quality data is measured offline, so it is critical to monitor on-line parameters to achieve desired results

### SOLUTION

Monitor temperature based on historical curves

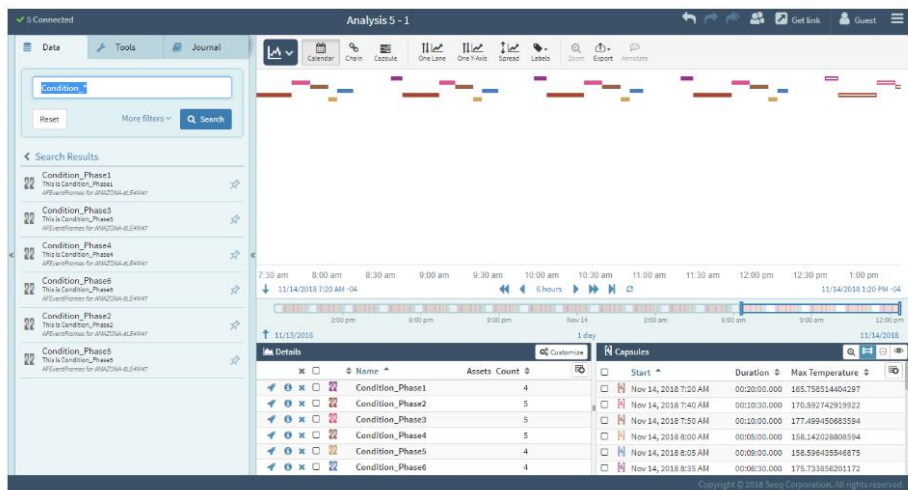
- Create a reference profile of temperature during diacyl rest based on high quality batches
- This profile can be applied to future batches to monitor product quality

### RESULTS

Improve beer quality with diacyl levels maintained within specification

- Allow early detection of temperature deviations
- Optimize diacyl rest times to achieve consistent product quality

# Contextualize Data from PI Event Frames



BA PHASE EVENTS 1

Filter

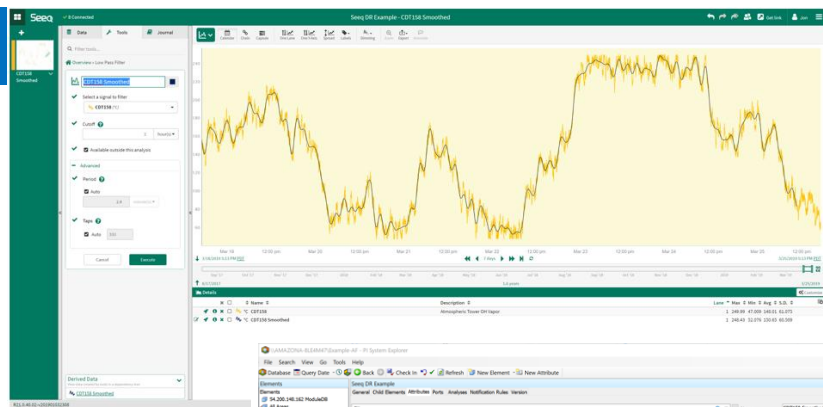
Name	Duration	Start Time	End Time	Description	Category	Severity	Template
Example-AP Event Frames	1	[9:08:57:30]					
Phase1 Event	0:06:30	11/14/2018 12:59:17	11/14/2018 1:05:47 PM			None	BA Phase
Phase5 Event	0:06:00	11/14/2018 12:32:47	11/14/2018 12:38:47			None	BA Phase
Phase5 Event	0:05:00	11/14/2018 12:27:47	11/14/2018 12:32:47			None	BA Phase
Phase4 Event	0:10:00	11/14/2018 12:17:47	11/14/2018 12:27:47			None	BA Phase
Phase3 Event	0:10:30	11/14/2018 12:07:17	11/14/2018 12:17:47			None	BA Phase
Phase2 Event	0:21:30	11/14/2018 11:45:47	11/14/2018 12:07:17			None	BA Phase
Phase1 Event	0:07:30	11/14/2018 11:38:17	11/14/2018 11:45:47			None	BA Phase
Phase5 Event	0:06:00	11/14/2018 11:11:47	11/14/2018 11:17:47			None	BA Phase
Phase5 Event	0:05:00	11/14/2018 11:06:47	11/14/2018 11:11:47			None	BA Phase
Phase4 Event	0:10:30	11/14/2018 10:56:17	11/14/2018 11:06:47			None	BA Phase
Phase3 Event	0:10:00	11/14/2018 10:46:17	11/14/2018 10:56:17			None	BA Phase
Phase2 Event	0:21:30	11/14/2018 10:24:47	11/14/2018 10:46:17			None	BA Phase
Phase1 Event	0:07:00	11/14/2018 10:17:47	11/14/2018 10:24:47			None	BA Phase
Phase6 Event	0:07:30	11/14/2018 9:49:17 AM	11/14/2018 9:56:47 AM			None	BA Phase
Phase5 Event	0:05:00	11/14/2018 9:44:17 AM	11/14/2018 9:49:17 AM			None	BA Phase
Phase4 Event	0:10:30	11/14/2018 9:33:47 AM	11/14/2018 9:44:17 AM			None	BA Phase
Phase3 Event	0:10:00	11/14/2018 9:23:47 AM	11/14/2018 9:33:47 AM			None	BA Phase
Phase2 Event	0:21:00	11/14/2018 9:02:47 AM	11/14/2018 9:23:47 AM			None	BA Phase
Phase1 Event	0:07:00	11/14/2018 8:55:47 AM	11/14/2018 9:02:47 AM			None	BA Phase

## Impact

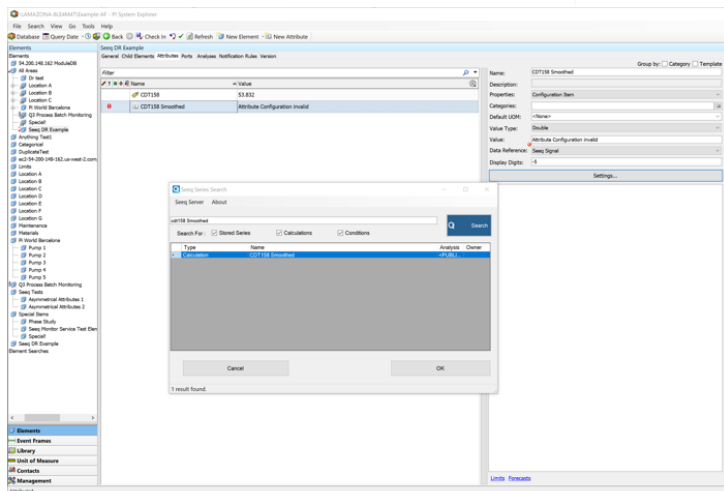
Leverage PI Event Frames to contextualize data in Seeq.

# Writing Seeq Signals back to PI

1



2



3



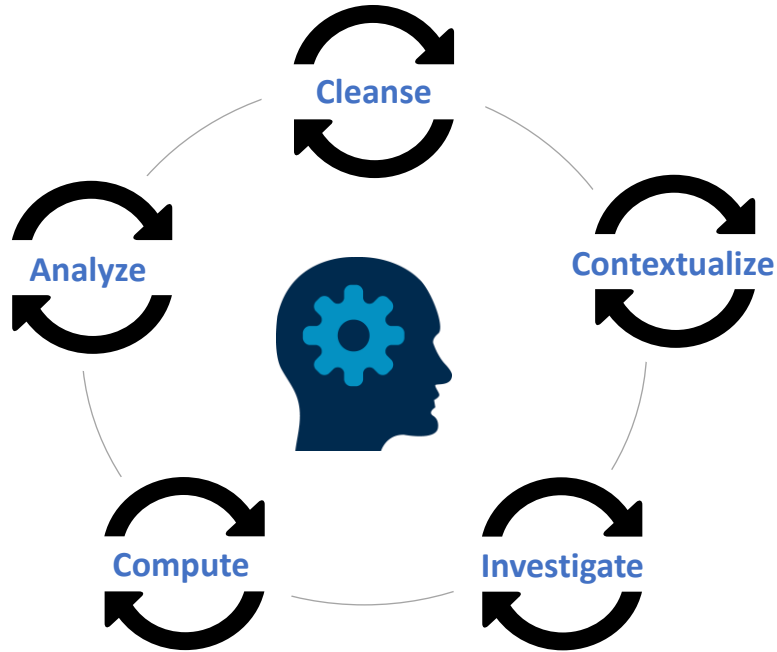
## Impact

Make model results or cleansed signals available outside Seeq.



# Empower Employees

Connect the Subject Matter Expert to Interactive, Intuitive Applications



## Application Requirements

- Self-directed
- Visual
- Iterative
- Flexible
- Scalable
- Modern

# Questions?

Please wait for  
the **microphone**

State your  
**name & company**



# Please remember

TO DOWNLOAD  
APP, SEARCH  
OSISOFT



Download on the  
App Store



GET IT ON  
Google Play



# Advanced Analytics with the OSIsoft PI System



- Emily Anderson
- Senior Analytics Engineer
- Seeq
- [Emily.Anderson@Seeq.com](mailto:Emily.Anderson@Seeq.com)

