Introduction to Asset Monitoring & Condition-based Maintenance with the PI System

Nick Pabo-Eulberg
System Engineer

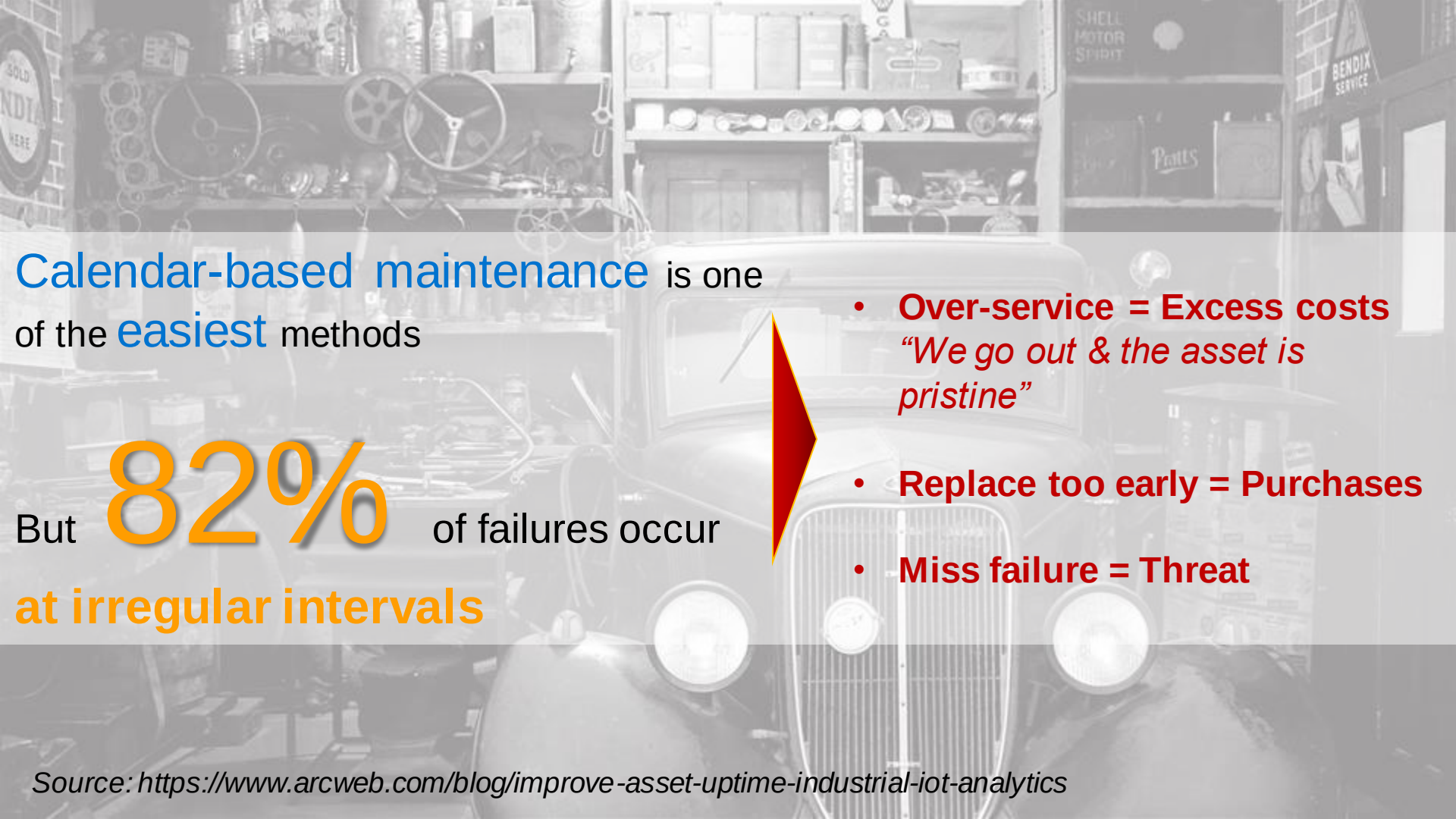
Many words for similar goal: Keep assets healthy

…In a cost effective way

Calendar-based maintenance is one of the easiest methods

But 82% of failures occur **at irregular intervals**

Source: https://www.arcweb.com/blog/improve-asset-uptime-industrial-iot-analytics



Calendar-based maintenance is one of the easiest methods

But 82% of failures occur at irregular intervals

- **Over-service = Excess costs** *"We go out & the asset is pristine"*
- **Replace too early = Purchases**
- **Miss failure = Threat**

Source: https://www.arcweb.com/blog/improve-asset-uptime-industrial-iot-analytics

What are our maintenance options?

Reactive

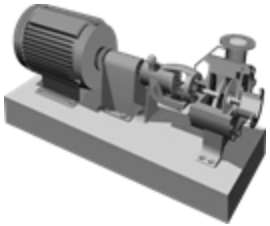
"Break-Fix"
Run to failure

Preventative

Calendar-based

Condition Based

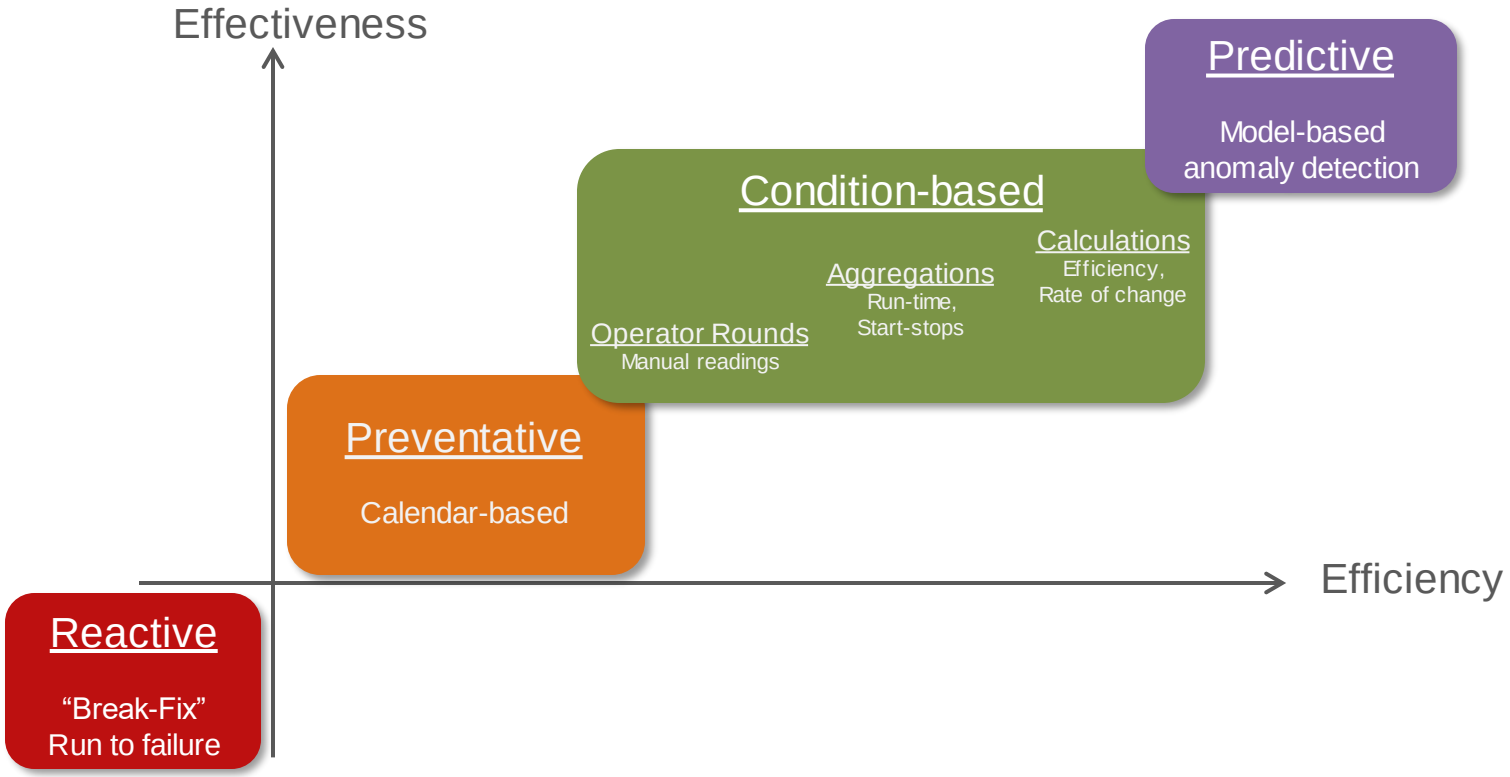
Repair based on insight



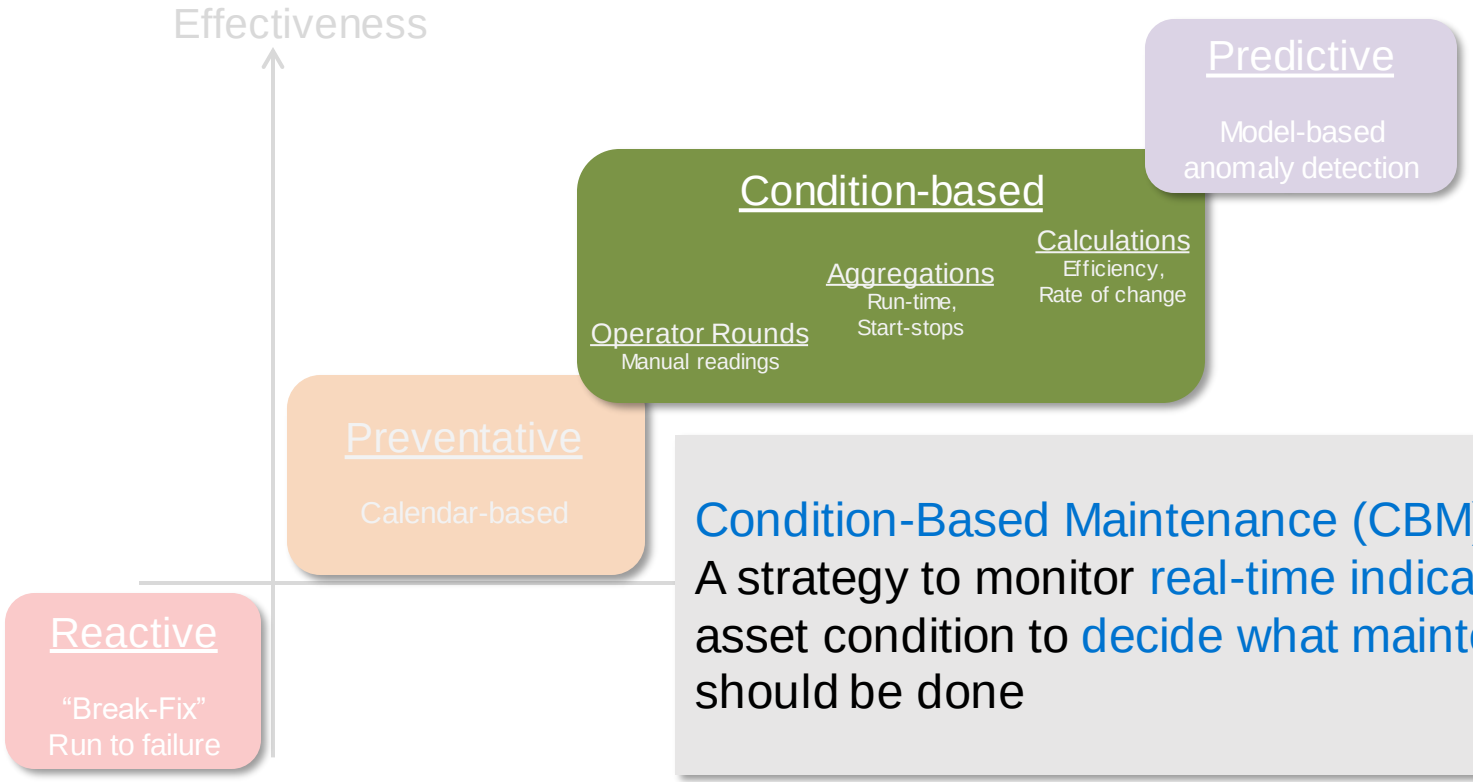
Predictive

Advanced Pattern Recognition

What are our maintenance options?



Condition monitoring: An improved maintenance strategy

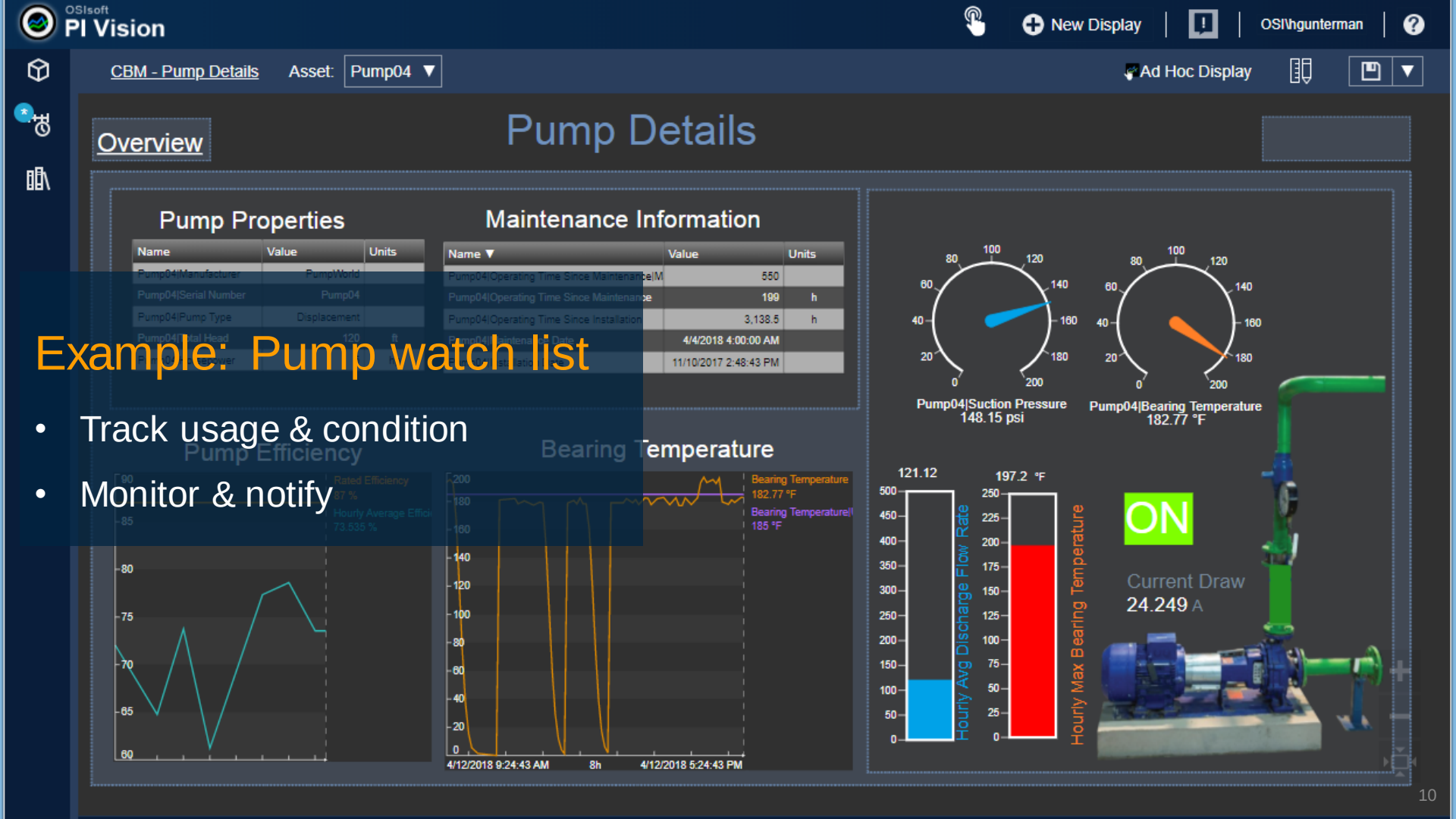


Condition-Based Maintenance (CBM):
A strategy to monitor real-time indicators of asset condition to decide what maintenance should be done

In this talk, you'll see

- How to set up condition monitoring
- Jumpstart your CBM program

- What you have today
- Deploy within weeks


OSIsoft
PI Vision
New Display
OSI\hgunterman
CBM - Pump Details
Asset: Pump04
Ad Hoc Display
Overview
Pump Details
Pump Properties
Name
Value
Units
Pump04|Manufacturer
PumpWorld
Pump04|Serial Number
Pump04
Pump04|Pump Type
Displacement
Maintenance Information
Name
Value
Units
Pump04|Operating Time Since Maintenance
550
Pump04|Operating Time Since Maintenance
199
h
Pump04|Operating Time Since Installation
3,138.5
h
4/4/2018 4:00:00 AM
11/10/2017 2:48:43 PM
Example: Pump watch list
Track usage & condition
Monitor & notify
Pump Efficiency
Rated Efficiency
Hourly Average Effici
73.535 %
Bearing Temperature
Bearing Temperature
182.77 °F
Bearing Temperature
185 °F
4/12/2018 9:24:43 AM
8h
4/12/2018 5:24:43 PM
Pump04|Suction Pressure
148.15 psi
Pump04|Bearing Temperature
182.77 °F
121.12
Hourly Avg Discharge Flow Rate
197.2 °F
Hourly Max Bearing Temperature
ON
Current Draw
24.249 A

5 Steps of CBM *with the* PI System

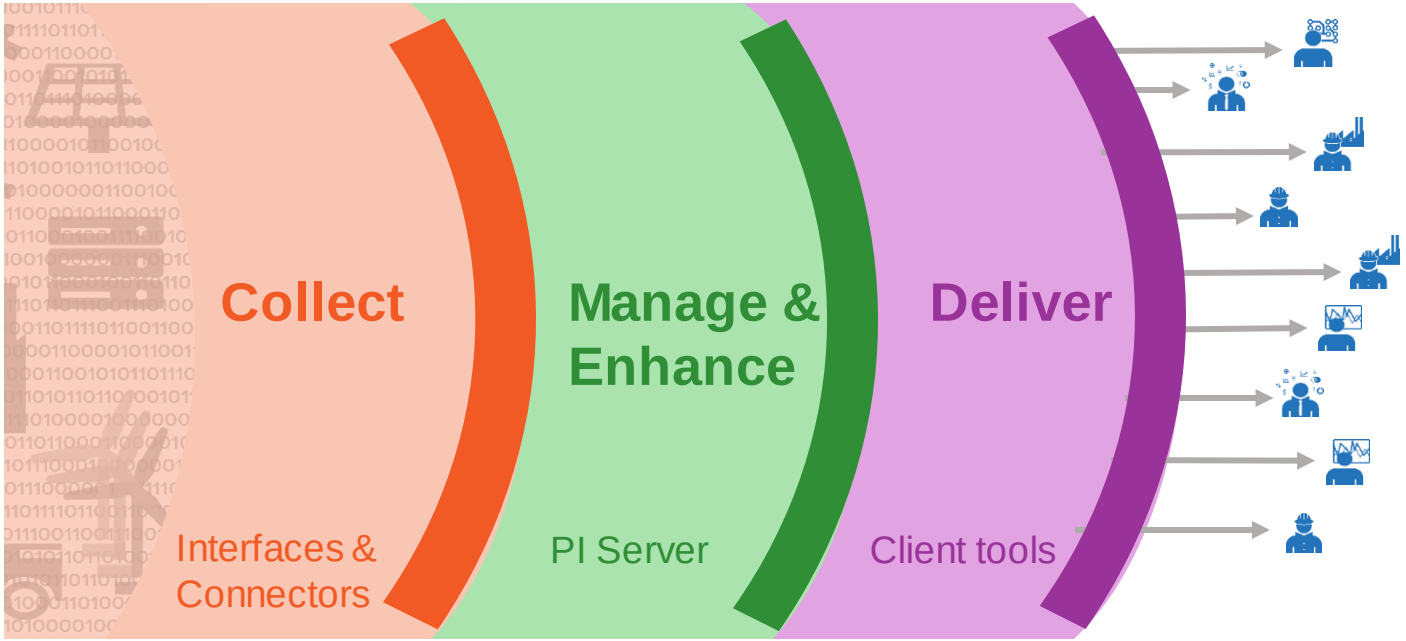
1. Collect & store data

2. Assign asset context

3. Execute condition monitoring logic

4. Visualize real-time conditions

5. Notify



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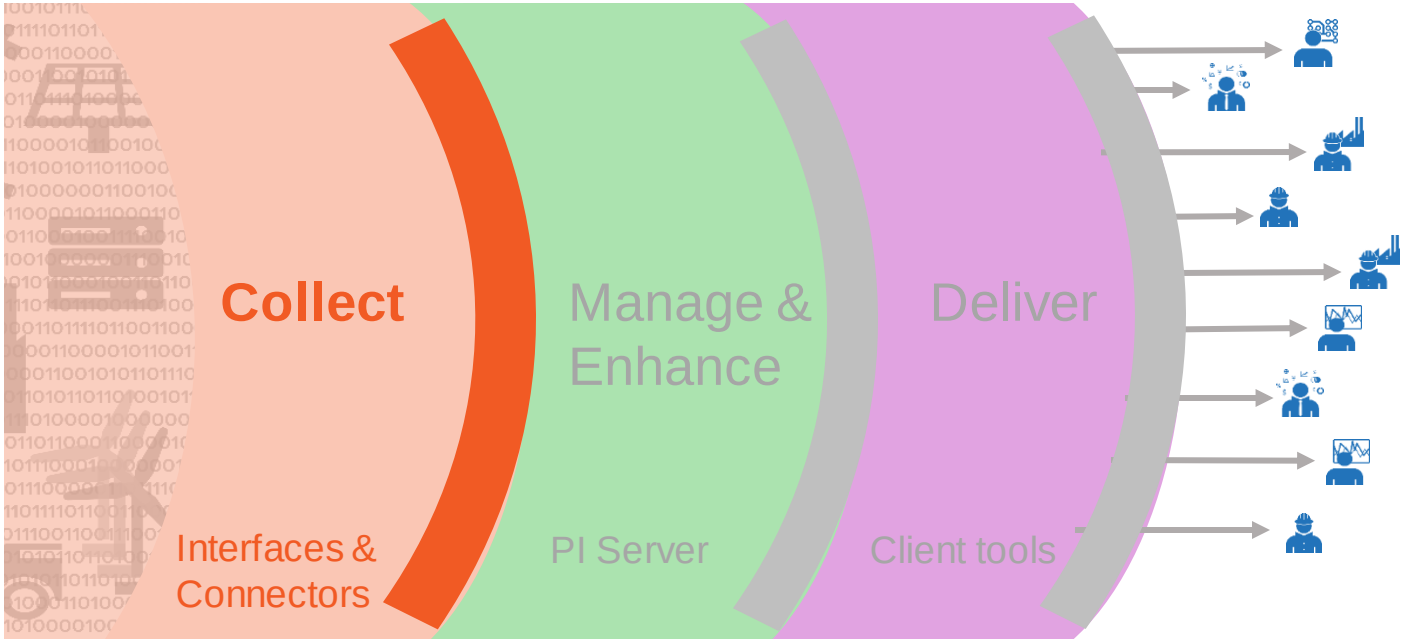
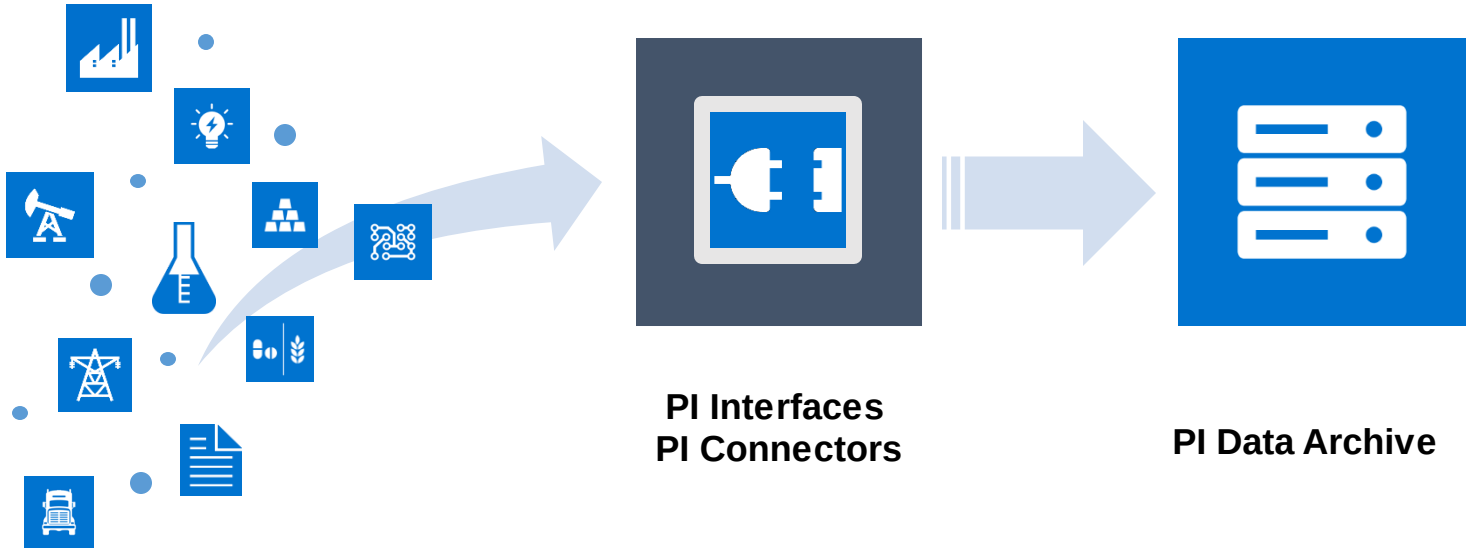


Collect and Store Data



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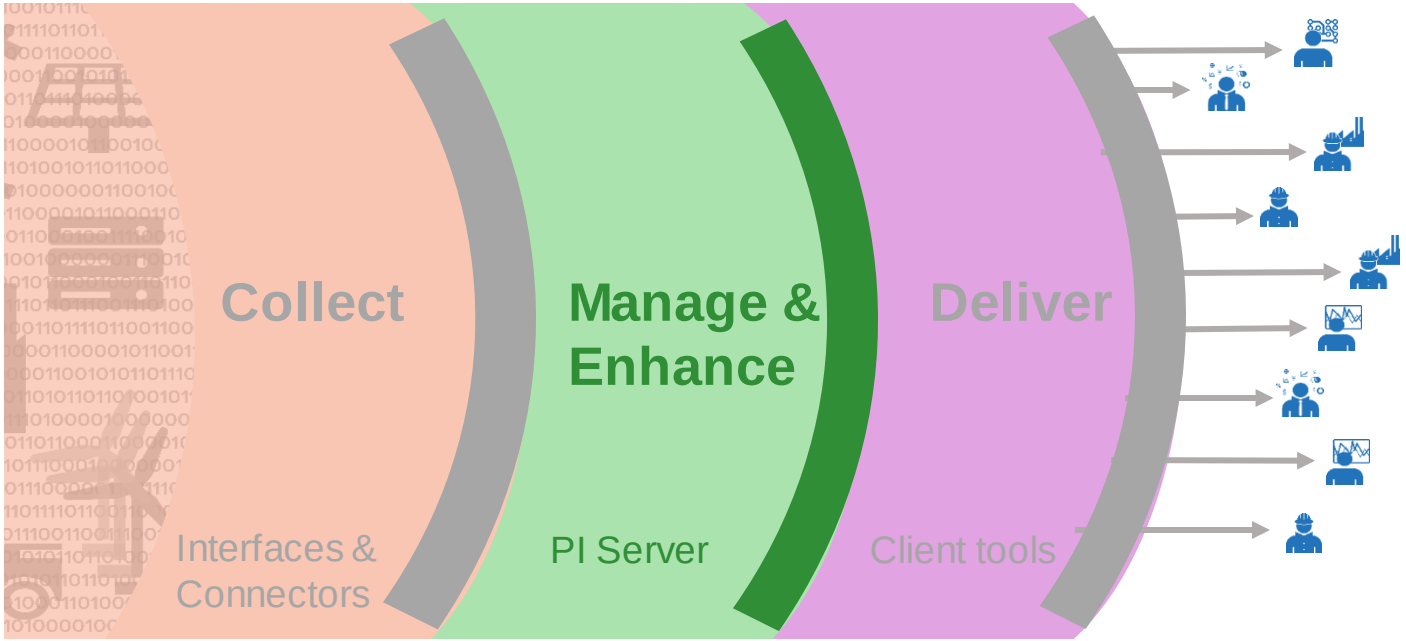
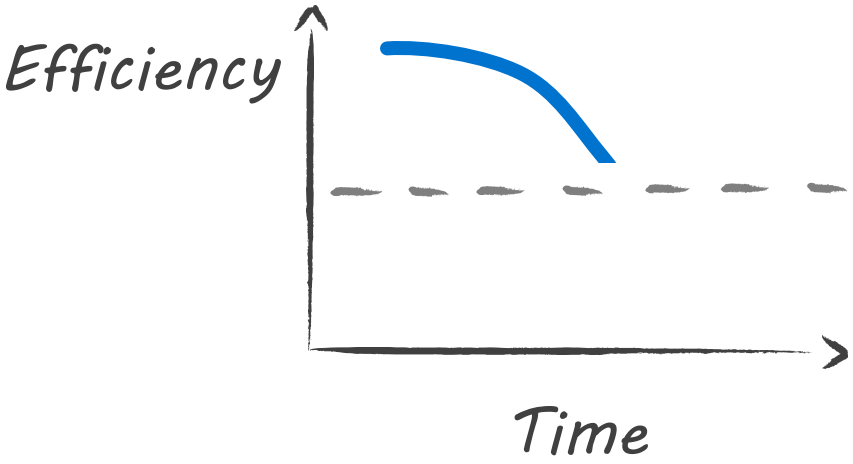
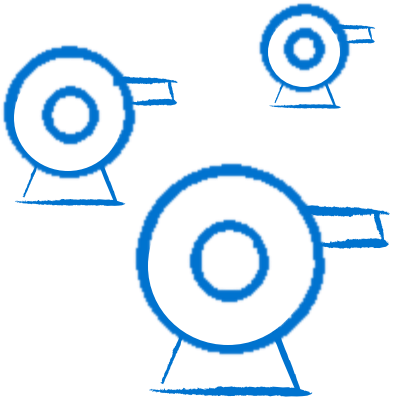


AF pro-tip: Sketch what you want to see





Type: Discharge pump

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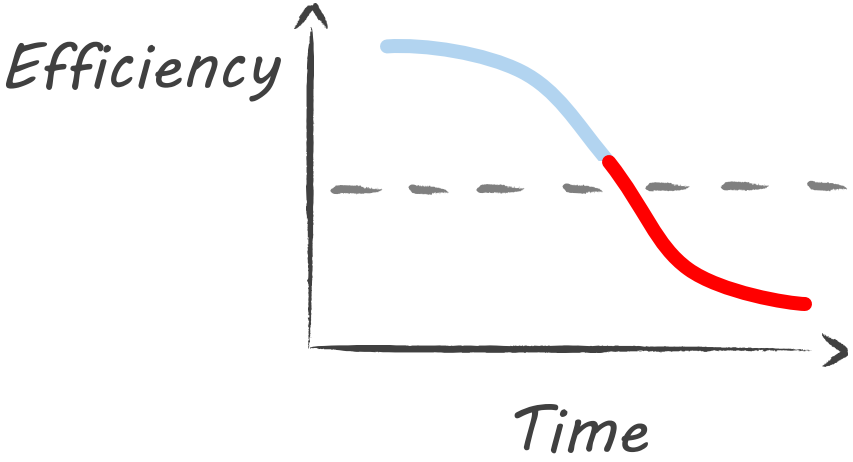

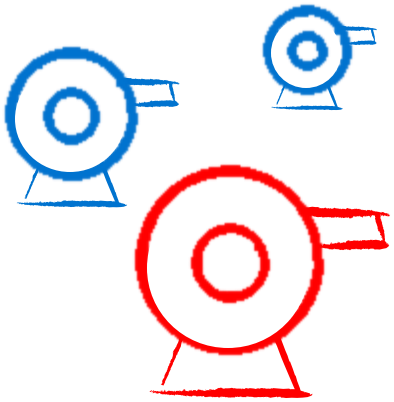

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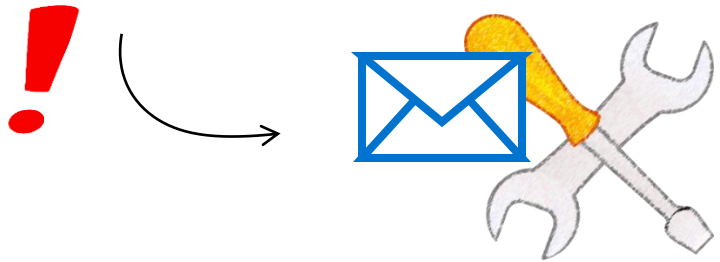
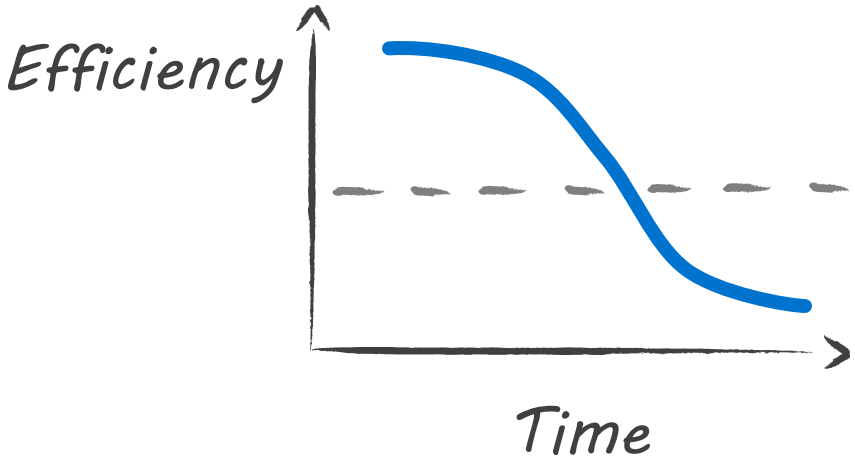


Use a sketch to focus on what you need for CBM



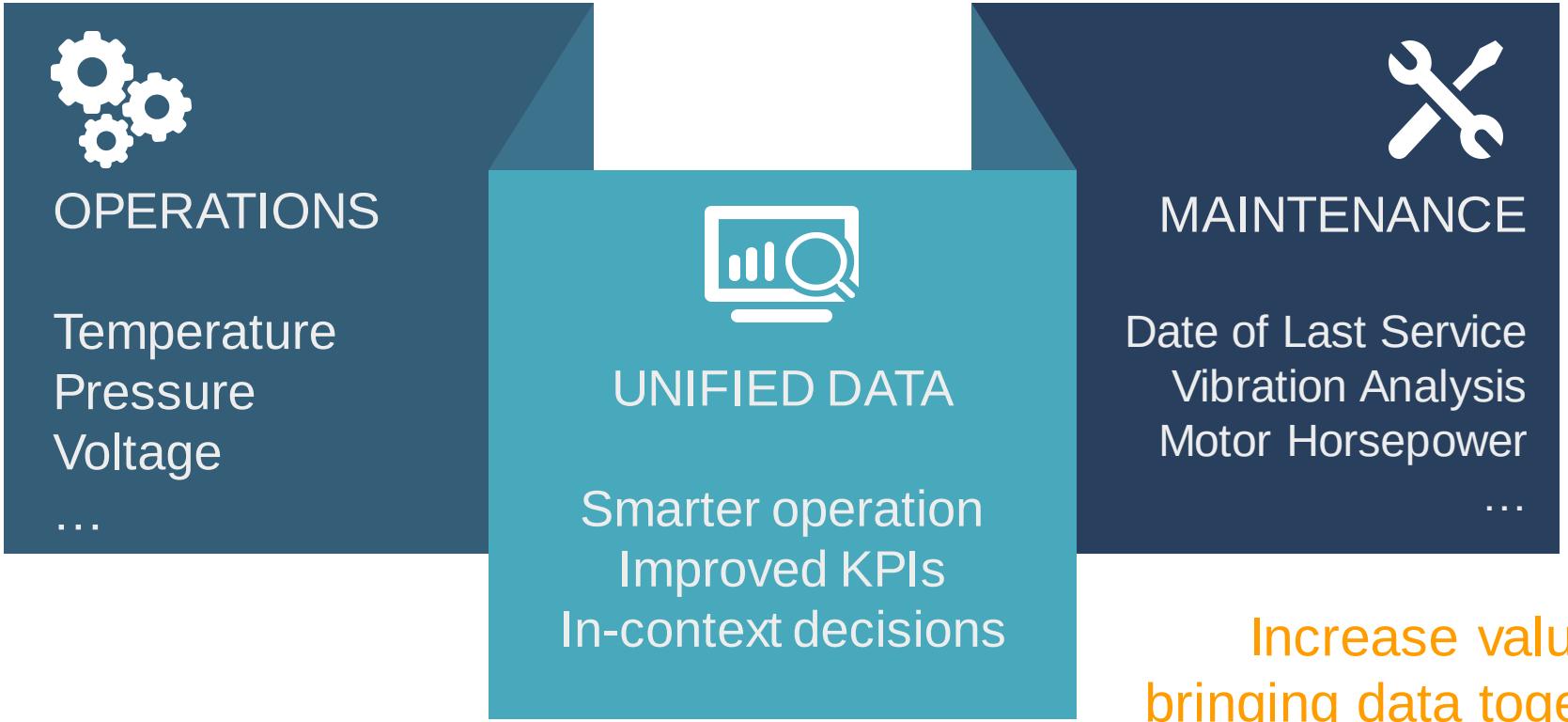
Flowrate X Head

Horsepower

Get these values

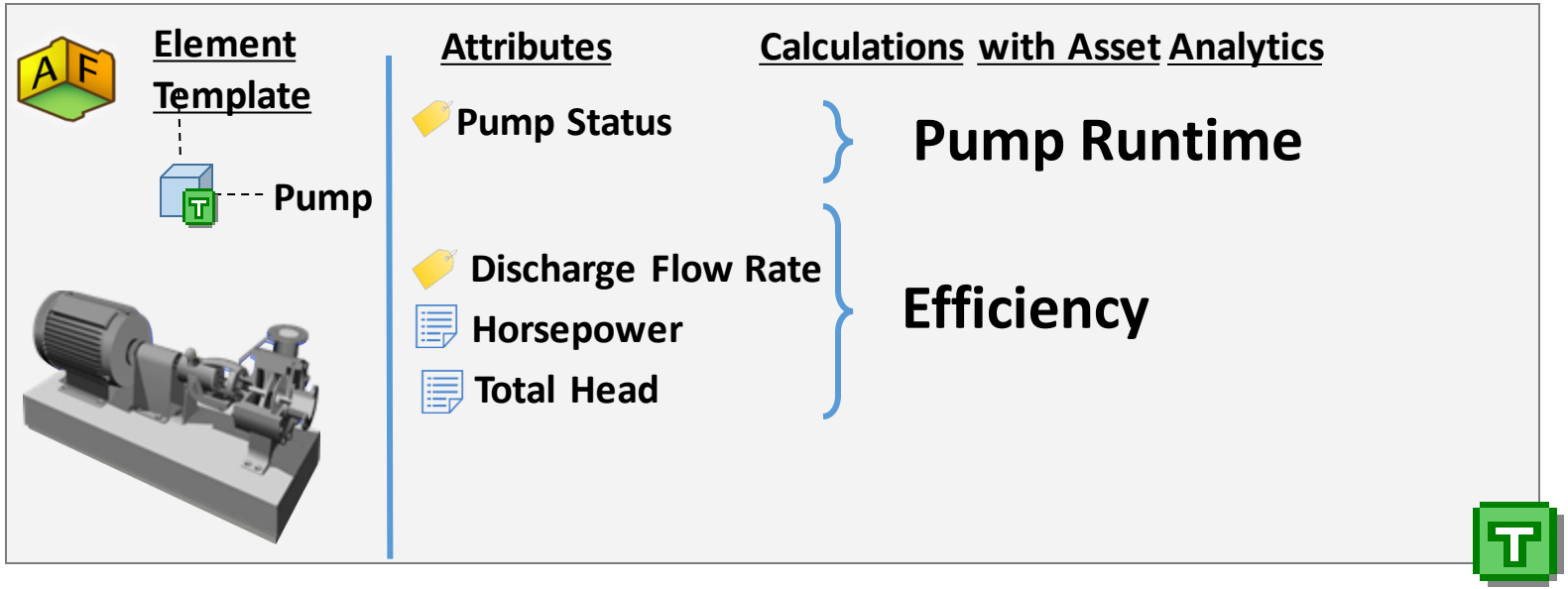
- Measurements
- Look-up tables

Traditionally, operations & maintenance data are separate

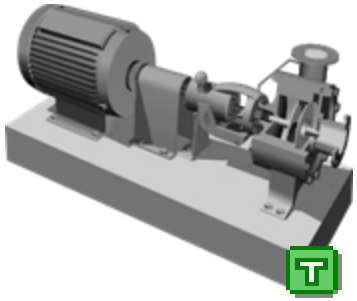


Increase value by bringing data together

Build a Template

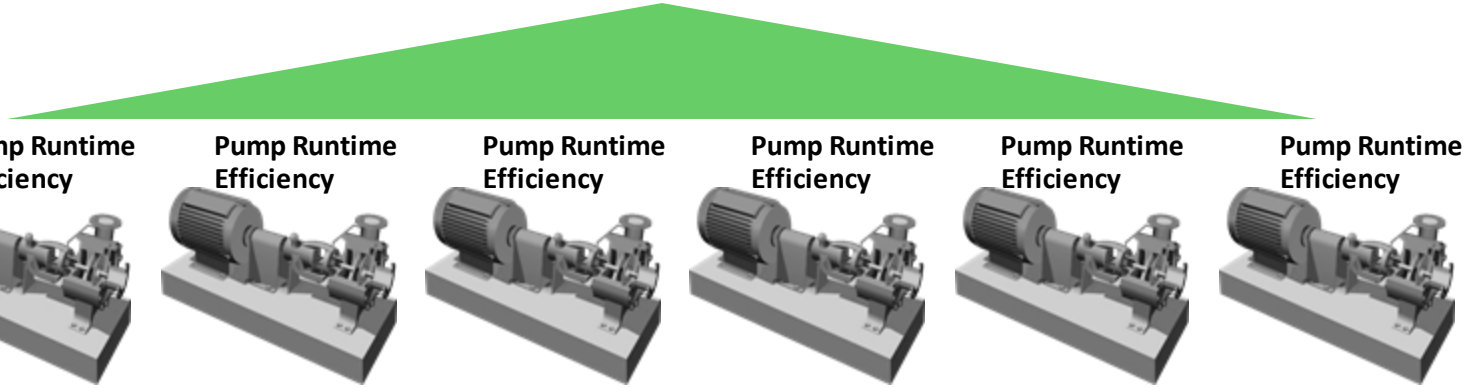


Reuse Your Template



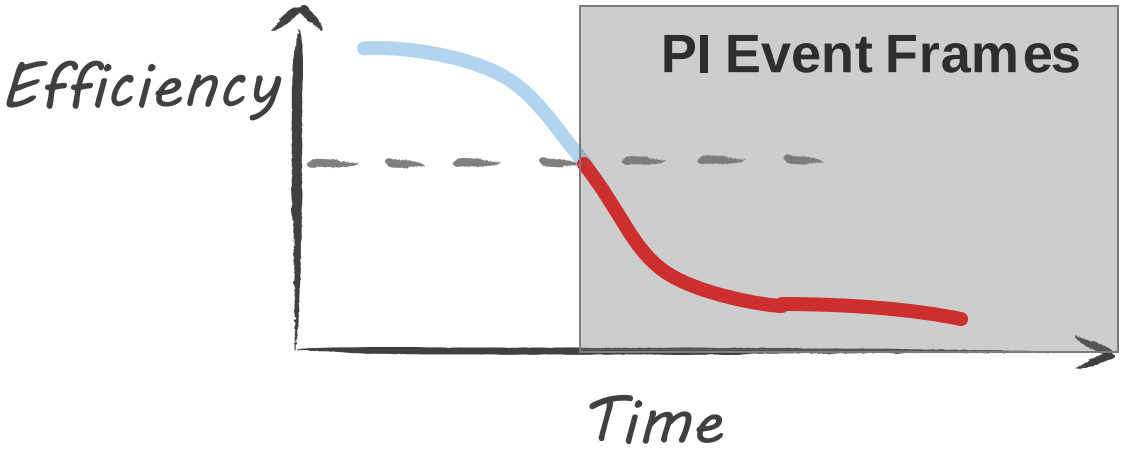
Pump Runtime

Efficiency

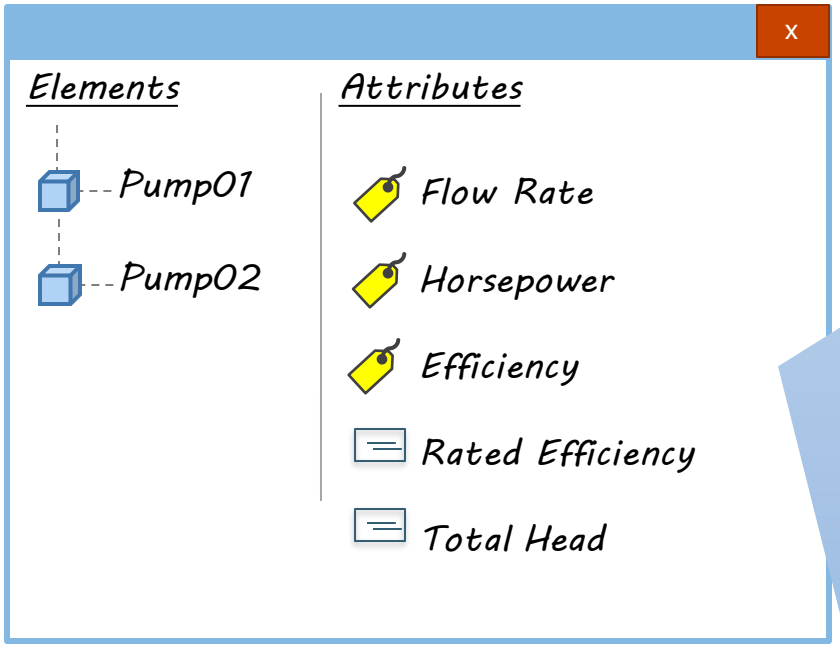


Specify Trigger Conditions

Pump Efficiency < **Rated Efficiency %**



A few attributes is all you need to start CBM



Maintenance event

Template: Pump maintenance

Expression

`'Efficiency' < 'Rated Efficiency'`

True for

`12 hours`

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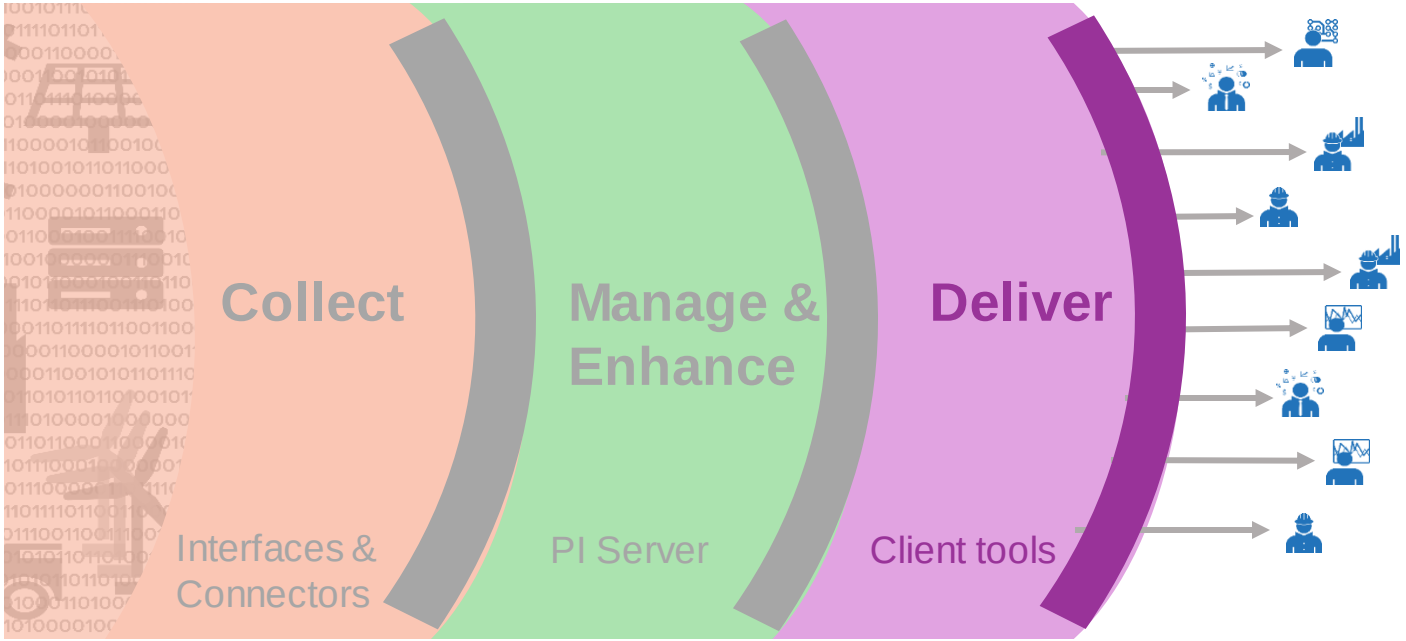
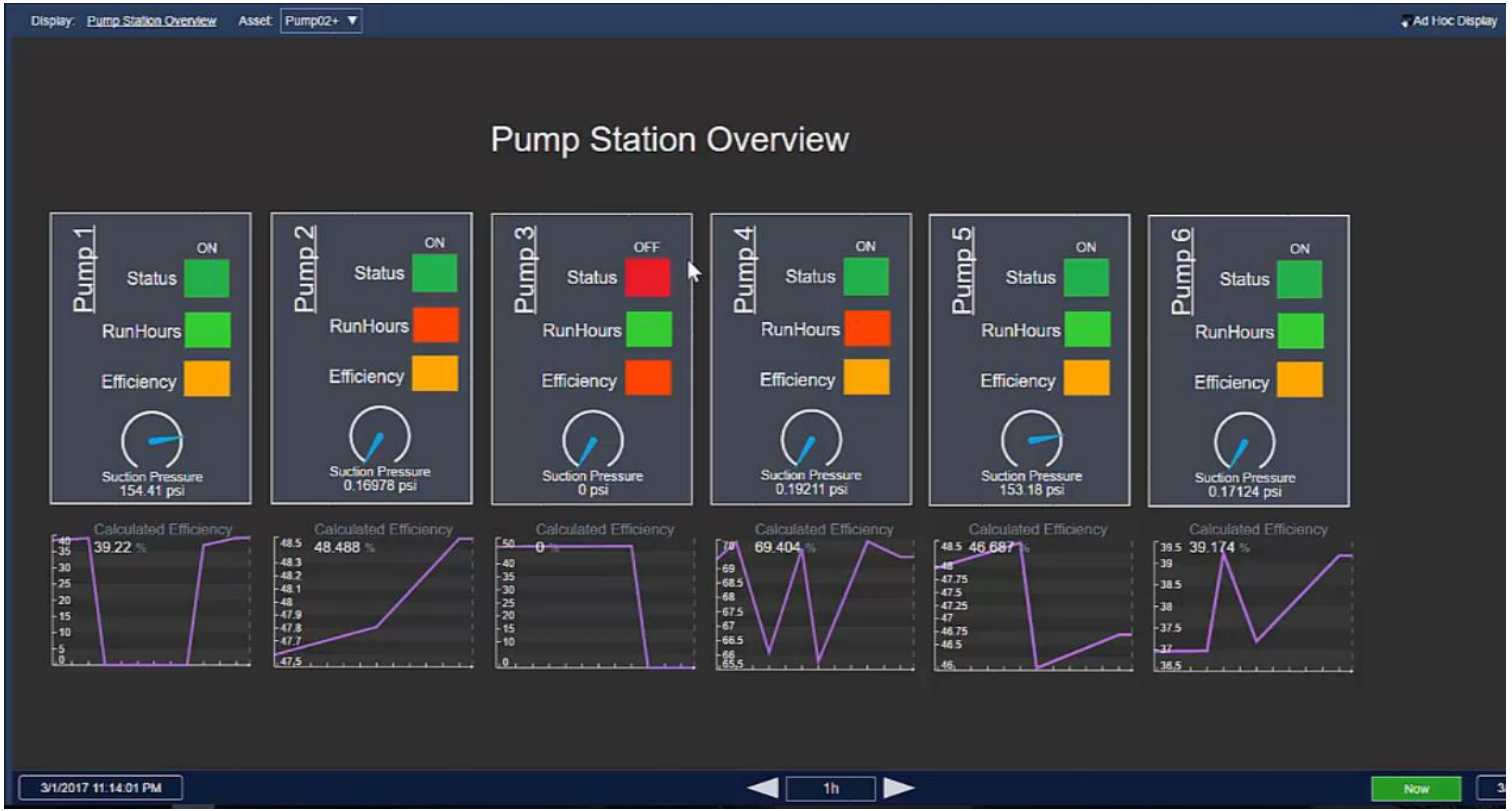
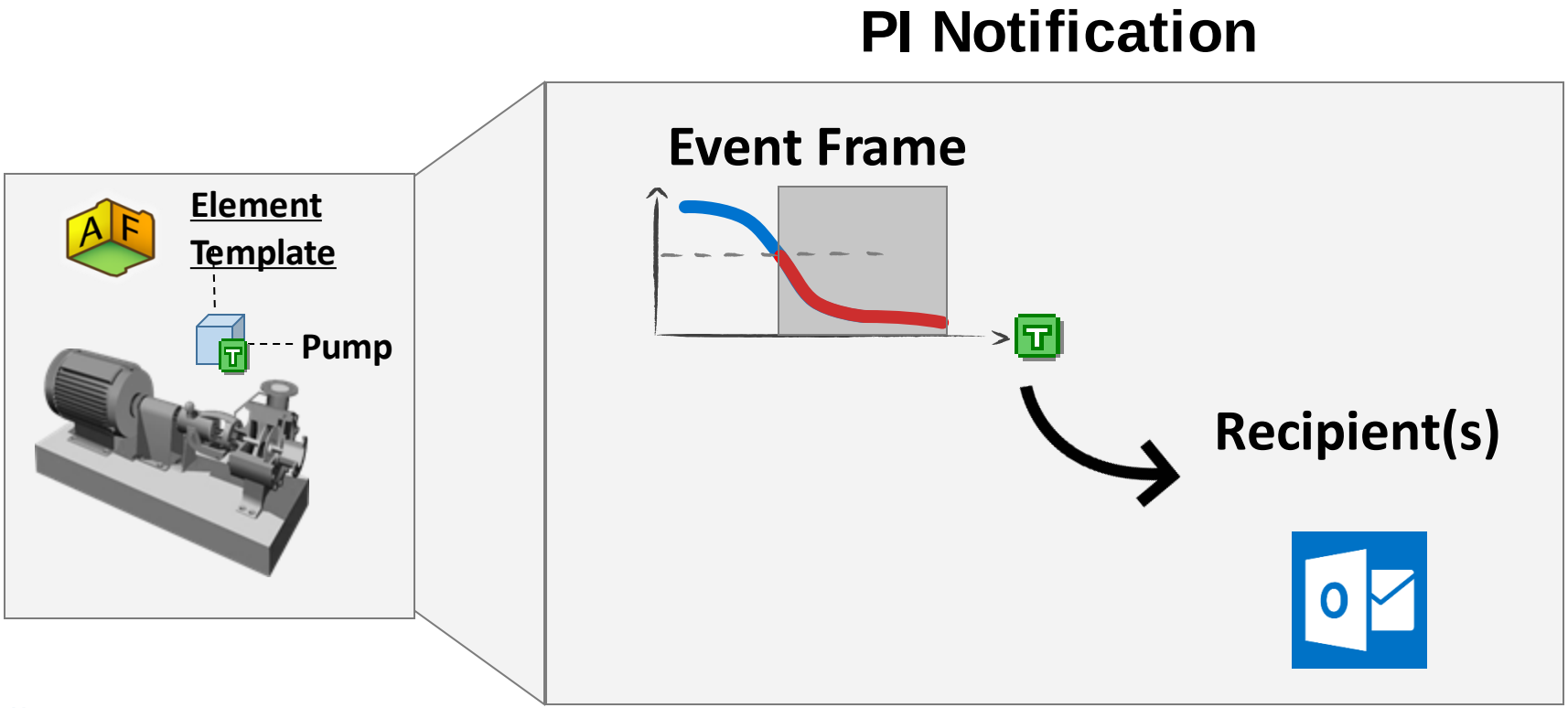
4. **Visualize real-time conditions**
5. **Notify**



PI Vision Dashboards



Send Alerts to Users



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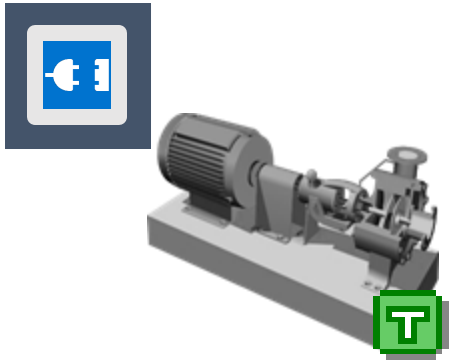
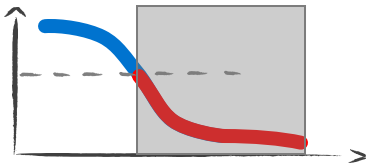
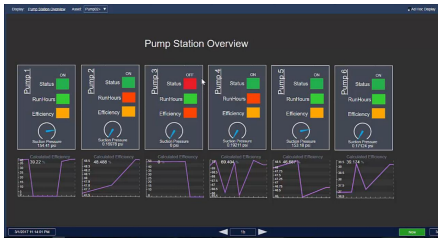
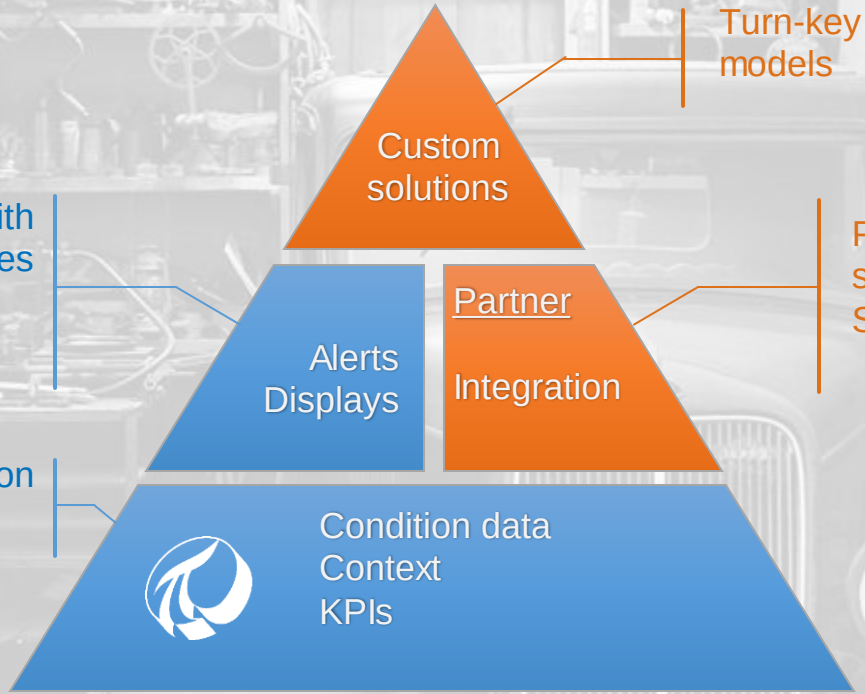


Event Frame





Jumpstart CBM and create foundation for solutions



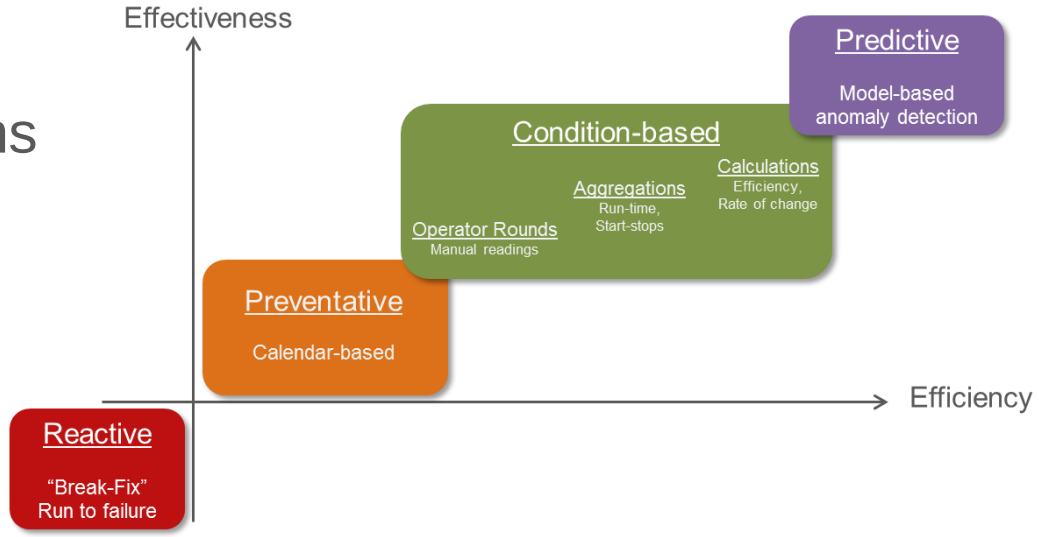
Condition monitoring: Driving effective maintenance

Start TODAY with your PI System:

- Asset watch list & notifications

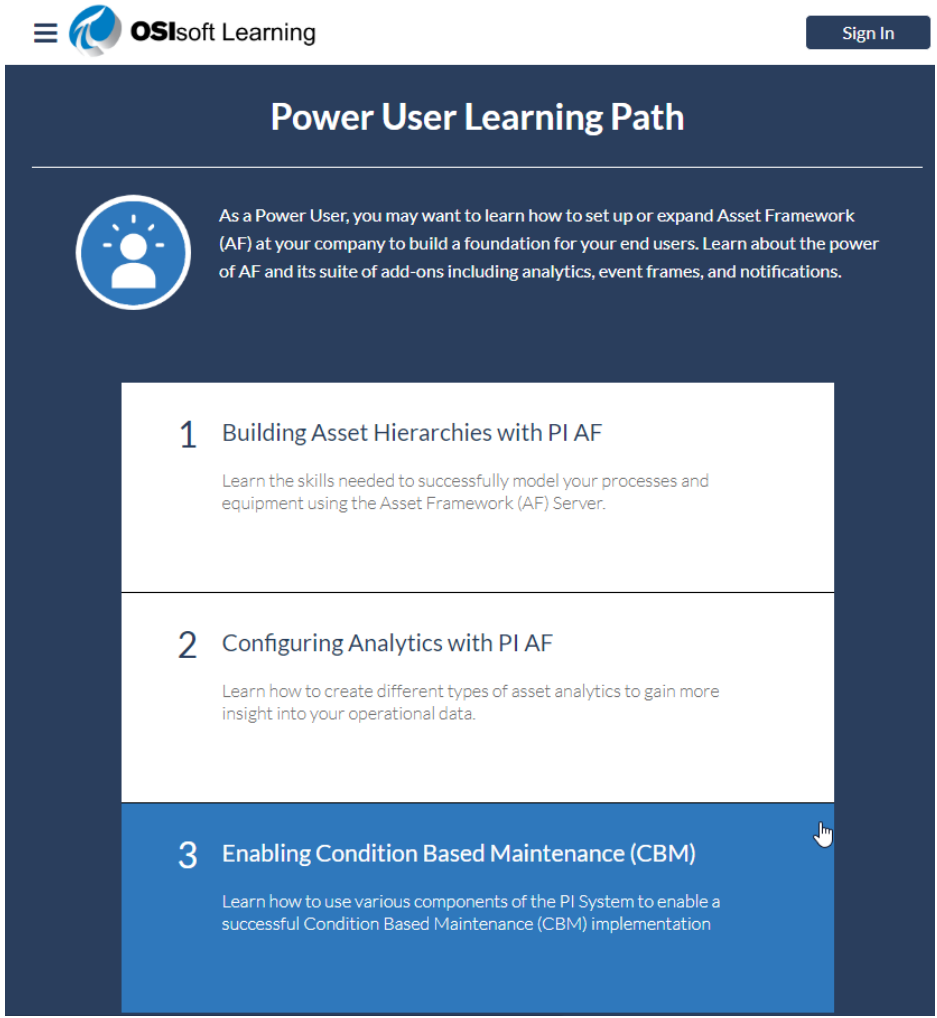
Foundation for further partner enhancements & advanced integration

- Pump CBM AF Example Kit
- Videos & white paper on PI Square > Search “CBM”



CBM
Small Private Online Course (SPOC)

learning.osisoft.com



Asset Monitoring and Condition-based Maintenance (CBM) with the PI System

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State your **name & company**

Please remember to…

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