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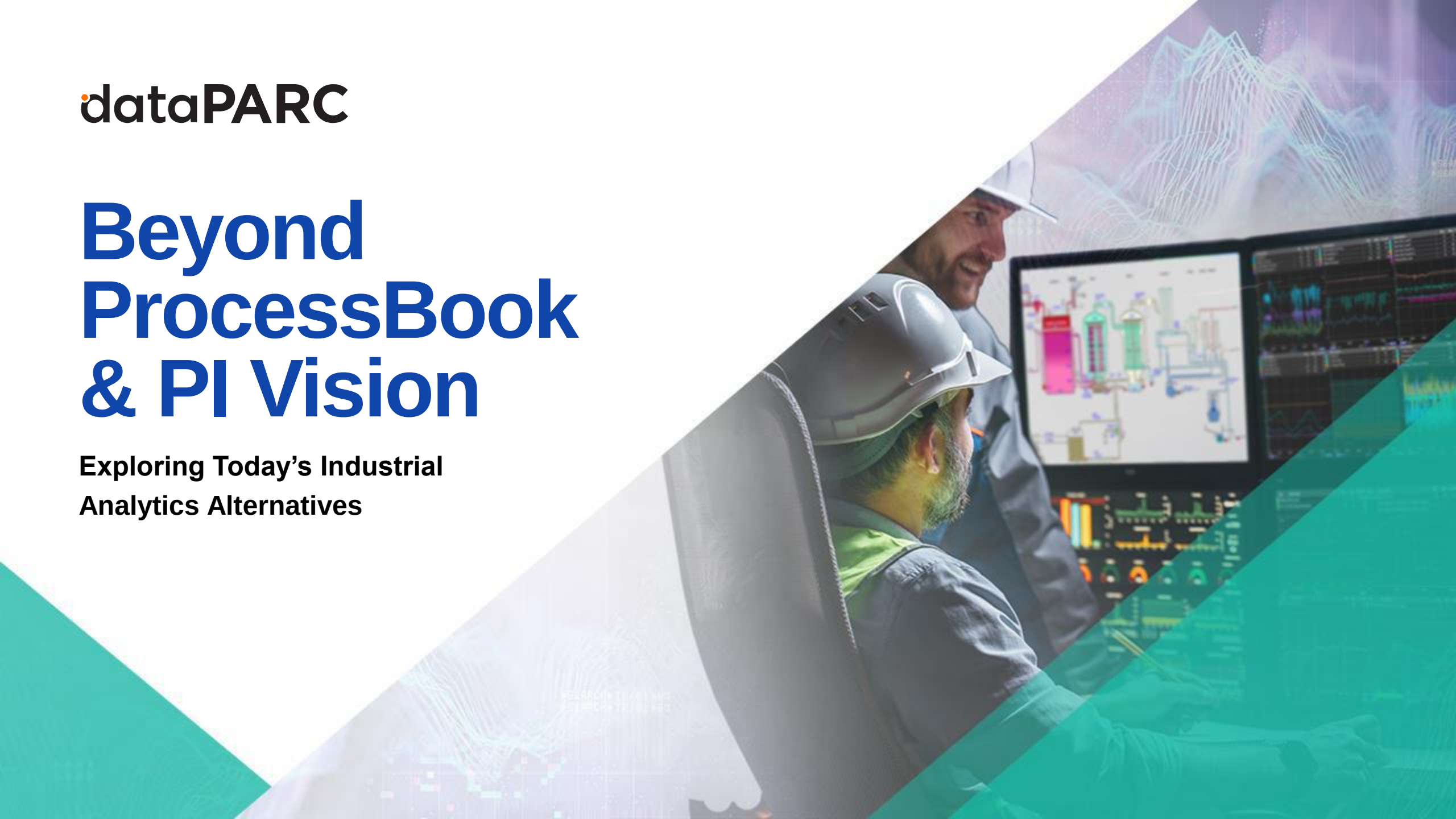
Beyond ProcessBook & PI Vision

Exploring Today's Industrial Analytics Alternatives



Today's Presenters

Kevin Jones

Director of Partner & Product Strategy

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Adam Cooper

Senior Sales Engineer

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Agenda

Part 1 (For Everyone): Industrial Analytics

- Background
- Value
- Overview of the marketplace

Part 2 (For those investigating alternatives to PI)

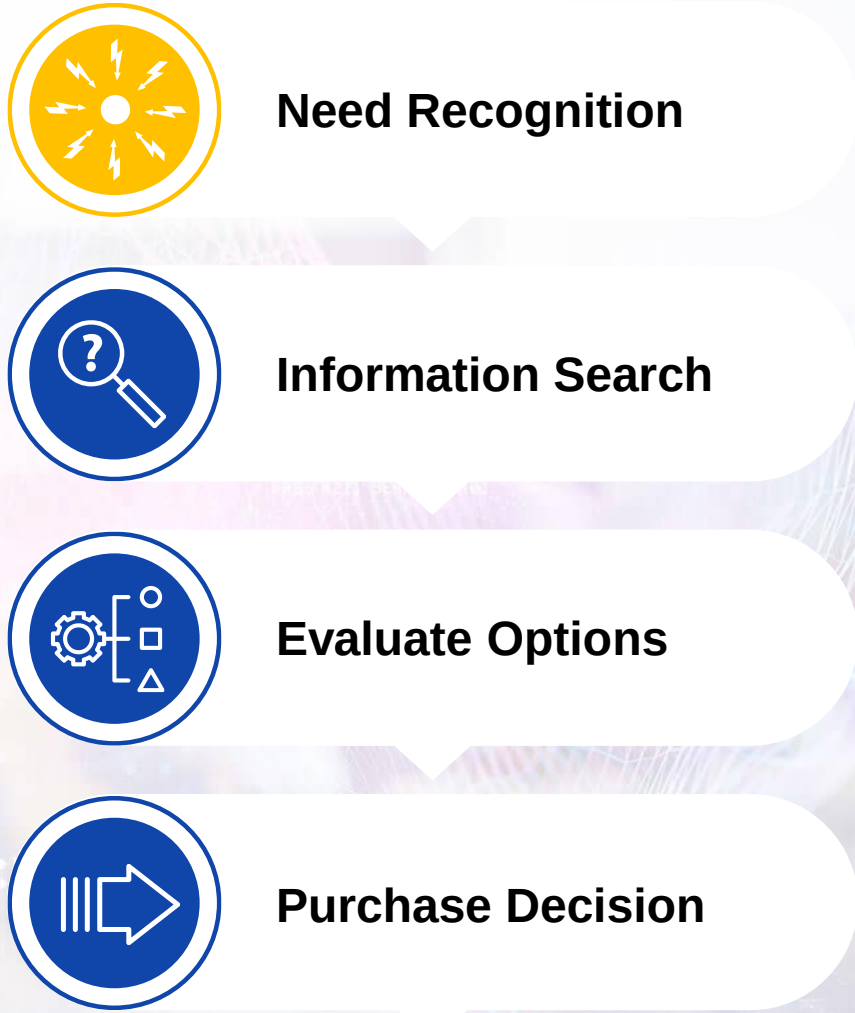
- Evaluation criteria & considerations
- dataPARC's approach
- Migration strategy

Q&A

Triggering Need

Can happen at any time.

1. Current ProcessBook users confronting end-of-life.
2. ProcessBook users that switched to Vision (or another solution) & looking again at alternatives.
3. Customers looking at PI for initial investment & wondering about alternatives.



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1980	1997	Present
Development of historians and **plant** information systems	Founded by a group of chemical engineers with decades of plant operations experience	1000+ Customers

Approximately 1000 sites using dataPARC worldwide

Headquarters in Washougal, WA

Part of the Voith Group

Focus on Real-Time Visualization, Analytics & Monitoring

dataPARC Experience

PI Integration Experience

- Ease of Integration – dataPARC was **originally** designed to leverage the PI Historian
- Highly Optimized Drivers for PI Historian
- Improved Query Speed
- **15 years** of experience in conversion tools For ProcessBook, Vision & Datalink Reports
- Empower Your People

Industrial Analytics

Why & Who

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Industrial Analytics (why)

- Stay competitive
- Enhance operational efficiency
- Improve decision-making

Organizations need to run better with fewer people

Industrial Analytics allows every employee to become a better decision-maker, faster

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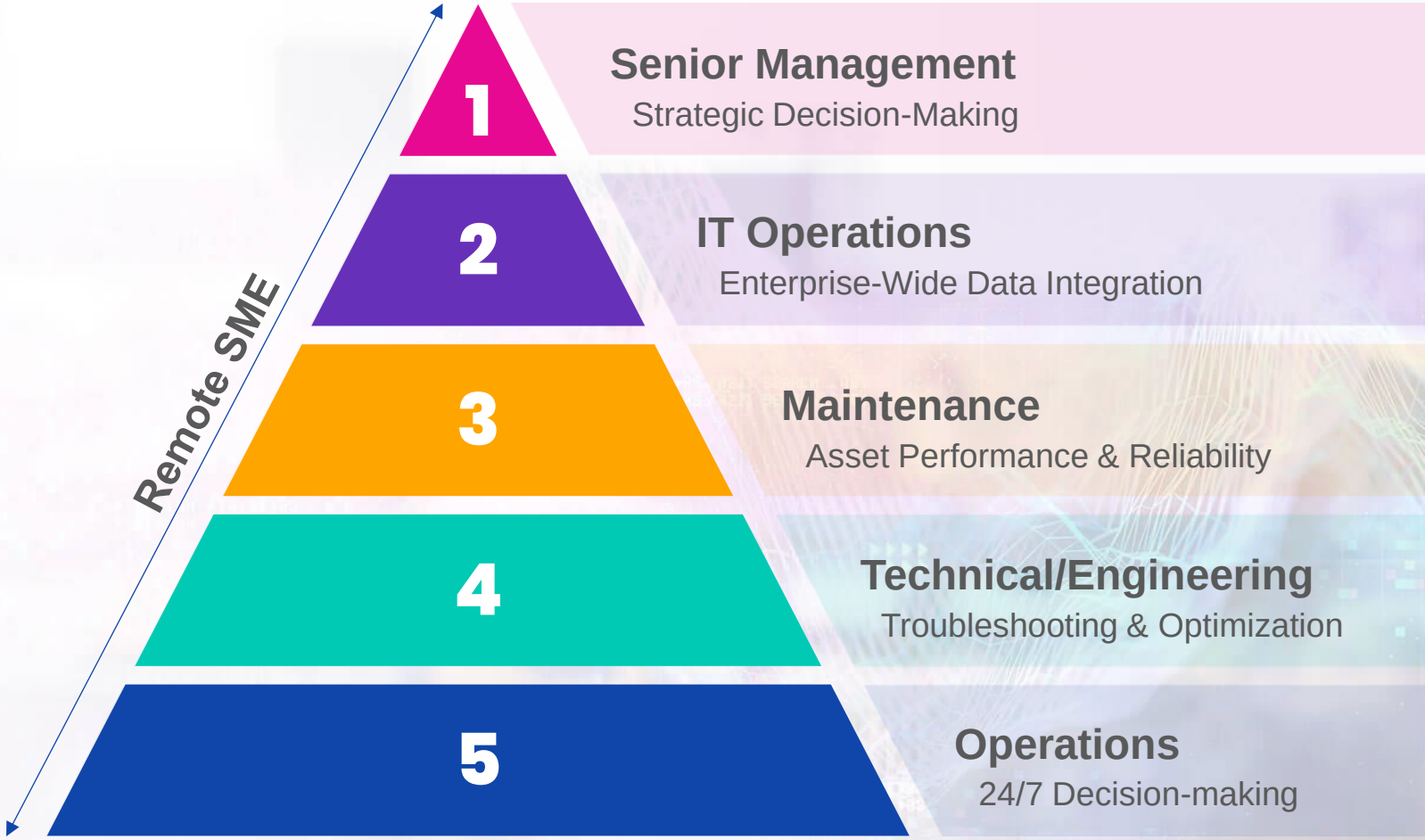
Industrial Analytics (who)

- **Operations** – Make every operator your best operator
- **Technical** – Troubleshoot, optimize and subject matter expertise
- **Maintenance** – Asset performance & reliability
- **IT** – Admin, Security, Data Ops
- **Senior Management**
- **Remote SME** (Spans all levels)



What are my Options?

Exploring the industrial analytics landscape

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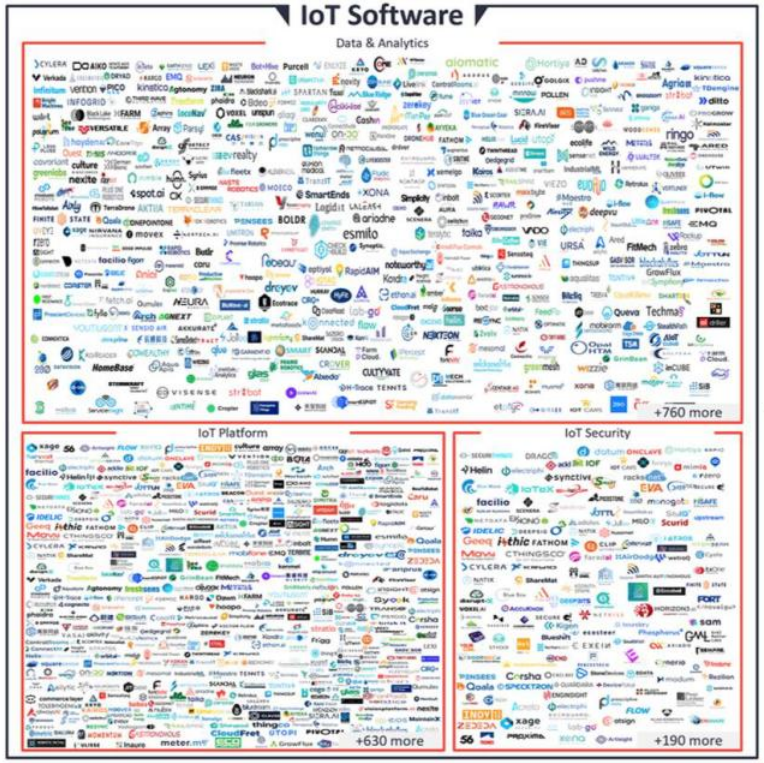
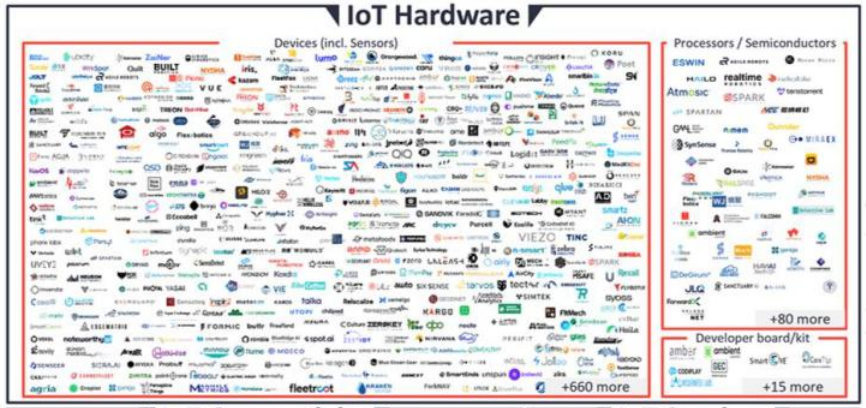
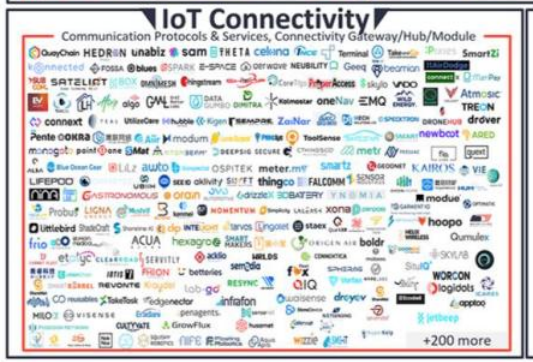
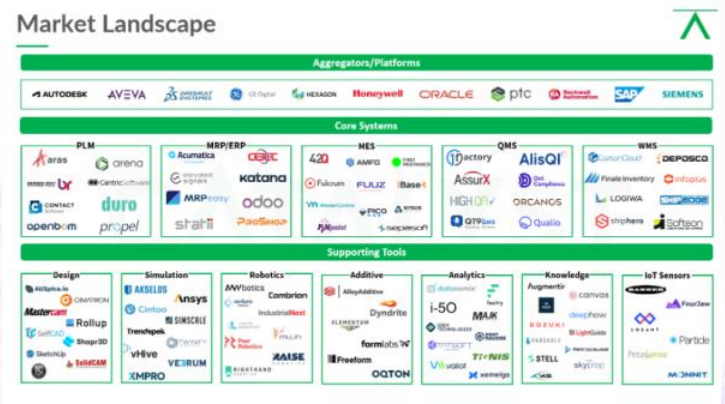
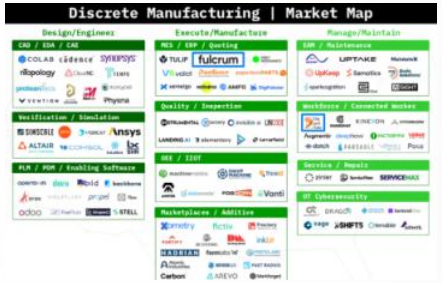
Variety of Market Maps











Categories of Industrial Analytics Solutions

Transparency - Provide data where none currently exists

Assist - Perform tasks more efficiently

Guide - Recommend the best solutions to a given problem

Automate - Solutions in closed-loop or digitally automated (real-time process changes, automated work flows, etc.)

Autonomy - Solutions in closed-loop that automatically adapt, and ultimately act autonomously

Industrial Analytics Generations

Gen 1

- Born out of OT
- "Actionable Insights"
- Consolidate operational data
- Trusted tools

Gen 1

- **dataPARC**
- **ABB**
  - 800xA
- **AspenTech**
  - InfoPlus
- **AVEVA/OSIsoft**
  - PI System
  - InStep
- **Emerson**
  - DeltaV
- **GE**
  - Proficy
  - Csense
- **Honeywell**
  - PHD & Uniformance
- **Mitsubishi**
  - Iconics
- **Rockwell**
  - Incuity (VantagePoint)
- **Siemens**
  - XHQ
- **Yokogowa**
  - ExaQuantum

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Industrial Analytics Generations

Gen 2

- "Advanced Analytics"
- Leverage existing data repositories
- Focus on advanced users
- VC enthusiasm

Gen 2

- **Braincube**
- **Falkonry**
- **Seeq**
- **Trendminer**
- **Cognite**
- **SightMachine**
- **Element Analytics**
- **Etc.**

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Industrial Analytics Generations

Gen 3

- Predict outcomes & recommend actions
- "AI/ML algorithms" - Original Industrial AI
- Reduce user involvement
- Vertically-focused
- IT experience, applied to OT
- Black box, white box, "trust"

Gen 3

- **ControlRooms AI**
- **Augury**
- **Palantir Foundry**
- **Symphony.ai**
- **Raven.ai**
- **Twinthread**
- **Canvas.ai**
- **Etc.**

Boom of Generative AI

Google Global Search Popularity (5-year Trend)

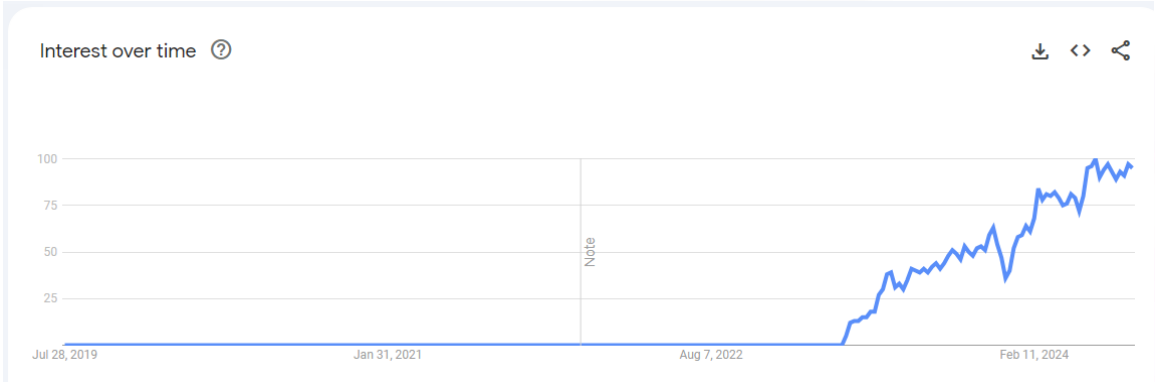
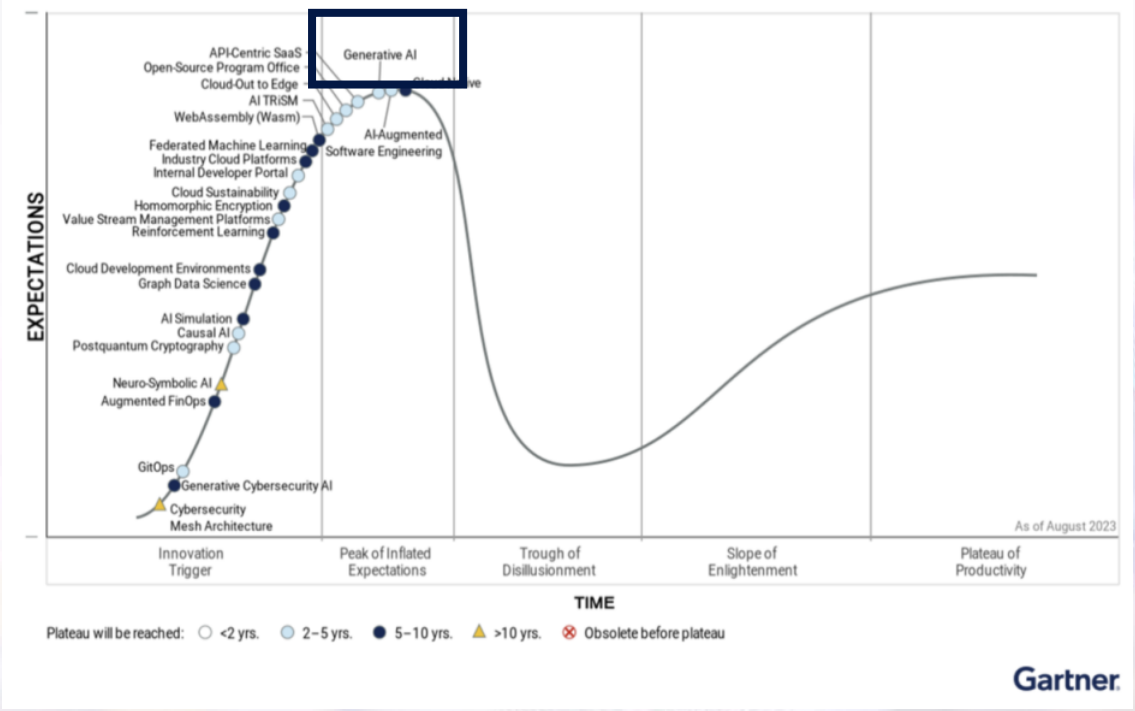


Figure 1. Hype Cycle for Emerging Technologies, 2023



- Marketed as a road to Autonomy → Not ready for AI with Agency*
- Practically serves as an Assist use case → UX element to software

* https://learn.microsoft.com/en-us/ai/playbook/technology-guidance/generative-ai/mlops-in-openai/security/security-recommend

Use Case Categories & Generations

- **Gen 1**: Original Value was Transparency…Assist & Guide have been natural expansion
- **Gen 2**: Original Value was Assist…Transparency & Guide were a natural expansion
- **Gen 3**: Original Value is Guide & Automate…Autonomy is the aspiration
- **Generative AI**: Current Value is Assist…Autonomy is the aspiration/marketing

Digital Maturity – Popular View

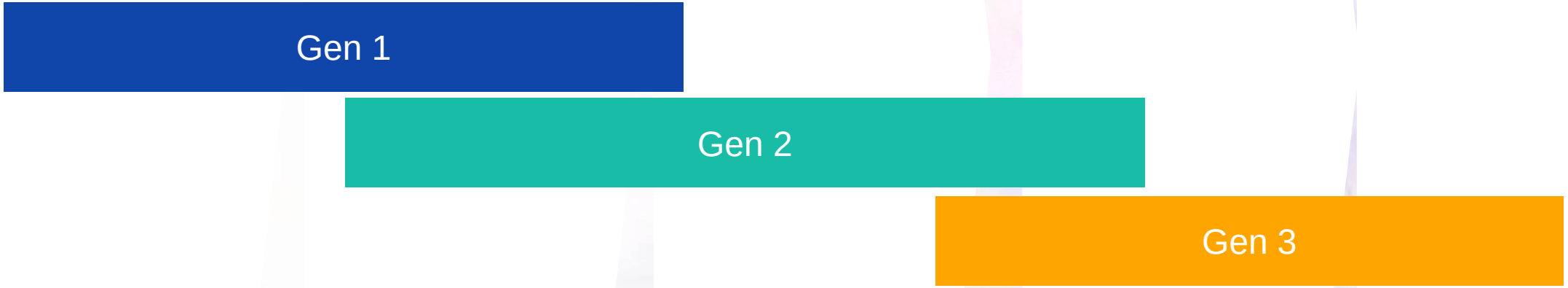
Transparency
Provide data where none currently exists

Assist
Perform tasks more efficiently

Guide
Recommend the best solutions to a given problem

Automate
Solutions, specific use cases, in closed-loop

Autonomy
Solutions with agency to make decisions



Concerns with Popular View

- Technology is not forever
- Vendors are not static
- Organizations are not homogenous
- Problems are not homogenous

Right Technology for the Problem

Robust Technology Stack

Role of People

Werner Vogels • Following
VP & CTO at Amazon.com
6mo •

AI is a major topic of conversation with many of the technology leaders I have met over the past few months. While some are apprehensive of the most recent developments and how it will impact our day-to-day lives, I'm optimistic that new technologies will positively augment human capabilities. Nowhere is this more evident than software development. Tools like CodeWhisperer and Amazon Q are already making it easier to write, debug, and deploy code. But we're only scratching the surface. In the coming years, we'll see AI tools take on a lot of the undifferentiated heavy lifting, freeing up developers to focus on the creative work that drives innovation. I will say it again: there has never been a better time to be a developer.

Security guidance for Large Language Models

Article • 03/22/2024 • 3 contributors

Feedback

In this article

LLM-specific threats
Recommended mitigations

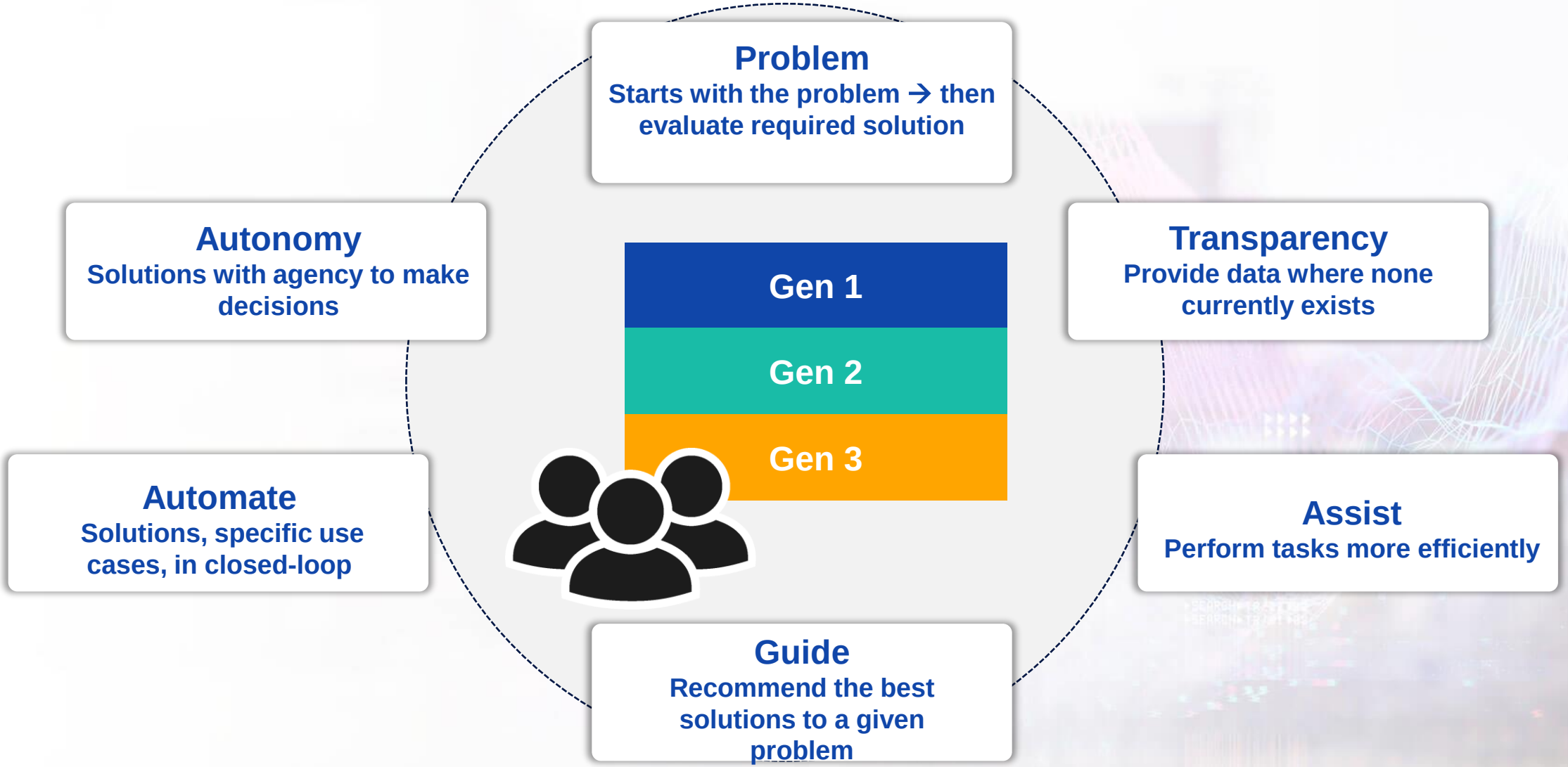
It's not a good idea to use Large Language Models (LLMs) in high-risk and autonomous scenarios.

LLMs may be biased, fabricate/hallucinate information, have reasoning errors, and struggle at certain tasks. They are susceptible to prompt injection, jailbreak attacks, and data poisoning attacks. Sensitive or confidential data may be leaked. When connected to other systems, they may take unintended actions.

Be mindful that LLMs is nascent technology. There are no proven, ironclad defenses for preventing manipulation of your LLM. For every clever defense, there seems to be a clever attack or workaround.

Therefore, it's best to use LLMs in low-stakes applications combined with human oversight.

Digital Maturity – Holistic View



Migration Considerations

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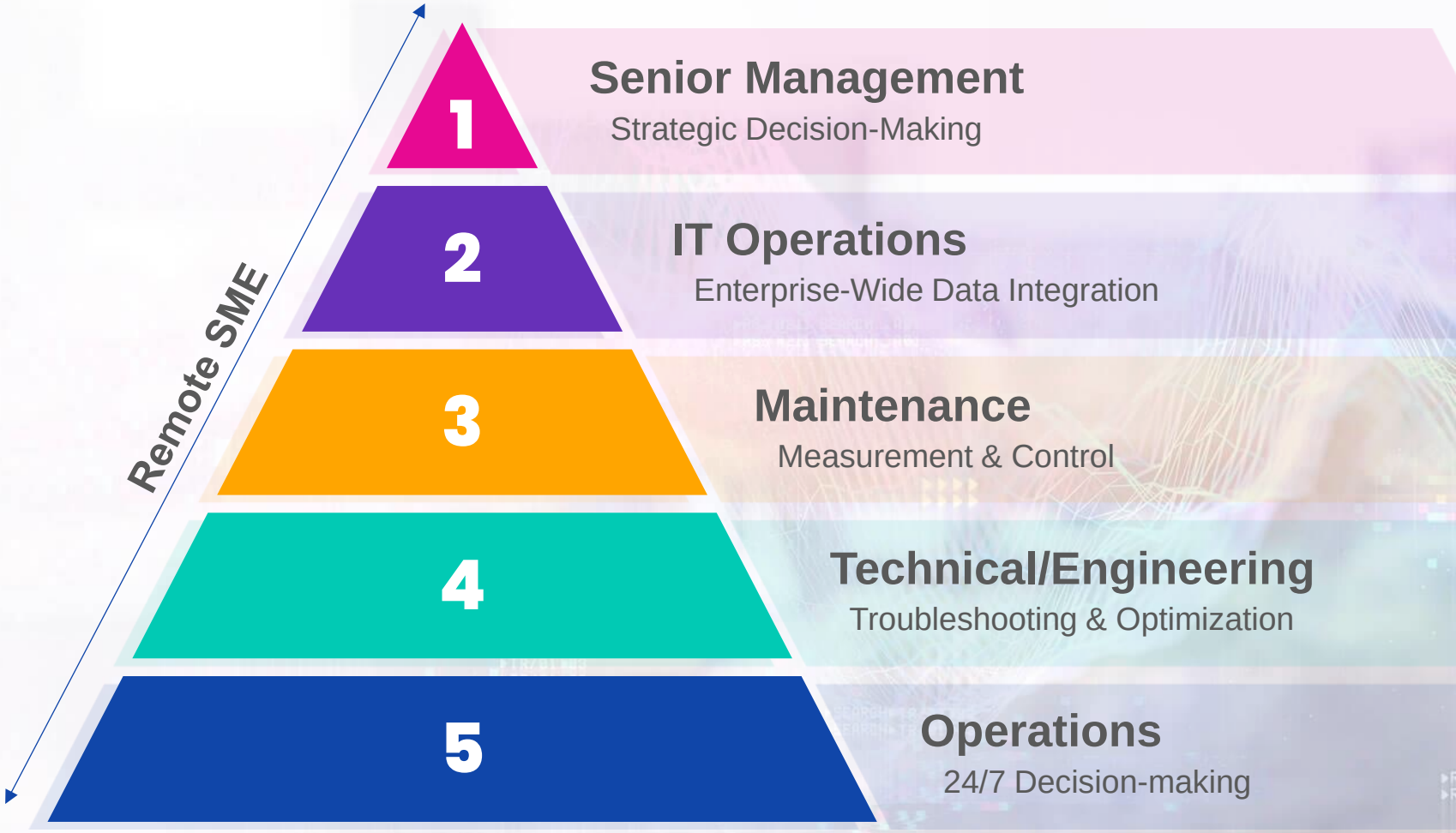
Additional Considerations

Users

- Current state & future aspiration
- Seamless across organization?
- Deliver a single version of the truth?



Additional Considerations

Ease of Data Integration

- Native integrations to historians?

Content Migration

- Migration utility/script to port over ProcessBook/Vision displays?
    - Is there a way to preserve existing displays
    - If not, what would it take to rebuild?
- Can you migrate expressions/calculations?
- How much experience does vendor have with migrations?

Training

- What is the effort?

Additional Considerations

Cost/Pricing

- Pricing model
  - Per user?
  - Cost to empower all key decision makers (operations, technical, management, etc.)
- Long-term view
  - Plant & enterprise-wide adoption
  - System should grow with you

dataPARC's Approach to Industrial Analytics

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Industrial Analytics – Comprehensive Solution

5 Pillars of Industrial Analytics

- **Data Operations**
  - Connect & move data to leverage external applications
- **Data Management**
  - Collect, store & transform data as the foundation of your industrial analytics strategy
- **Descriptive/Exploratory Analytics**
  - Self-Serve, Solve the problems you don't know you have
- **Operations Management**
  - Drive insights into effective decision-making
- **Advanced Analytics**
  - Industrial algorithms to provide additional insight to the data

Migration Demonstration

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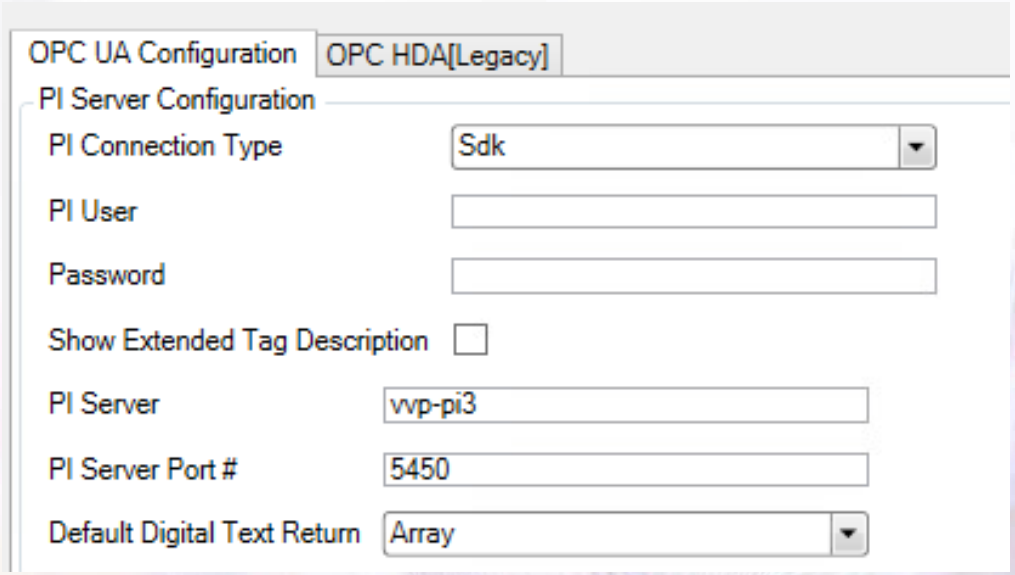
Connecting to Data

The PI SDK and PIAF SDK: widely used connection types

- dataPARC can connect in a few simple steps using the PI server address and port number



Improve Data Performance

Short term trend requests retrieve Raw data

Long-term trend requests retrieve Trend-Optimized values

Reports and Product Based Analysis retrieve values from the Rollup Archive

PI Historian

Aggregate Archive

Daily, Hourly & Trend Optimized Values

Rollup Archive

Grade, Shift, Batch, Product, Run ect…

Reads Real-Time Data

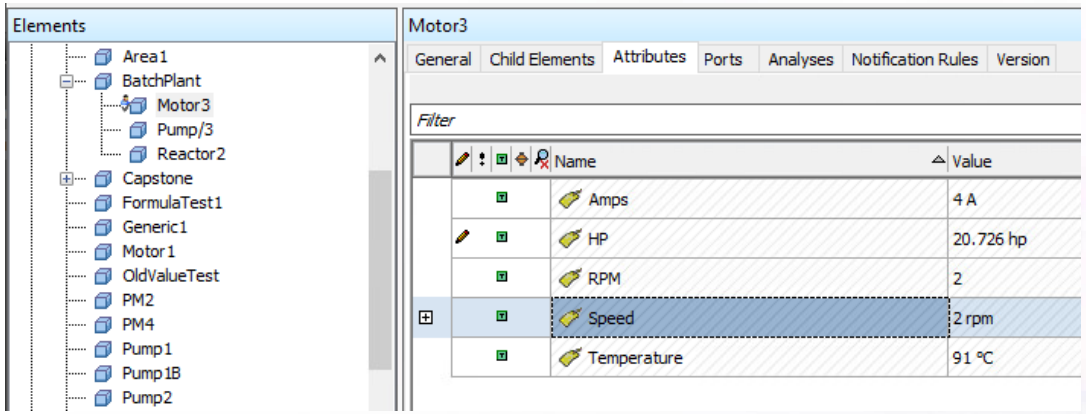
Writes Aggregates & Rollups – With Filters

PARCpde – Aggregate & Rollup Engine

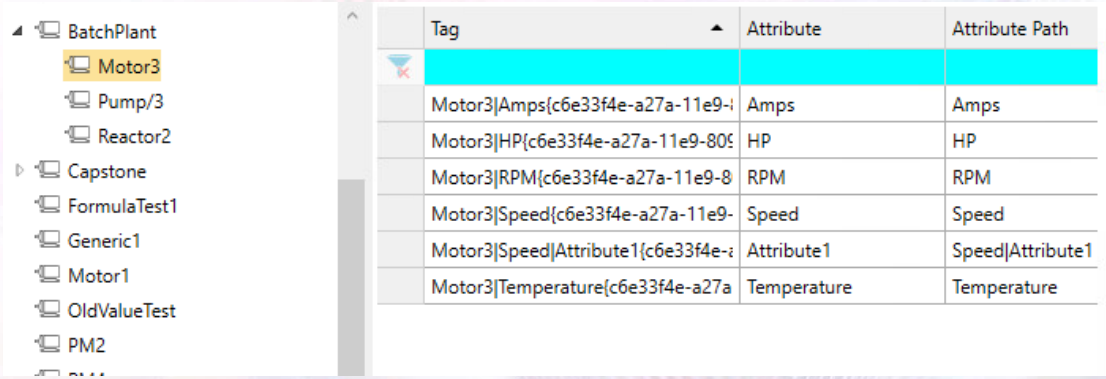
Asset Framework

Browse PI AF structure in dataPARC to leverage tag organization

PI System Explorer



PARCview Tag Browser



Exploring Today's Industrial Analytics Alternatives

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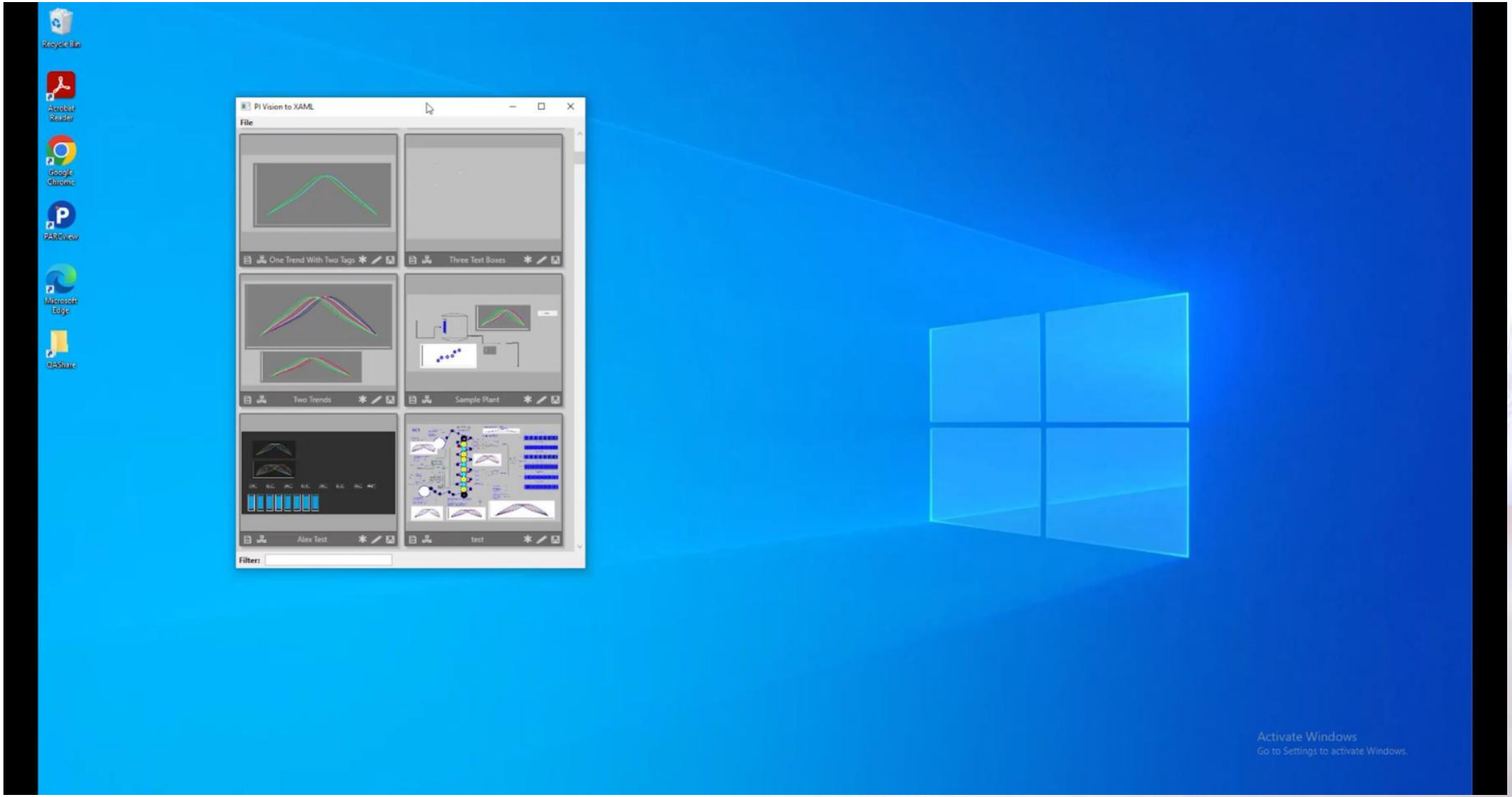
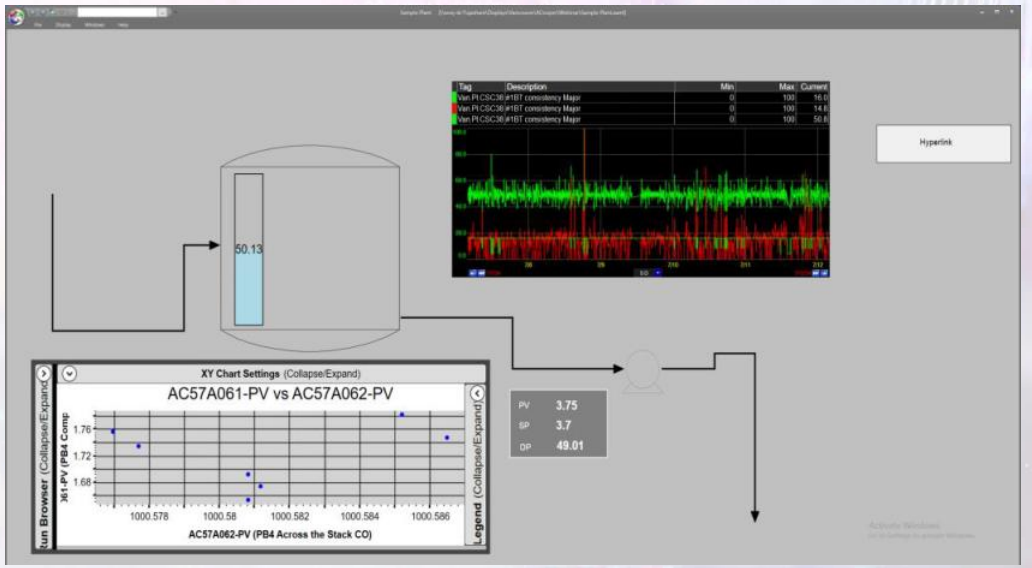


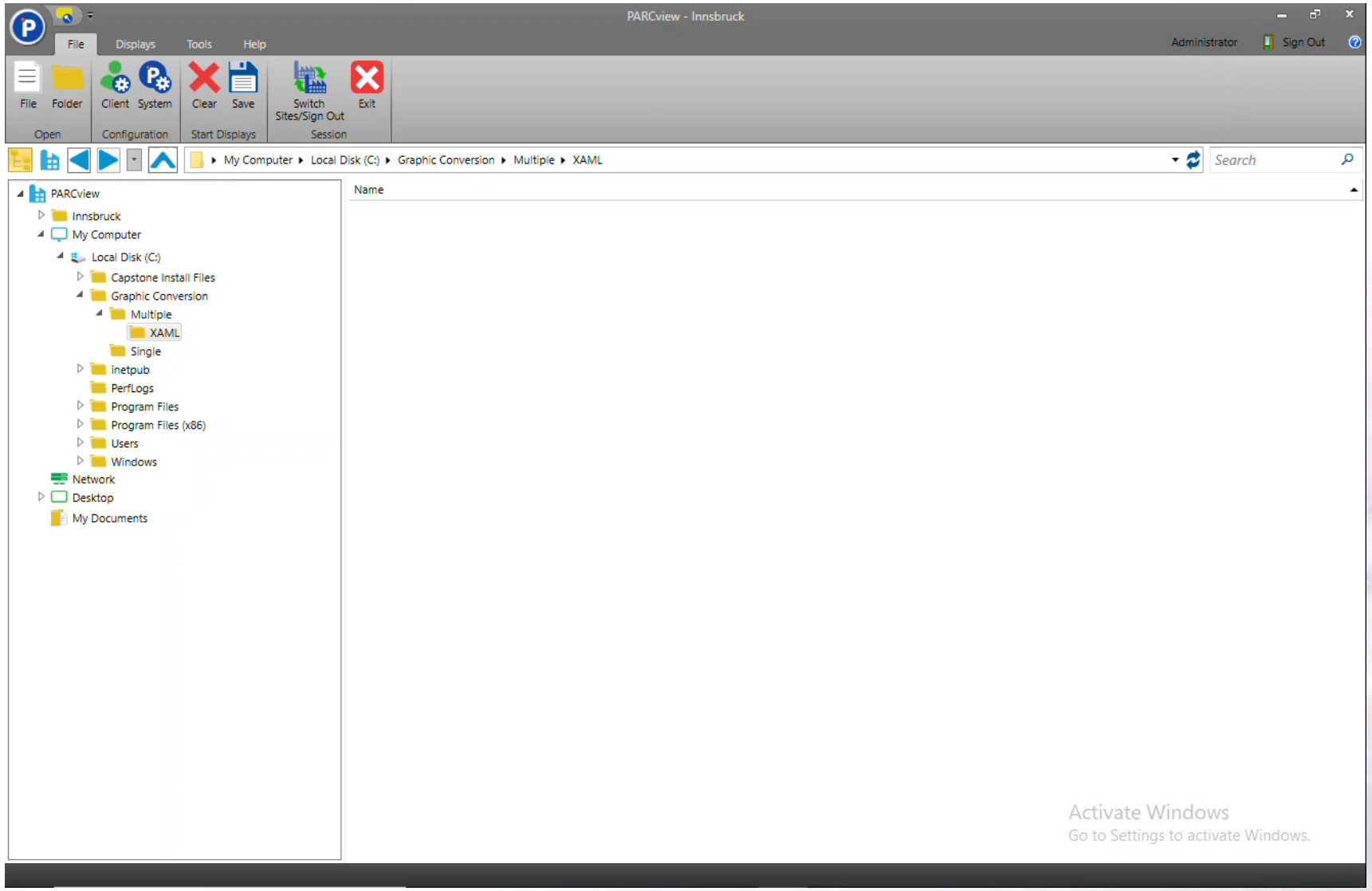
Display Conversion

Options: Convert or Re-create PI Vision Displays

- If converting, save in required format for new solution one at a time or in bulk
- Graphic displays are a direct conversion from Vision and can contain trends, flow diagrams, text values, calculations, AF elements etc.



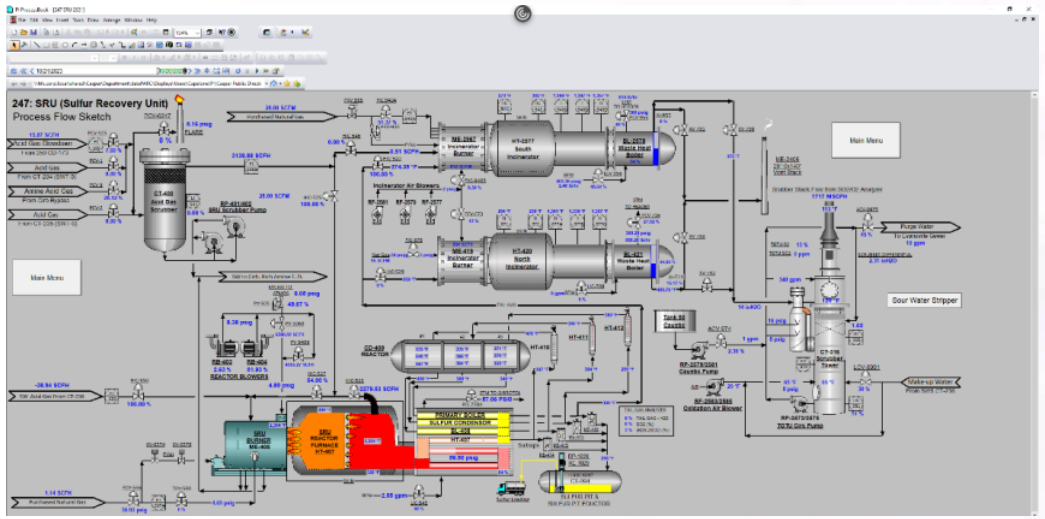
Multiple Graphic Conversion

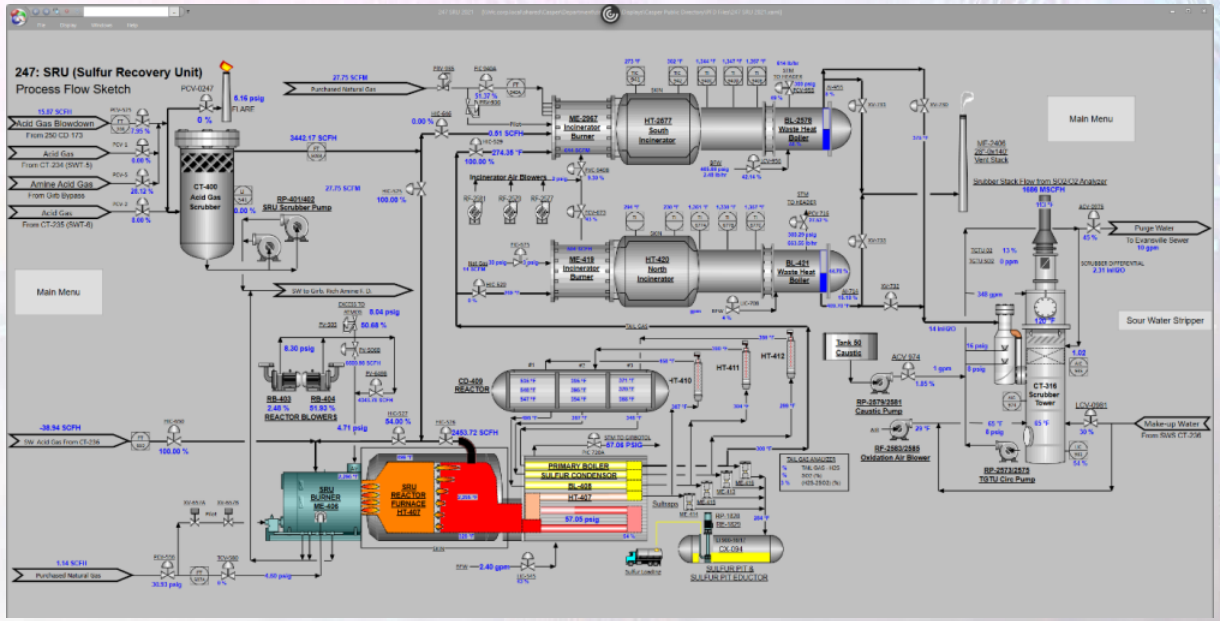


Display Conversion

Options: Convert or Re-create ProcessBook Displays

- If converting, save in required format for new solution one at a time or in bulk
- In dataPARC, you can save in two different formats: Trend or Graphic
  - Graphics display is a direct conversion from Processbook and can contain trends, flow diagrams, text values, calculations, AF elements etc.





Content Types

- Process Book Displays
  - Converter Application from svg files
  - Can do single displays at a time or bulk conversion of a folder
  - **Simple Effort**
- Vision Displays
  - Converter Application reading directly from Vision database
  - Can do single displays at a time or bulk conversion of a folder
  - **Simple Effort**
- Excel Spreadsheets using PI Add-In
  - Converter Excel File
  - Can do single displays at a time or bulk conversion of a folder
  - **Simple Effort**

Content Types

- Calculations
  - ACE Scripts
  - Performance Equations
  - Totalizers
  - Converter Application (Excel file)
  - **Medium Effort**
- PI Write Backs for manual entered data
  - PARCtask workflow
  - **Medium Effort**
- PI Notifications
  - Converter Application
  - Outputs as alarms in dataPARC
  - **Simple Effort**

Conversions/Migrations

15
Years executing PI conversions

100+
Companies migrated from PI

~1MM
Tags per company converted

~5
Days for initial conversion

Conversion Capabilities

- ProcessBook Displays
- PI Vision Displays
- DataLink Spreadsheets
- PE & Totalizers
- PI Write Back
- PI Notifications
- Asset Framework
- & More

Industries

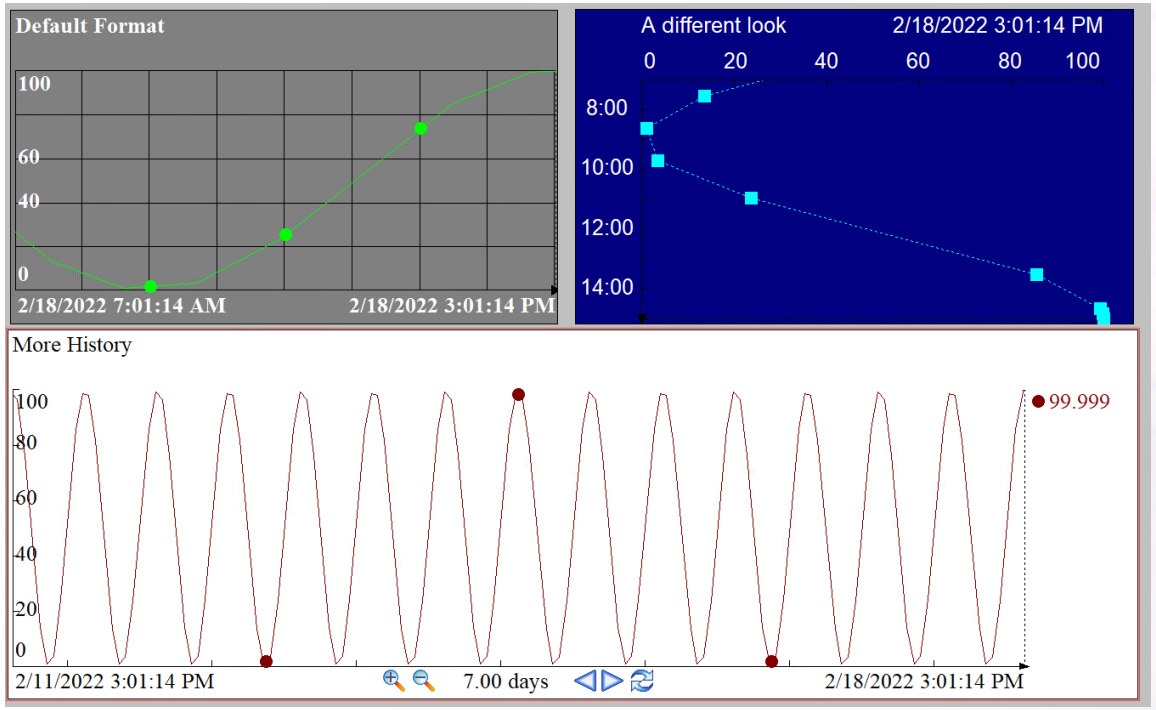
- Chemicals
- Specialty Materials
- Power & Energy
- Food & Beverage
- Oil & Gas
- Mining & Metals
- & More

Trend Conversion

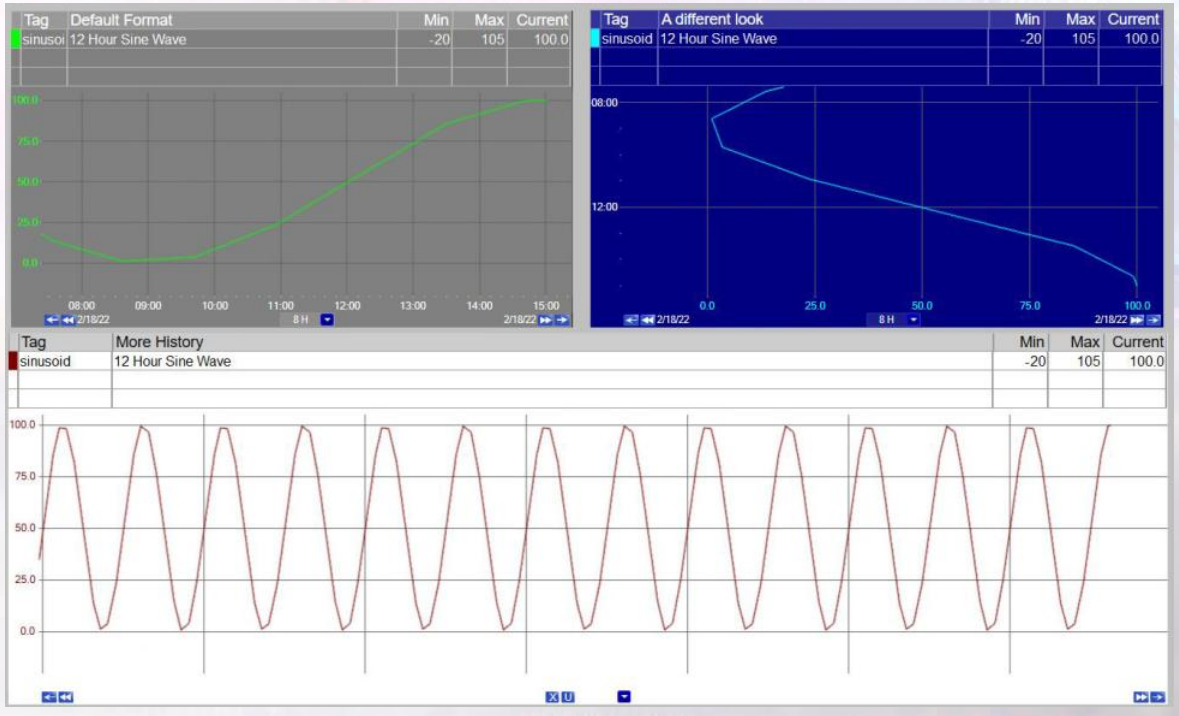
Second format is Trend display

- Cleaner and fully optimized for trending.

ProcessBook



PARCview



Capabilities Demonstration

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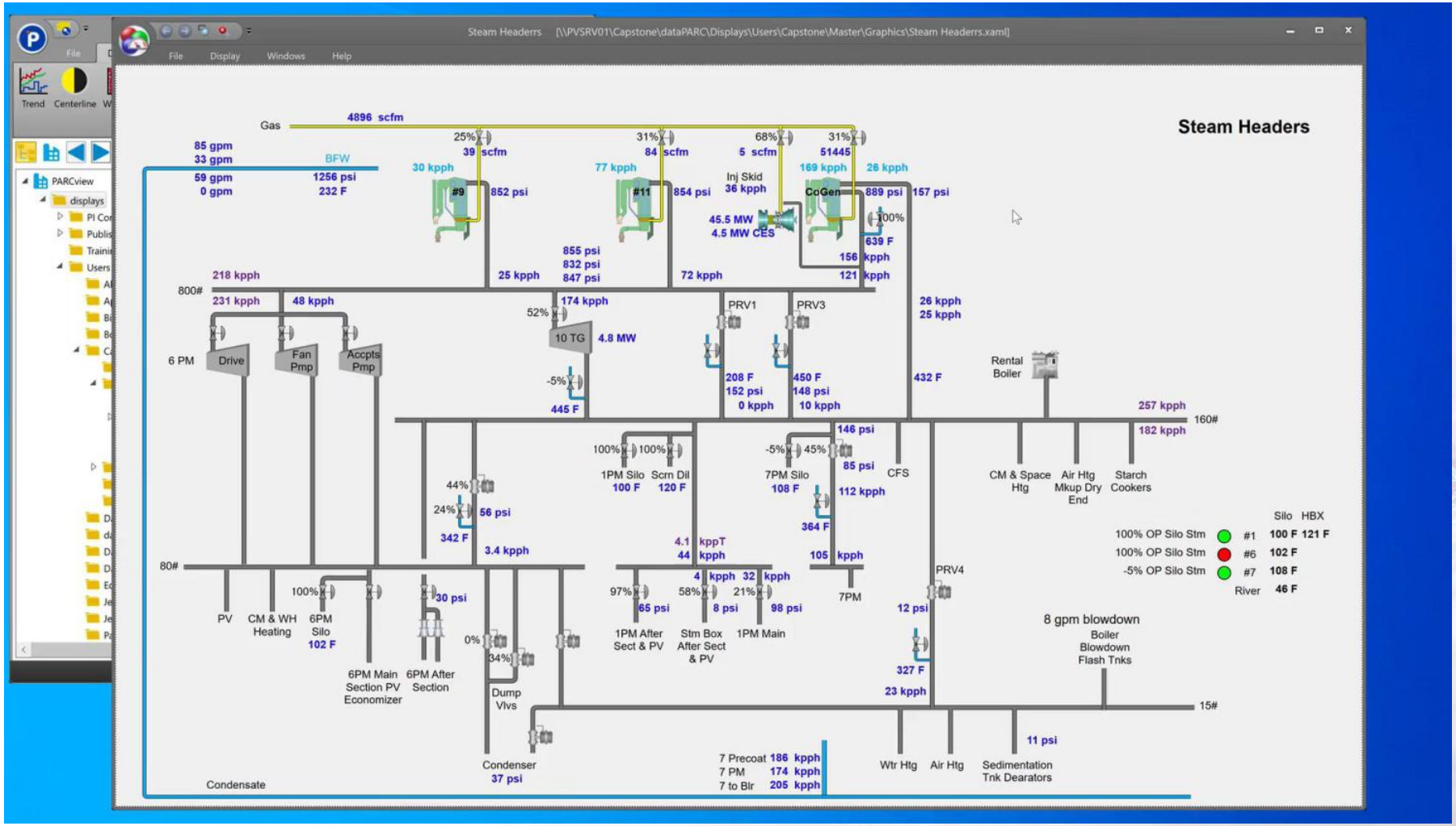
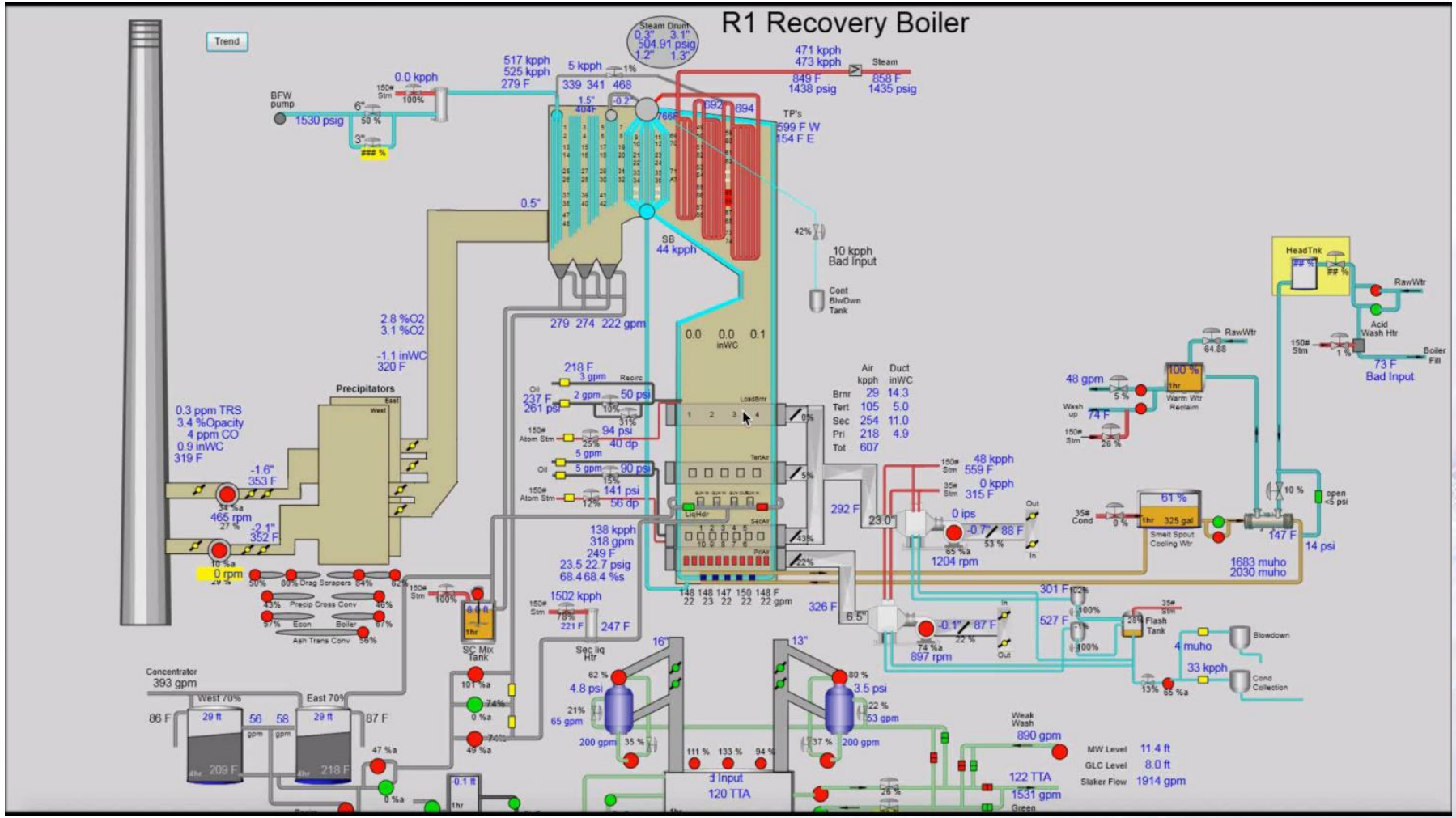
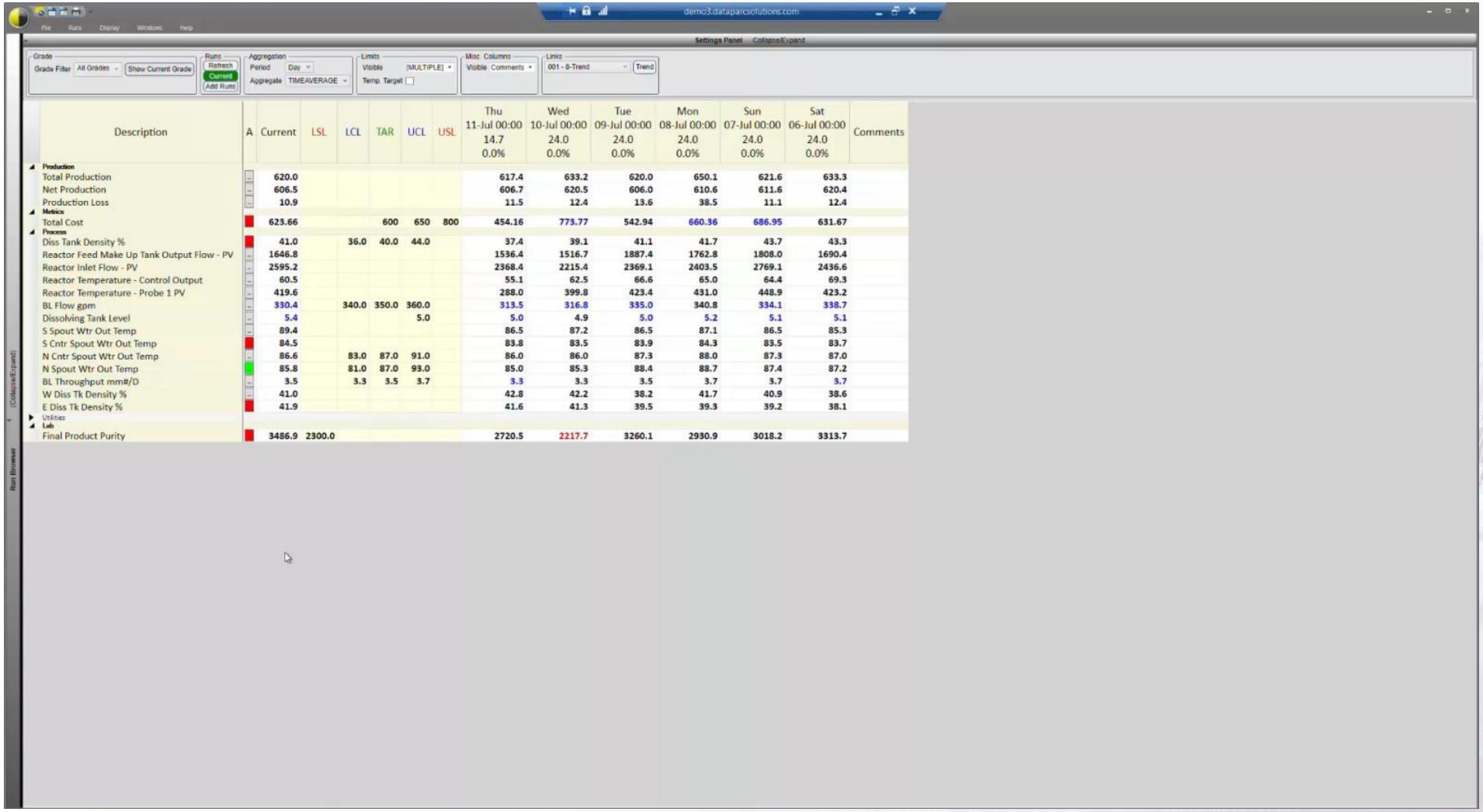
Diagnostic Analytics



Advanced Analytics



Operations Management



Description	A	Current	LSL	LCL	TAR	UCL	USL	Thu 11-Jul 00:00 14.7 0.0%	Wed 10-Jul 00:00 24.0 0.0%	Tue 09-Jul 00:00 24.0 0.0%	Mon 08-Jul 00:00 24.0 0.0%	Sun 07-Jul 00:00 24.0 0.0%	Sat 06-Jul 00:00 24.0 0.0%	Comments
Production														
Total Production		620.0						617.4	633.2	620.0	650.1	621.6	633.3	
Net Production		606.5						606.7	620.5	606.0	610.6	611.6	620.4	
Production Loss		10.9						11.5	12.4	13.6	38.5	11.1	12.4	
Metrics														
Total Cost		623.66			600	650	800	454.16	773.77	542.94	660.36	686.95	631.67	
Process														
Diss Tank Density %		41.0		36.0	40.0	44.0		37.4	39.1	41.1	41.7	43.7	43.3	
Reactor Feed Make Up Tank Output Flow - PV		1646.8						1536.4	1516.7	1887.4	1762.8	1808.0	1690.4	
Reactor Inlet Flow - PV		2595.2						2368.4	2215.4	2369.1	2403.5	2769.1	2436.6	
Reactor Temperature - Control Output		60.5						55.1	62.5	66.6	65.0	64.4	69.3	
Reactor Temperature - Probe 1 PV		419.6						288.0	399.8	423.4	431.0	448.9	423.2	
BL Flow gpm		330.4		340.0	350.0	360.0		313.5	316.8	335.0	340.8	334.1	338.7	
Dissolving Tank Level		5.4				5.0		5.0	4.9	5.0	5.2	5.1	5.1	
S Spout Wtr Out Temp		89.4						86.5	87.2	86.5	87.1	86.5	85.3	
S Cntr Spout Wtr Out Temp		84.5						83.8	83.5	83.9	84.3	83.5	83.7	
N Cntr Spout Wtr Out Temp		86.6		83.0	87.0	91.0		86.0	86.0	87.3	88.0	87.3	87.0	
N Spout Wtr Out Temp		85.8		81.0	87.0	93.0		85.0	85.3	88.4	88.7	87.4	87.2	
BL Throughput mm#/D		3.5		3.3	3.5	3.7		3.3	3.3	3.5	3.7	3.7	3.7	
W Diss Tk Density %		41.0						42.8	42.2	38.2	41.7	40.9	38.6	
E Diss Tk Density %		41.9						41.6	41.3	39.5	39.3	39.2	38.1	
Utilities														
Lab														
Final Product Purity		3486.9	2300.0					2720.5	2217.7	3260.1	2930.9	3018.2	3313.7	

Conversion Case Study

- S-Oil Ulsan, Korea
- 150k tags with 20 years of historical data
  - Process Book Displays (800+)
  - PI DataLink Excel Displays (100+)
  - 100+ Users
- Key Reasons for Migration & Replacement
  - Fast Performance of Trending through PARCpde (Performance Data Engine)
  - Advanced Trend Functions
  - Multiple Data Sources Connections
  - Unlimited License for Users
  - Lower maintenance cost
  - Quick Implementation (less than one month)

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Beyond ProcessBook & PI Vision

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