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# PARTNER MEETING 2012

EMEA

The Power of Data



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# PI Asset Framework and Event Frames

Presented by **Hans Otto Weinhold**

OSIsoft Senior Customer Support Engineer



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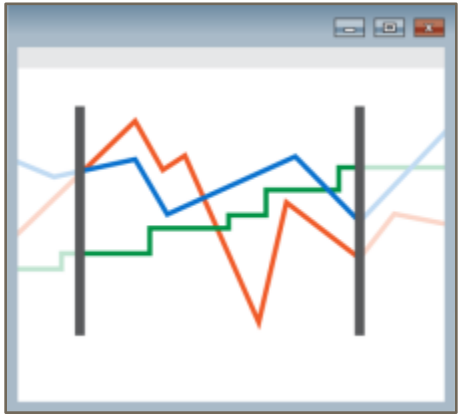
# PI System Themes

Scale

More data
Fast Performance
More robust

Asset-Centric PI

Manage data via
Asset context –
Reuse many times



Event Frames

Identify and use
important events
and related data

Visualization

Many roles
Different formats
Any device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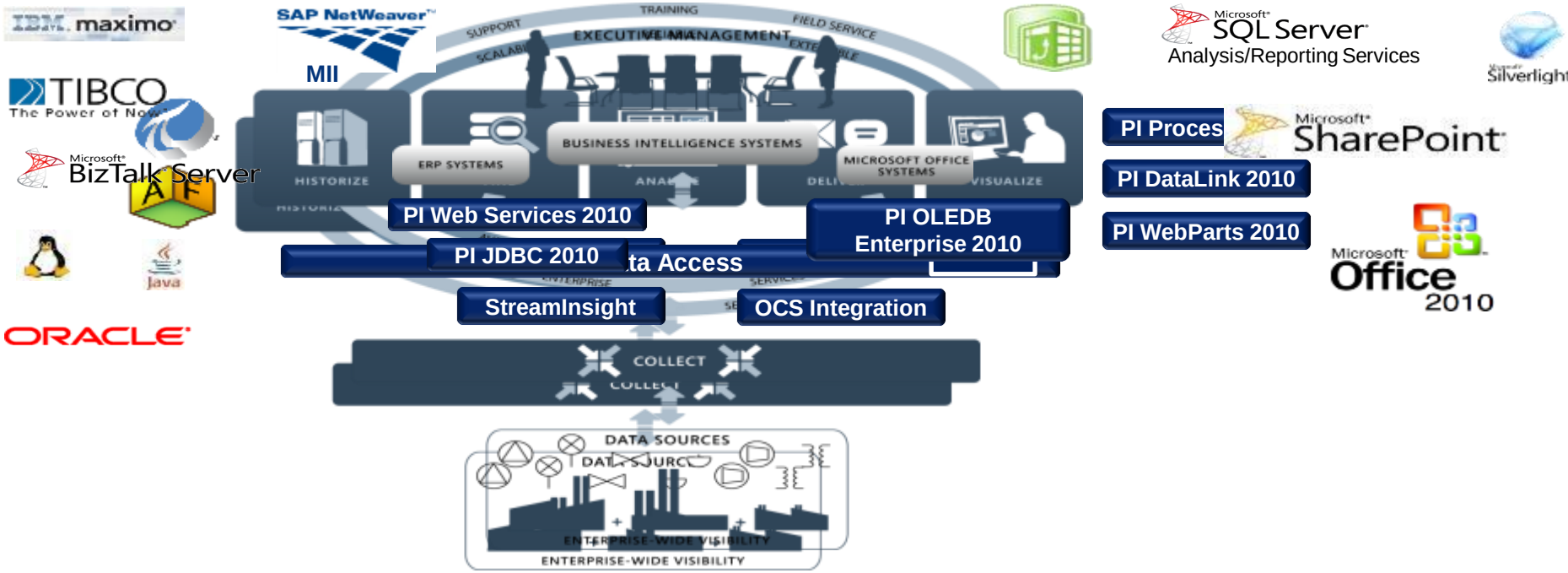
# The PI System





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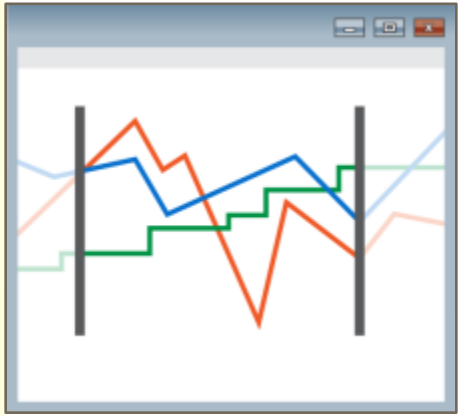

## Event Frames

Identify and use
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and related data

## Visualization

Many roles
Different formats
Any device


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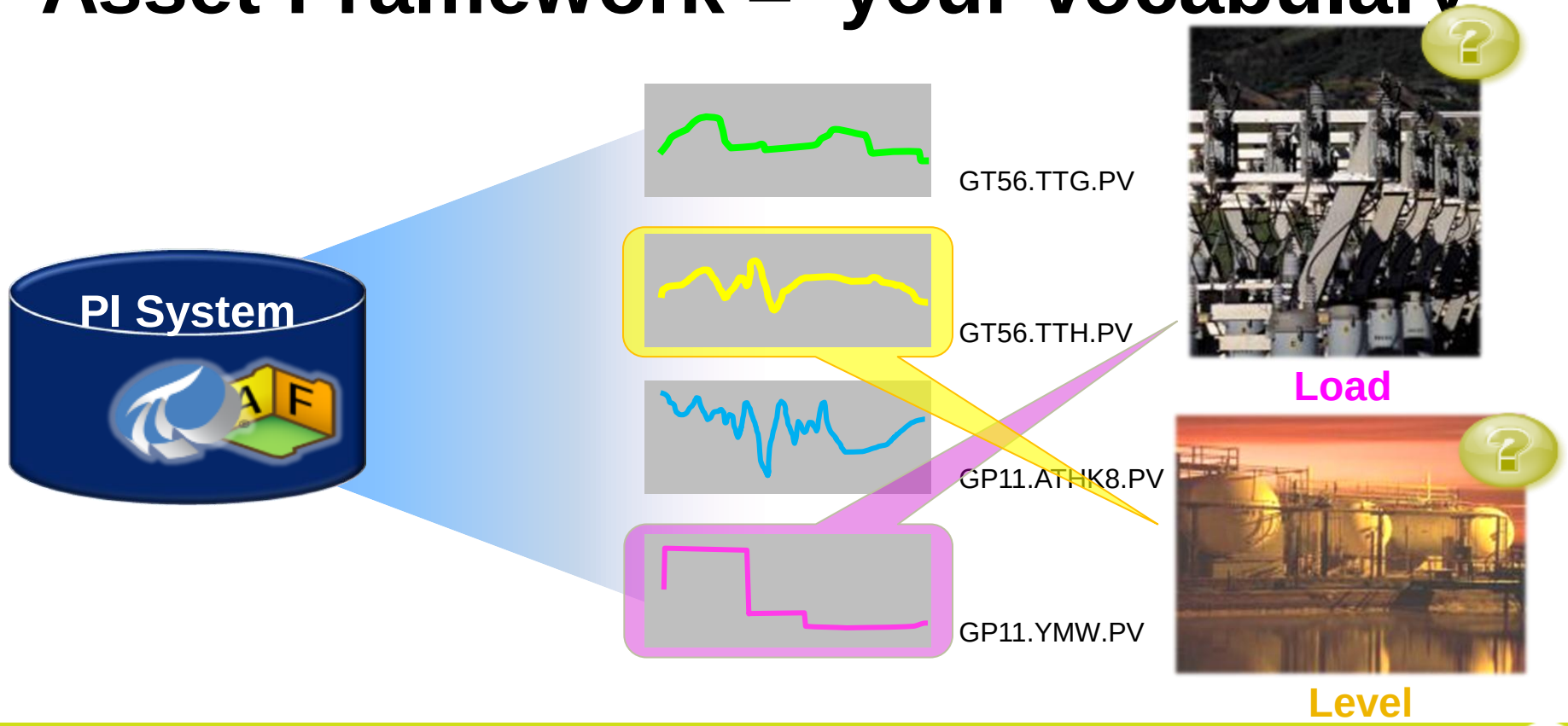
# Asset Framework = your vocabulary





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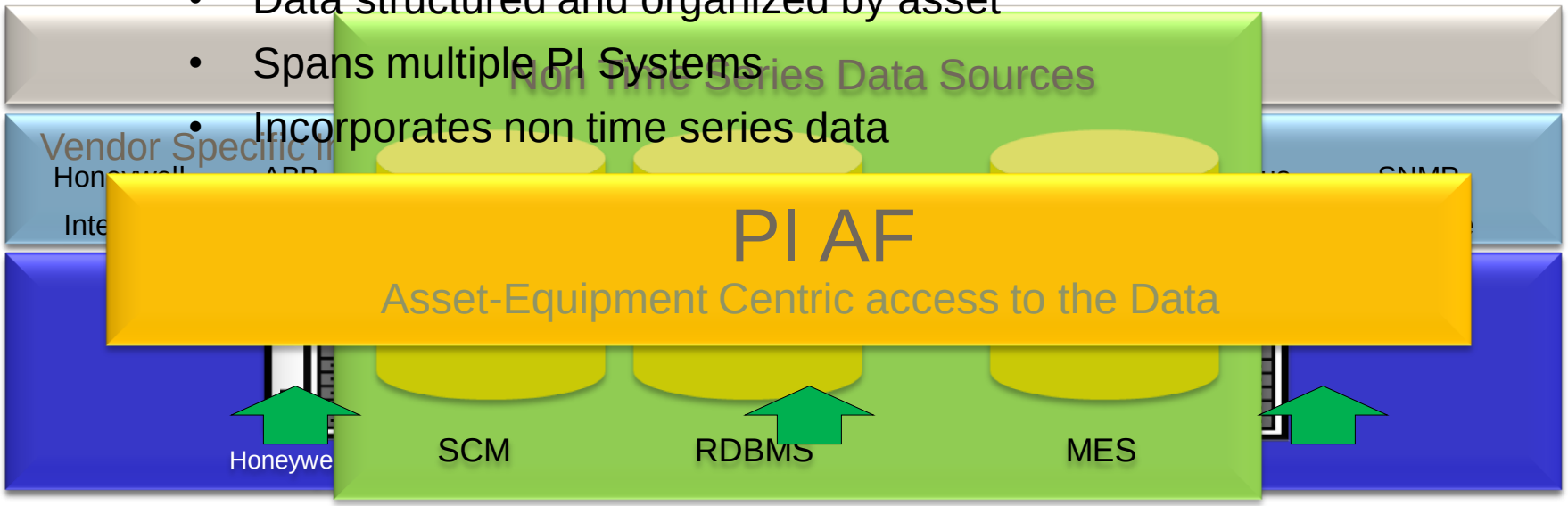
# spans all your data

- Data structured and organized by asset
- Spans multiple PI Systems
- Incorporates non time series data





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# Asset Centric PI System

- **PI AF provides an asset centric view of your plant**
- **Establish relationships**
  - Build hierarchies, categories and connectivity models
  - Relate asset properties to your disparate data
- **Standardize, common view**
  - Templates for similar assets
- **Apply domain knowledge via PI Notifications and analyzes**
- **Access your data via PI Data Access products**


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# Build a Complete Picture of Your Asset

PI Tags
- Inlet pressure
- Inlet flow
- Ambient temperature

PI Tags
- Exhaust temperature
- Exhaust flow
- Measured MW output

External Databases
- Performance curves
- Last service date
- Design documents
- Inspection best practice

Calculations
- Performance calculations
- KPI's


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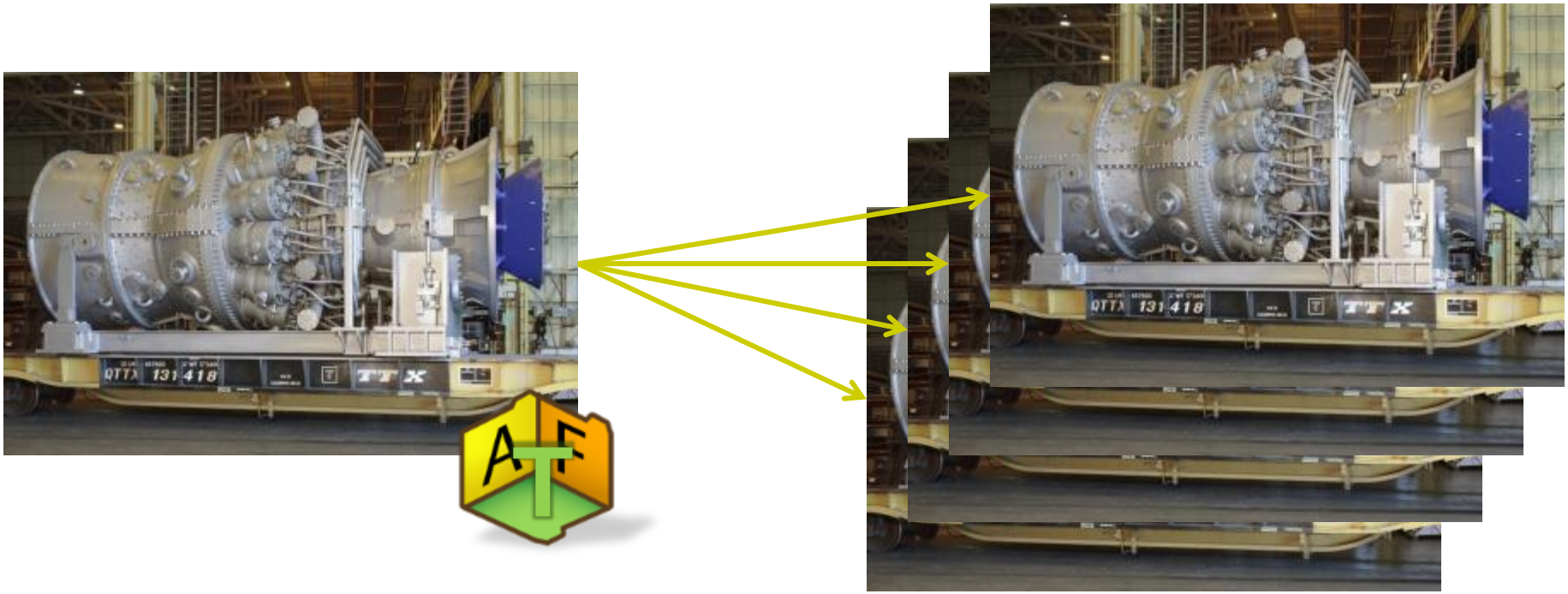
# Common View for Similar Assets

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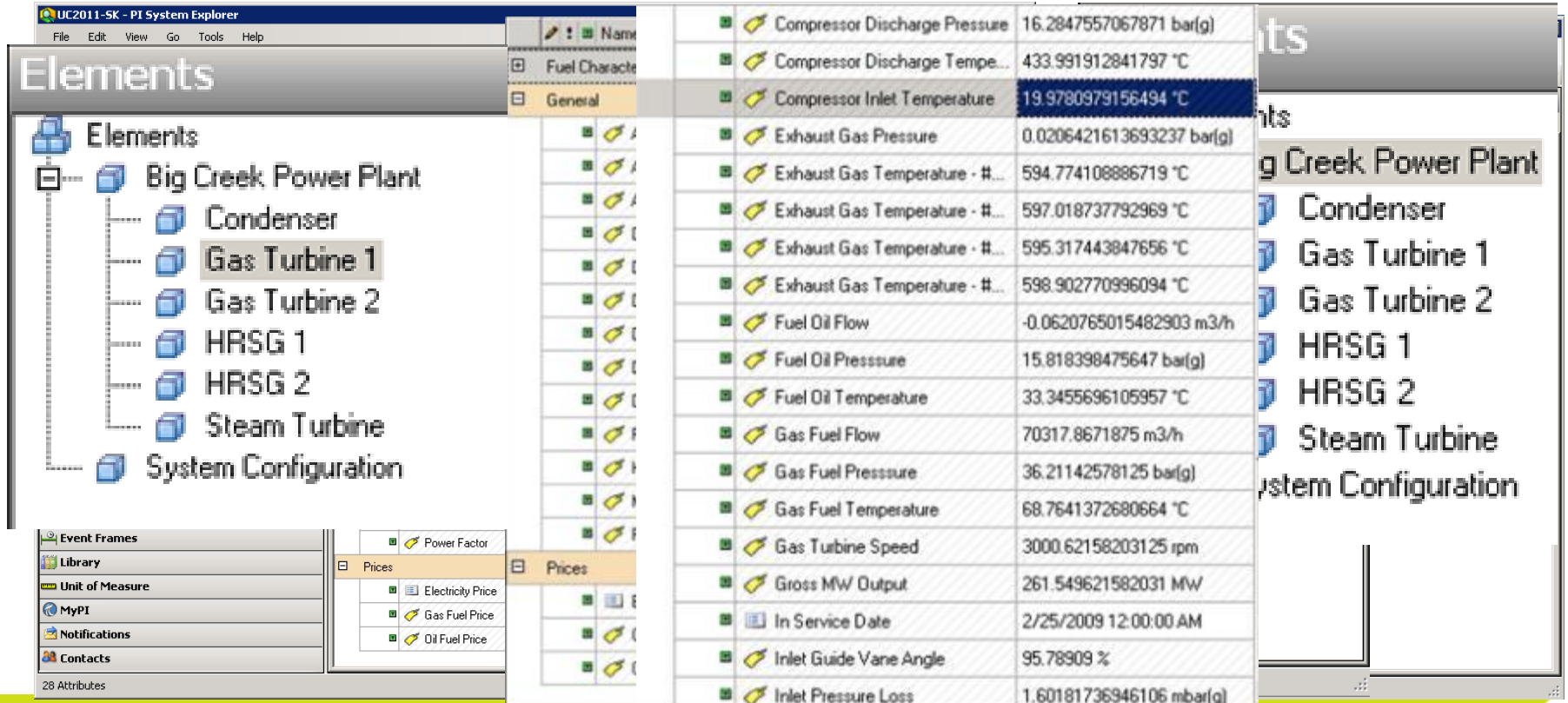
# Add Value to your PI System





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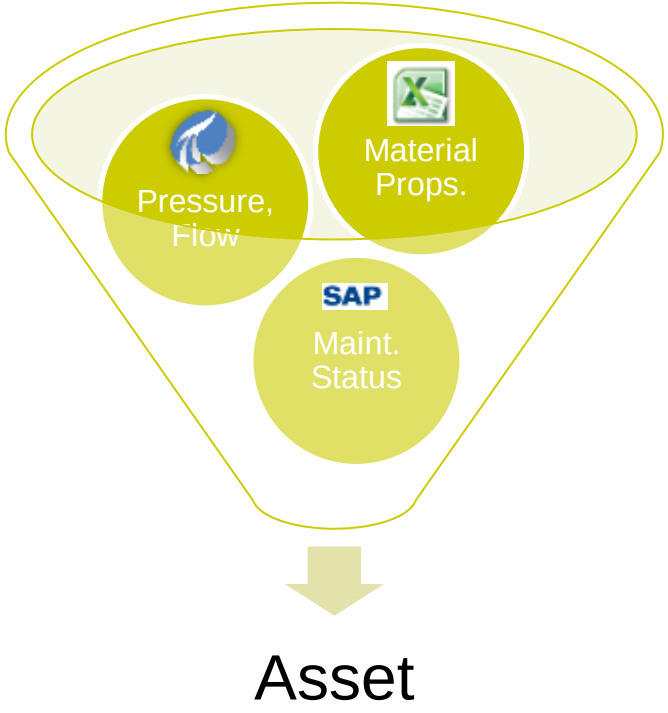
# Add Value to your PI System

- **Tie asset properties to your data**
  - Static values, PI Tags from multiple PI Servers, static or linked Tables
  - Custom data references to other data sources





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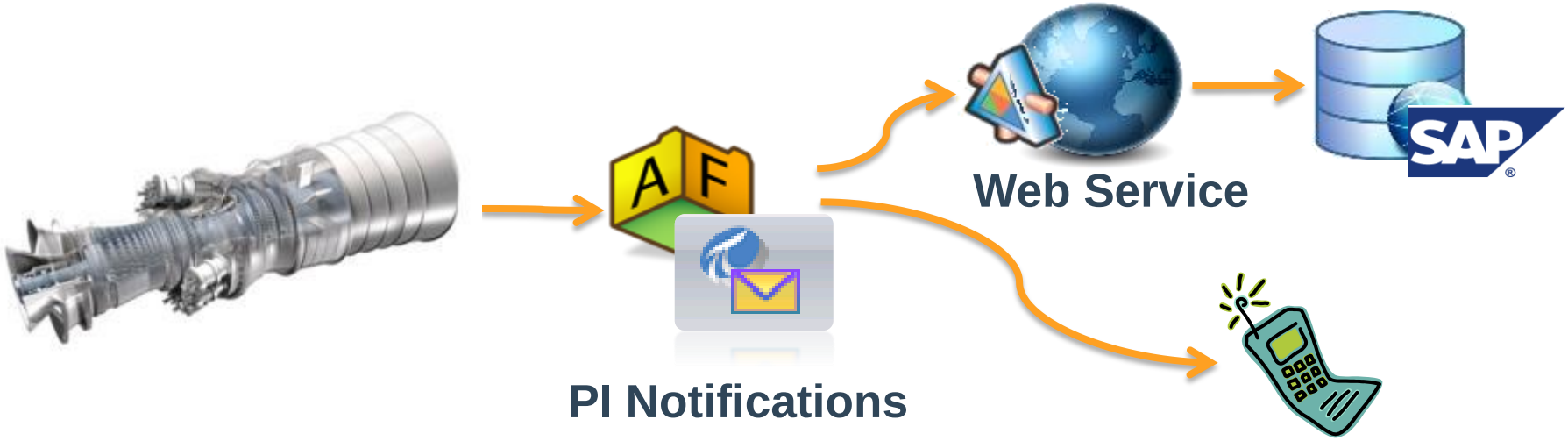
# Add Value to your PI System

"One of GT exhaust thermocouples has been acting up… Let's keep an eye on it and create a work order for maintenance if it fluctuates more than 5% in 5 seconds. Make sure Bob is notified of this also."





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# Add Value to your PI System
# Event Frames Are Part of Asset Framework

- GT #2 tripped again last night!!
- How many times has this happened in the last year?
- What were the operating conditions when it tripped?
- Let's find and gather all these events and analyze them.

Downtime Events
- Asset of interest
- Start/End Times
- Reason Codes
- Asset Conditions


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# How to begin


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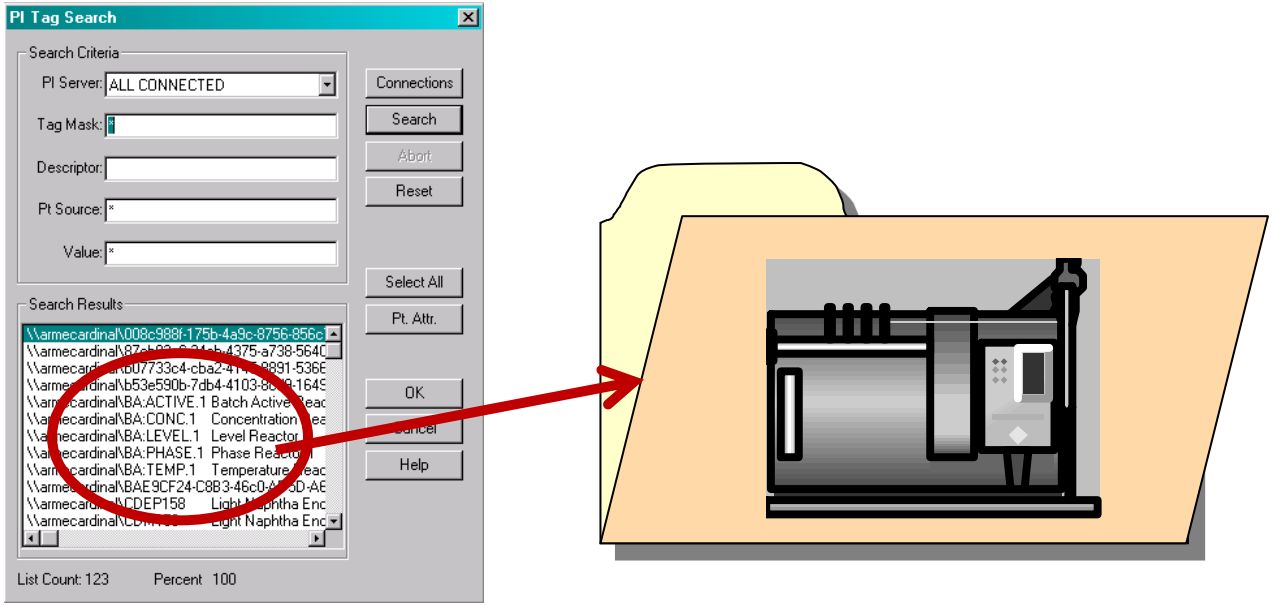
# Sort Your Tags into Elements Which Represent Your Equipment





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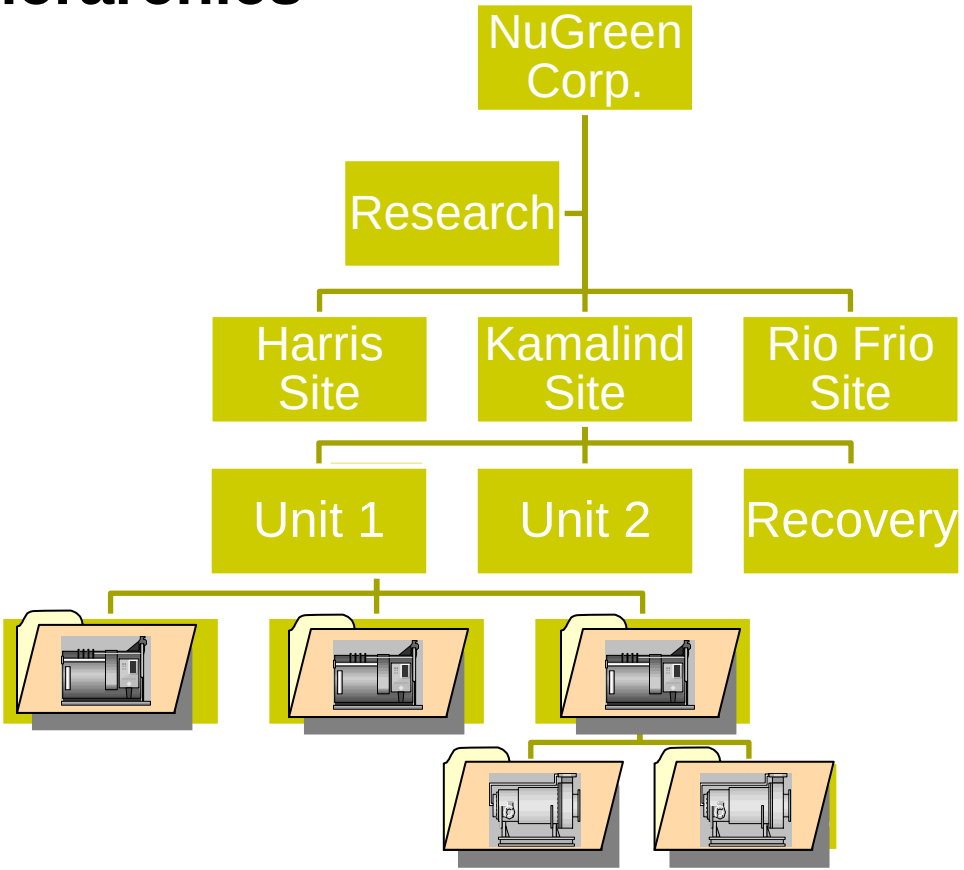
# Organize the Assets into Hierarchies





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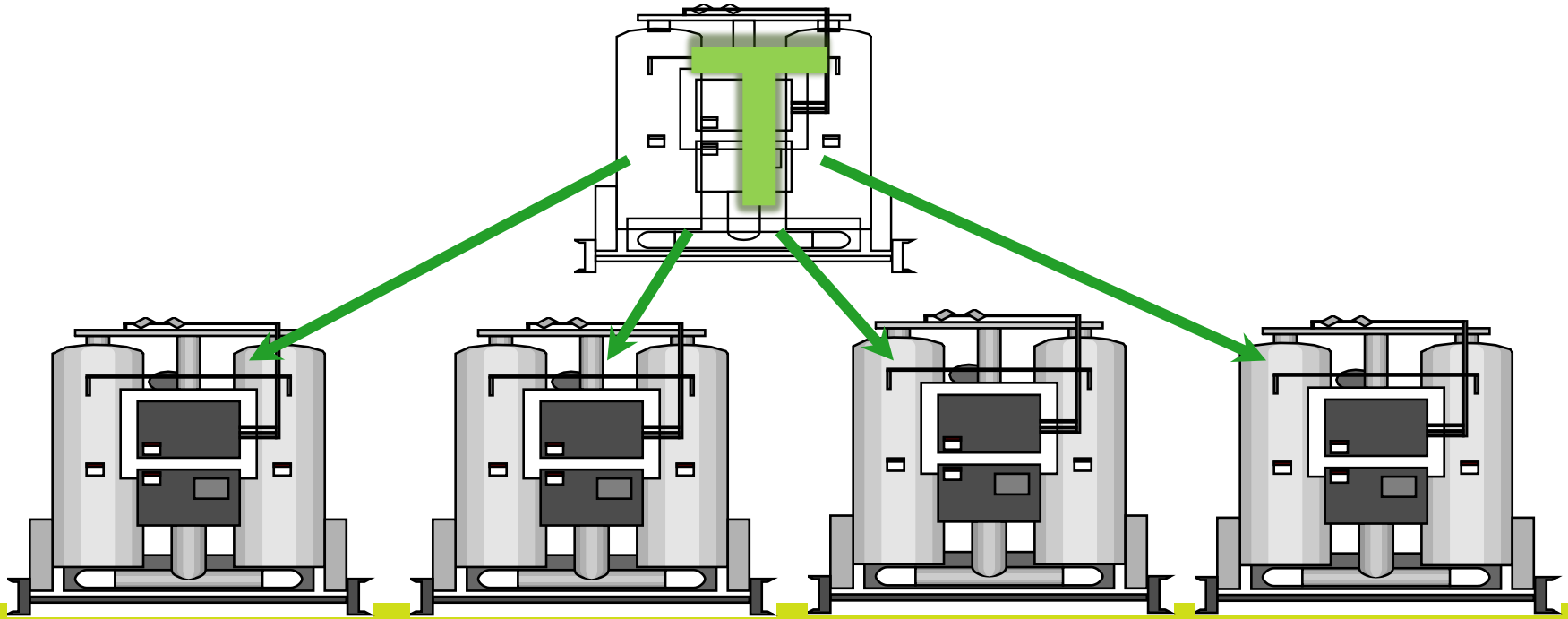
# Manage and Extend Elements by creating Powerful Templates





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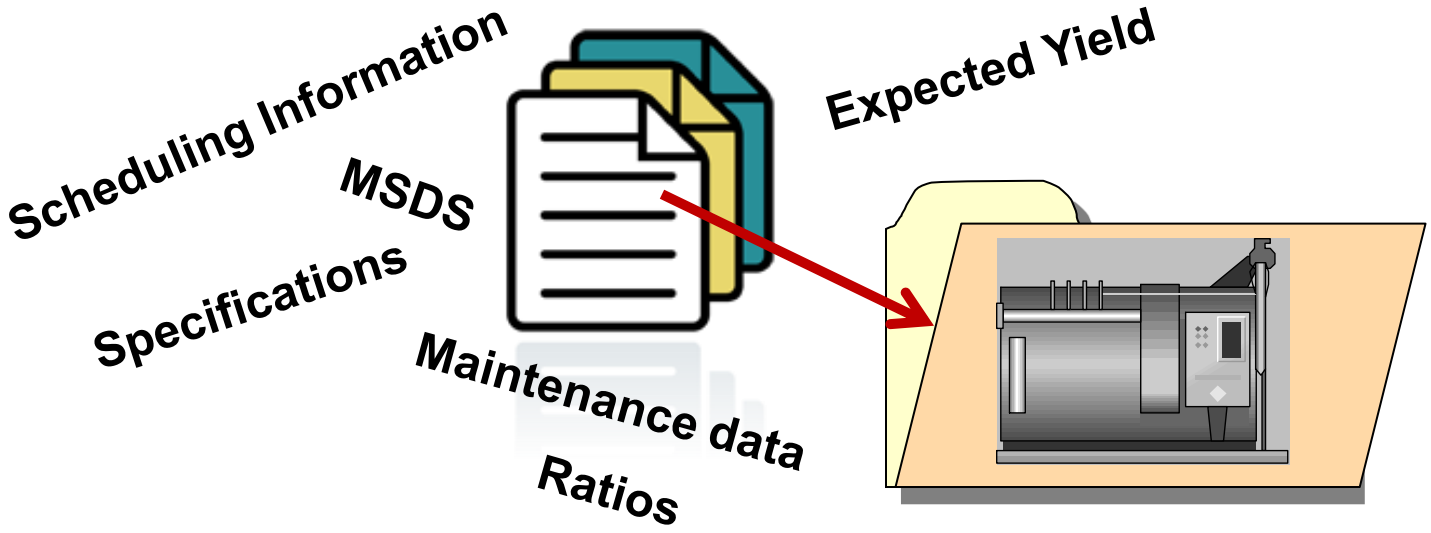
# Add Efficiency Calculations, KPIs, Reference Data from Relational Databases and Other Information to Add More Value





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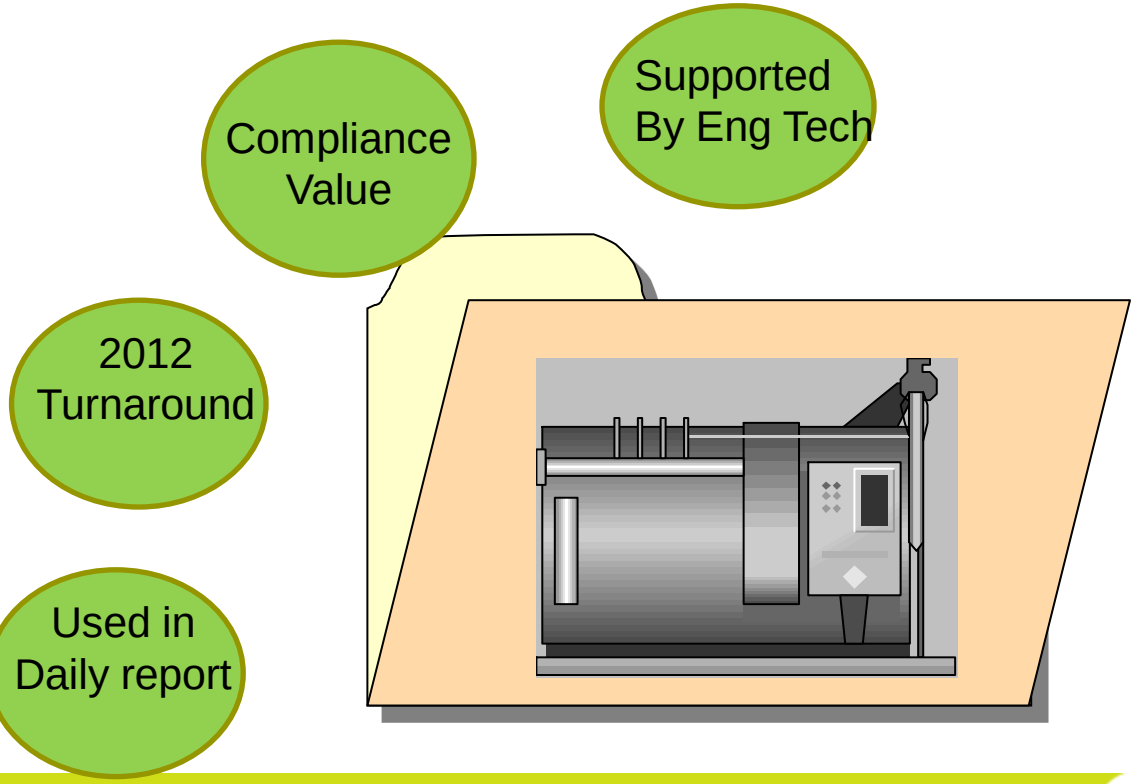
# Add Key Words (Categories) to Make Them Easier to Search for





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# It Might Take a Team

**Process "nerds"** – subject matter experts - who understand the data well enough to build the calculations and define the relationships

&

**IT "geeks"** who can wrangle the XML and SQL, to build large databases


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# AF – Putting AF into Best Practice

Shaping your data by:

1. Defining types of assets
   Schema how to attribute Elements
   » Templates

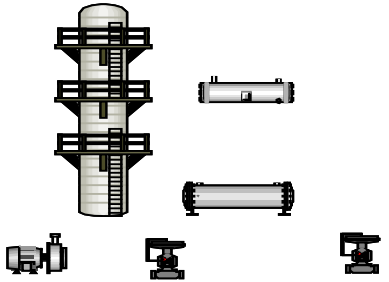
2. Association to a “real” asset
   Created from Template
   » Elements

3. Describing the “real” asset
   having Units Of Measurements (UOM)
   can come via data references from everywhere
   » Attributes

4. Physical/logical asset structure
   » Hierarchy

5. Assets connectivity
   Model : Collections of connected elements
   » Model

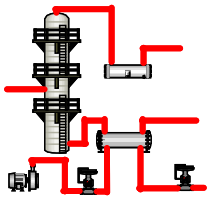
Condensor
Heatexchanger
Column
Valve
Pipe
Pump



Column661
Condensor661
P661_1
P661_2
HeatExchanger661
Valve661_1
Valve661_2

OpeningGrade
InspectionResult
LastInspection
SerialNumber
XZY

**PI Point:** \\MOBILEVBC\Valve661_1.OpeningGrade
**Table Lookup:** SELECT InspectionResult FROM …
**Table Lookup:** SELECT LastInspection FROM …
**Table Lookup:** SELECT SerialNumber FROM …
**Formula:** A=OpeningGrade;[A*0.98]

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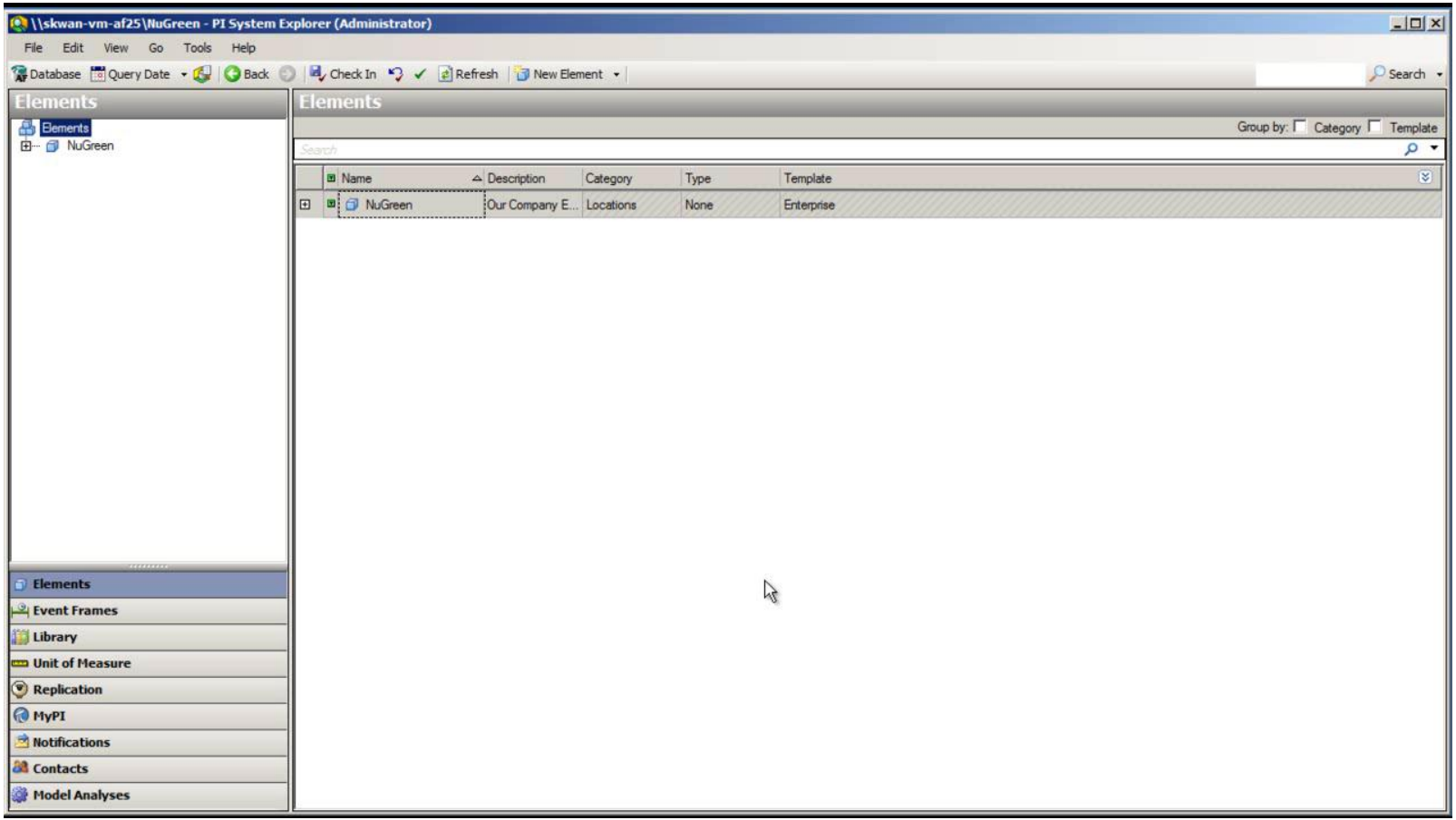



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# Insight PI Asset Framework


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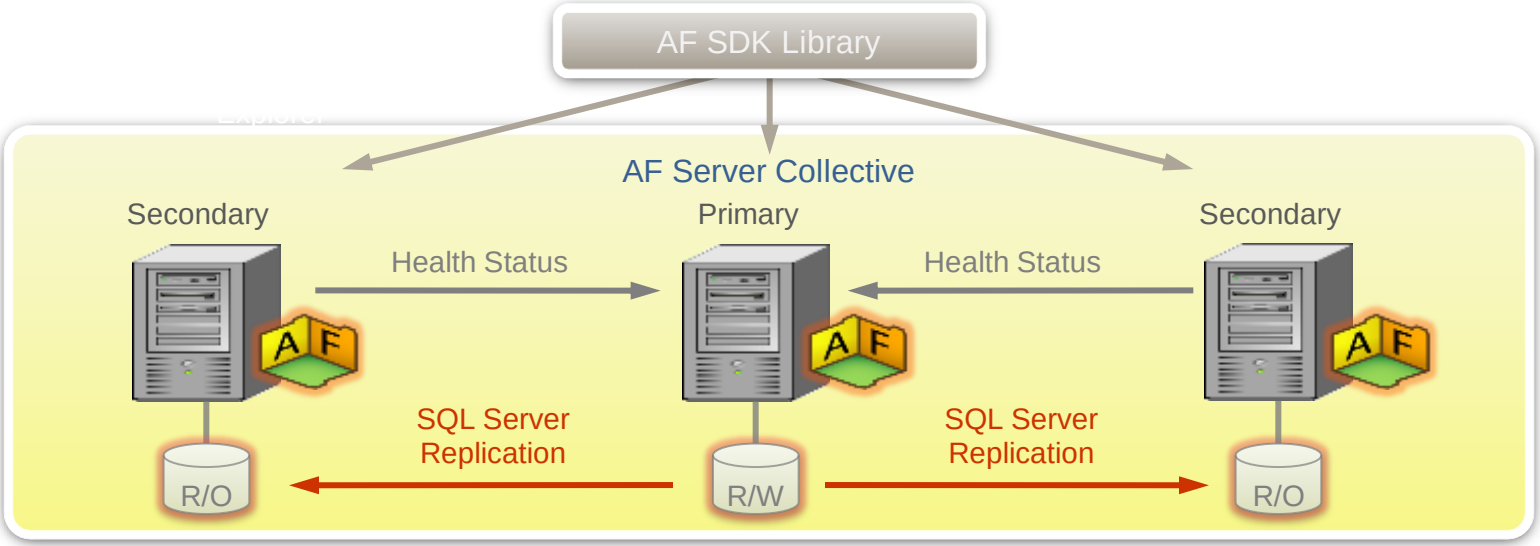
# AF HA Collective

PI Notifications, AF-based PI Clients
(PI WebParts, ProcessBook, DataLink, etc.)





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# Extending PI AF

- Enhance functionality of PI AF by your own Plugins
  - Access new data sources (Data References)
  - Notifications to users or systems (Delivery Channels)
- Easy deployment – no ‘roll-outs’ – just register


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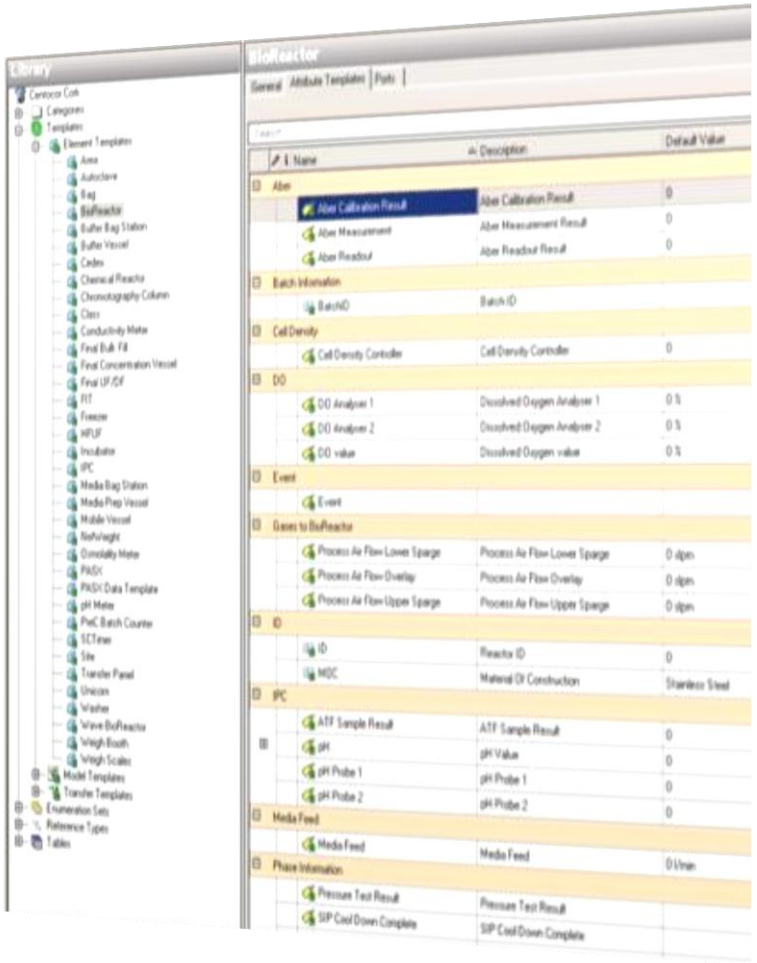
# Mapping assets – User example UC 2012
# PI Asset Framework – PI AF in Janssen

Super Class concept.

- Class based templates – built in conjunction with process and subject matter experts.
- Only process critical information grouped together in a logical model.
- Ensures that the entire organisation have a common taxonomy.

PAS|X \ PI AF

- Using Unit based templates allows us to build unit based MBR elements that can be applied on other sites.





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# Asset-centric Visualization

**PI Coresight:**
Ad Hoc Analysis & Collaboration

**PI WebParts:** Composite Apps, Shared broadly

**PI ProcessBook:**
Display authoring and Process monitoring

**PI DataLink:**
Reporting and analytics in Microsoft Excel

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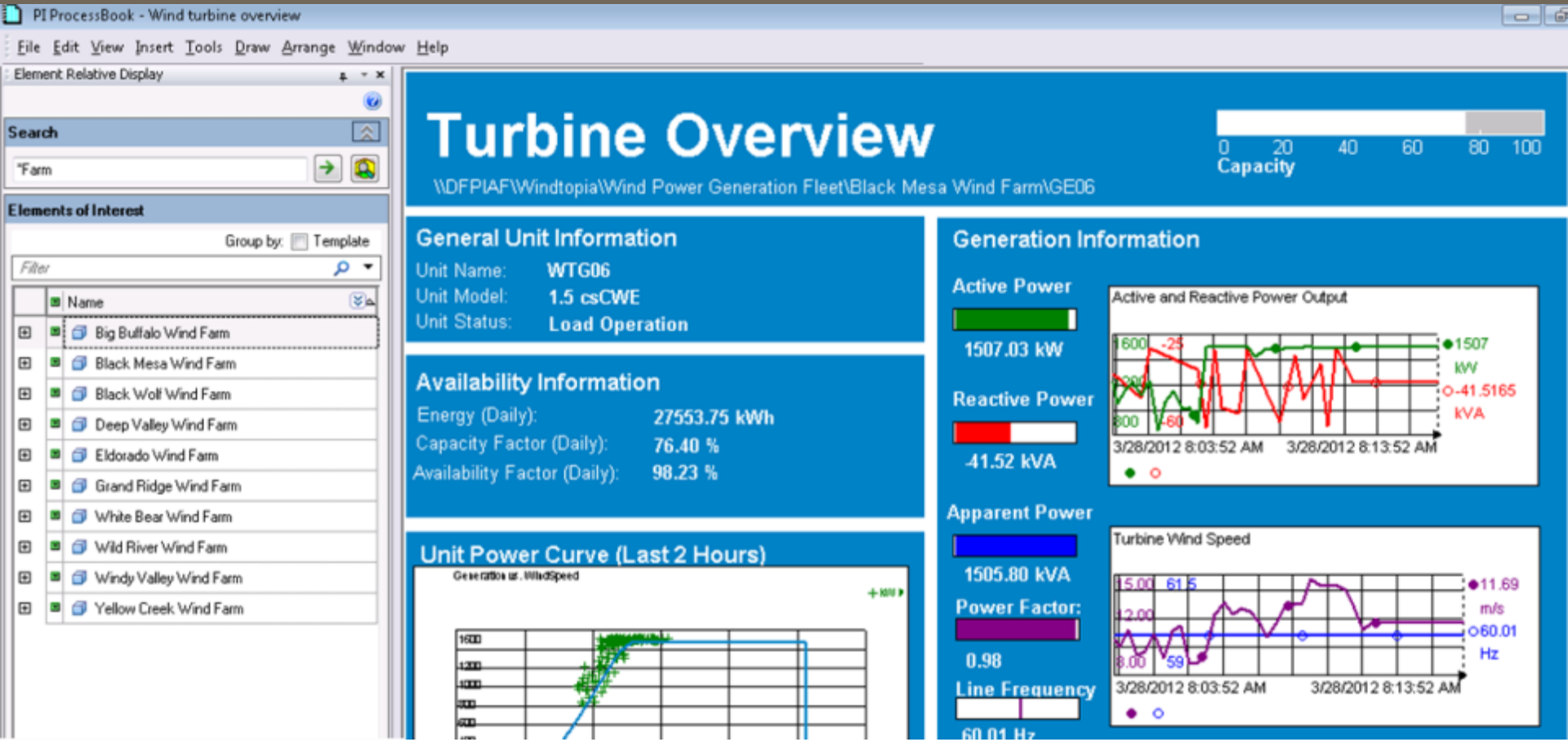
# Asset-centric displays in PI ProcessBook 2012





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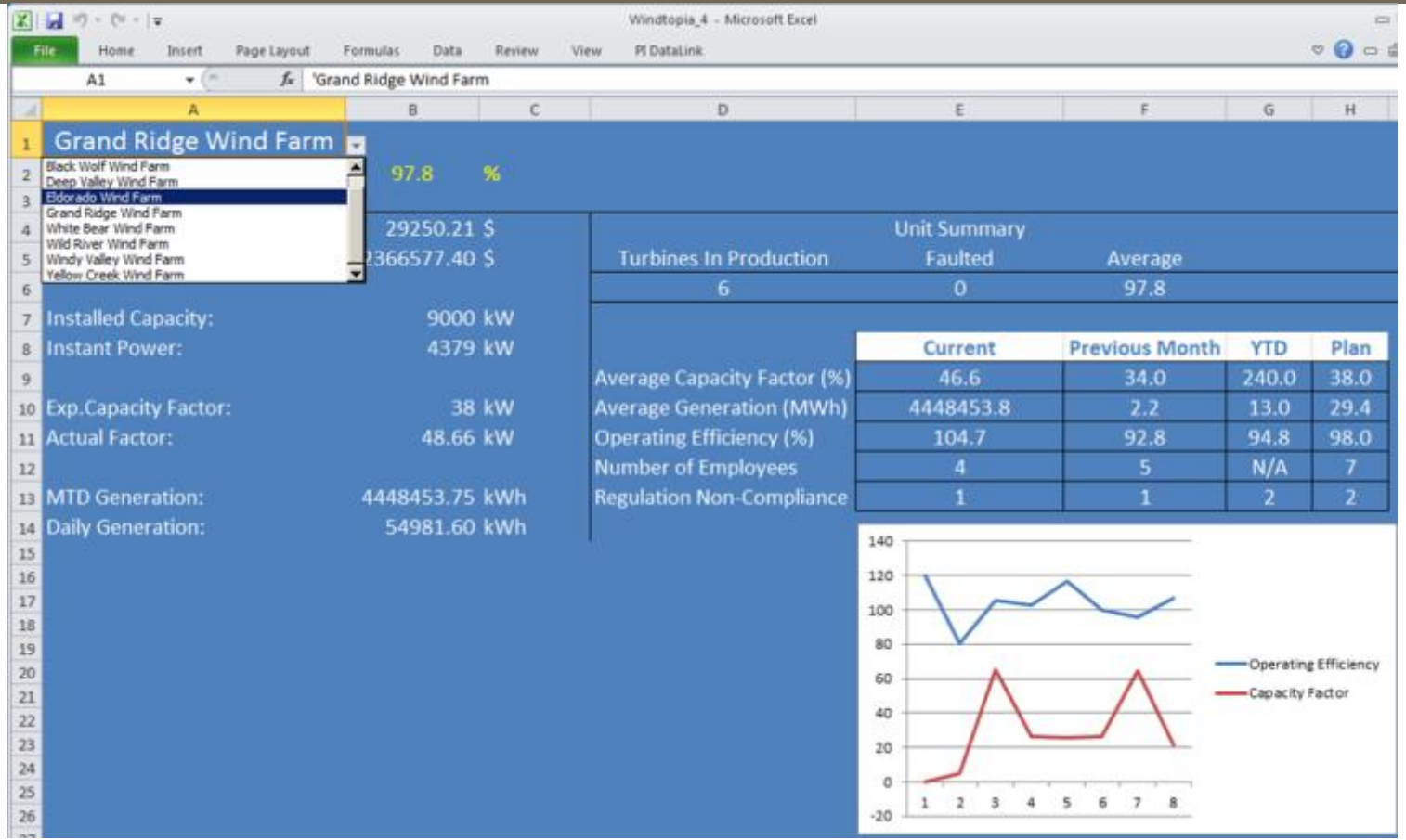
# Asset-relative reports in PI DataLink 2012





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# Consolidate and share with PI WebParts

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# Explore assets with PI Coresight

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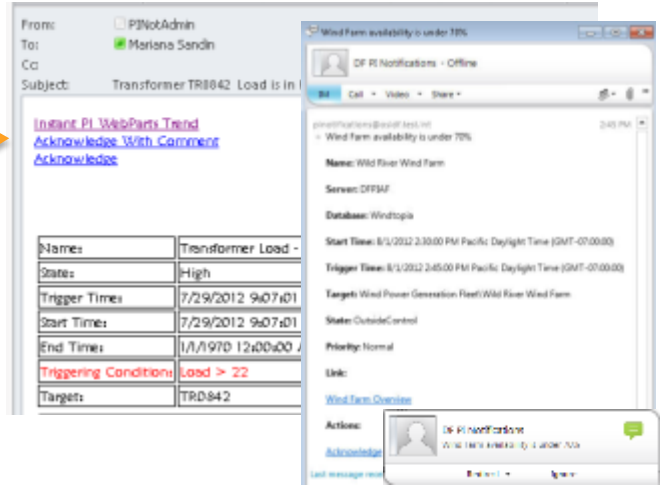
# PI Notifications keeps you informed of your assets

"One of the turbine's exhaust thermocouples has been acting up… Let's keep an eye on it and create a work order for maintenance if it fluctuates more than 5% in 5 seconds. Make sure Bob is notified of this also."

DELIVER




Web Service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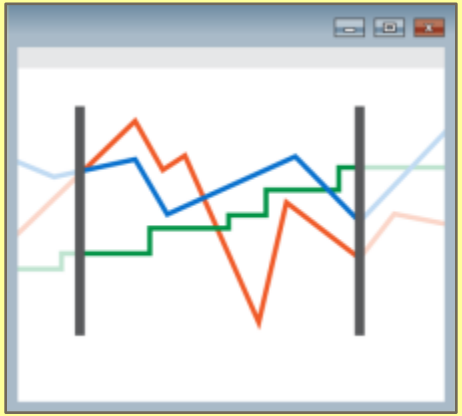

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Identify and use
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## Visualization

Many roles
Different formats
Any device


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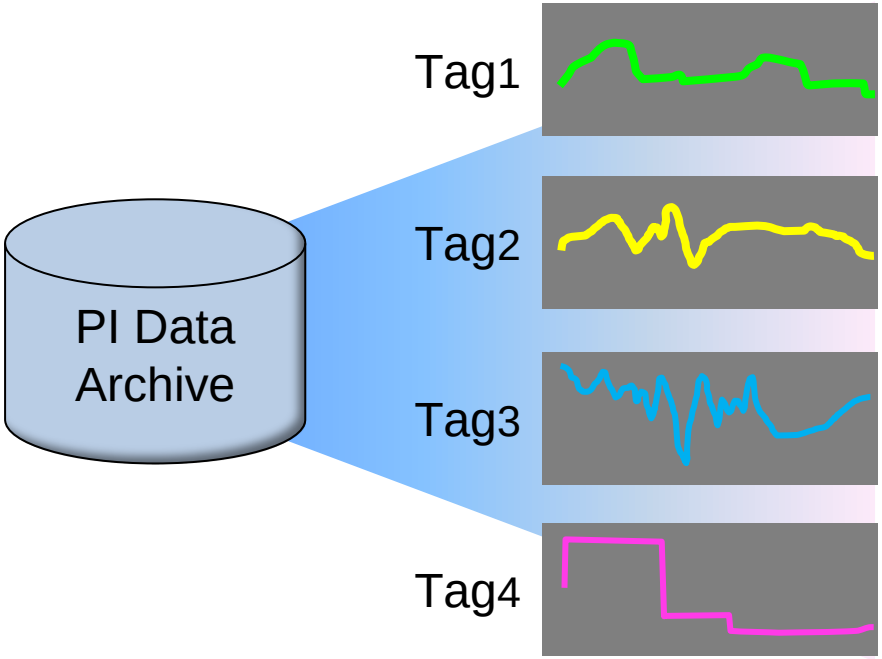
# PI Server – Time series data and Tags





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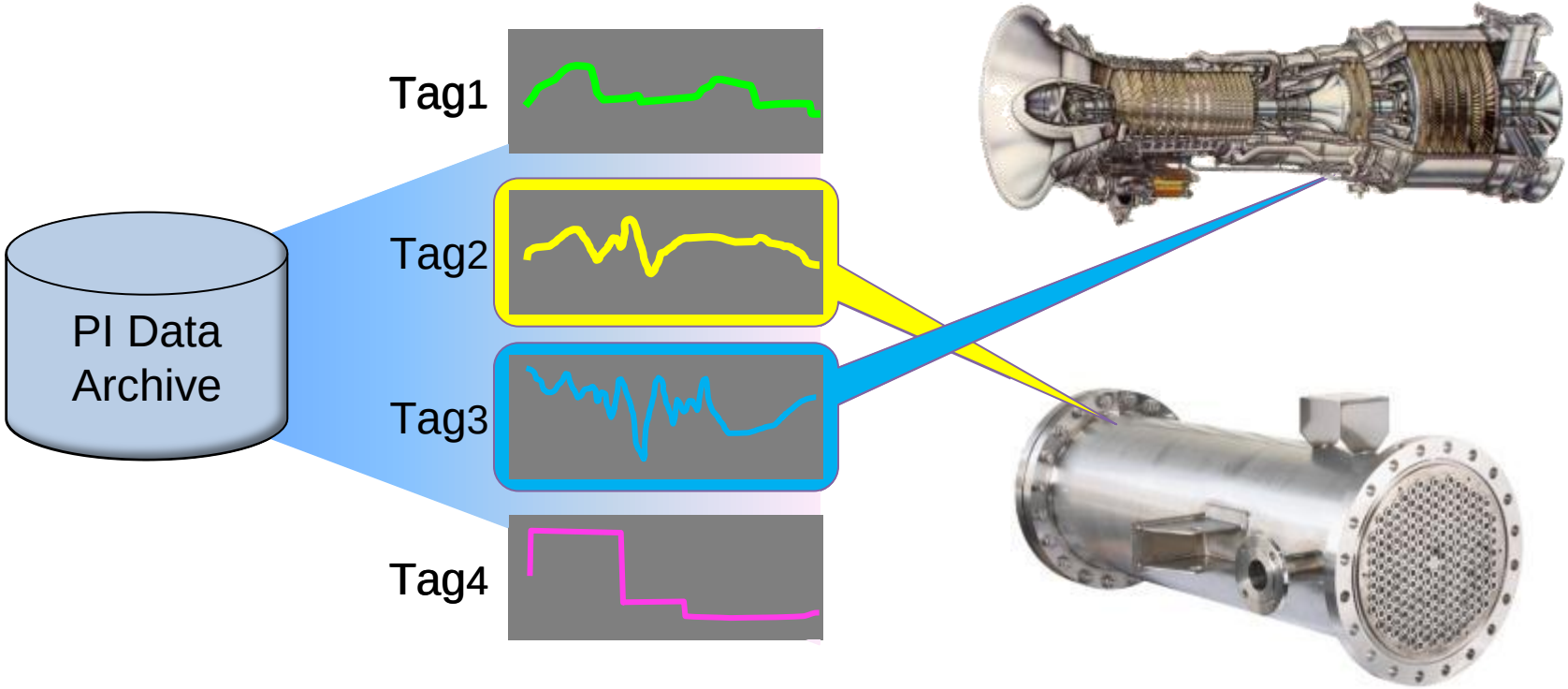
# PI AF helps you find the right tags using





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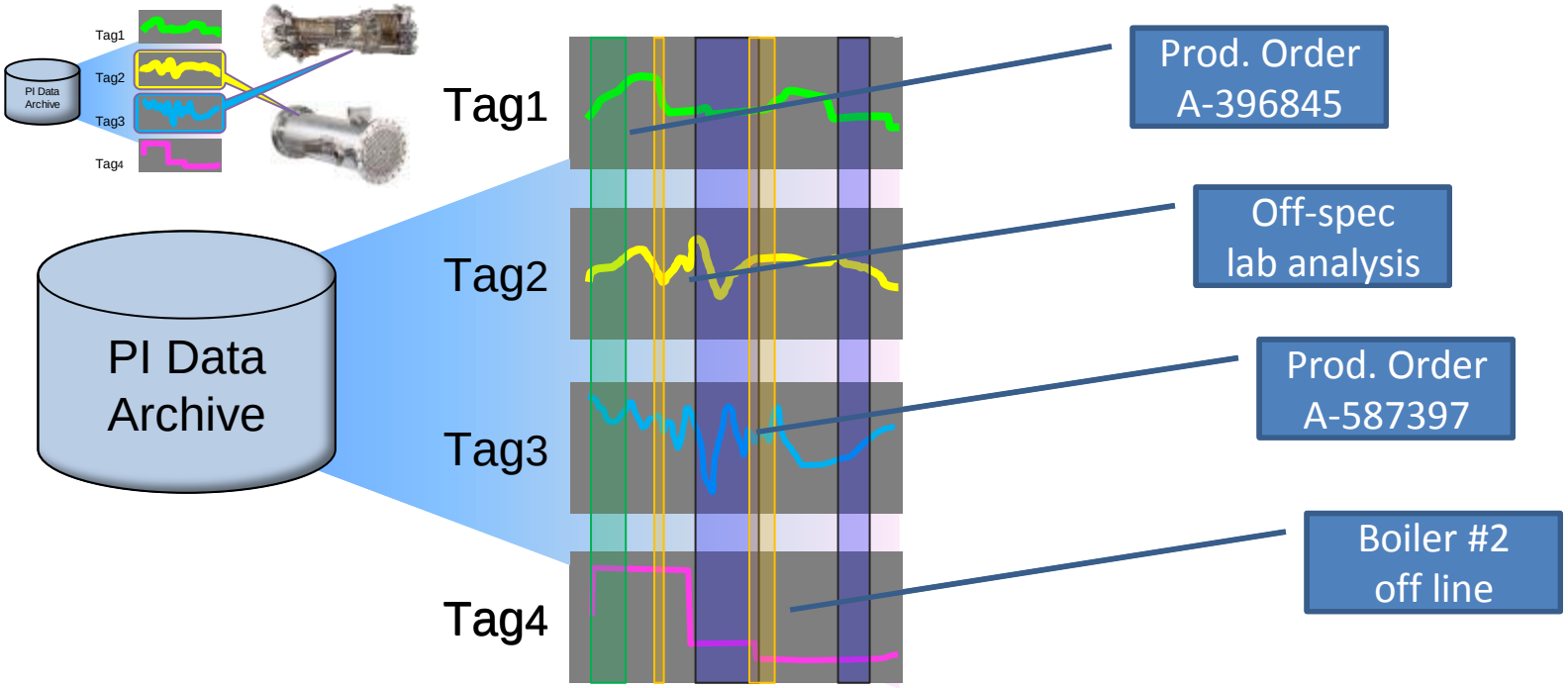
# PI Event Frames helps you find the right time periods





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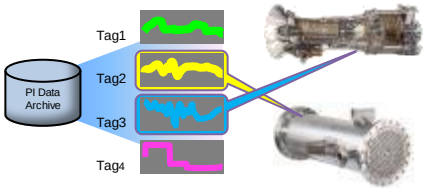
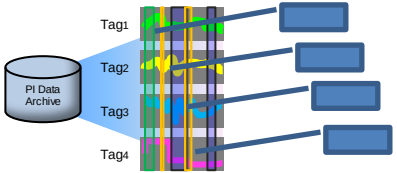
# PI Event Frames helps you find the right time periods




PI Event Frame

**OEE**

| Start | End | Asset | Code | W.O. |
|---|---|---|---|---|
| 10Jul09 15:23 | 13Jul09 13:00 | GT-48037 | SM-15 | S-32894RE |




PI Data Archive

PI Asset Framework

CMMS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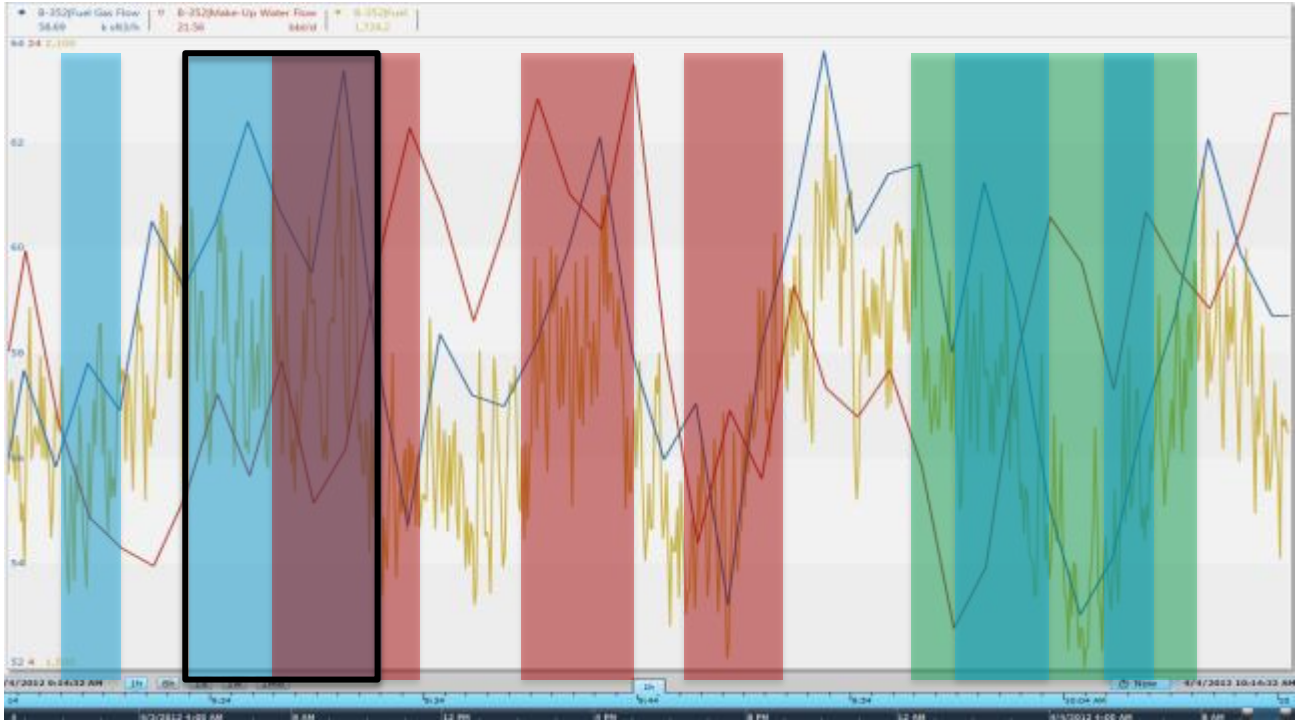
# PI Event Frames = *events* + *related data*

Excursions (4) Downtime (3) Product XYZ (1)



| Event Attribute | Value |
|---|---|
| **Name** | Ex 20121215-0002 |
| **Start** | 15-Dec-2012 10:35:02 |
| **End** | 15-Dec-2012 10:47:26 |
| **Duration** | 12 min, 24 sec |
| **Asset** | Boiler-459 |
| **Excursion Type** | High Violation |
| **Fuel Gas Flow.Avg** | 37.12 k sft3/h |
| **Fuel.Start** | 823.48 k sft3/ton |
| **myPIKPI.Max** | 47.19 bbl/d |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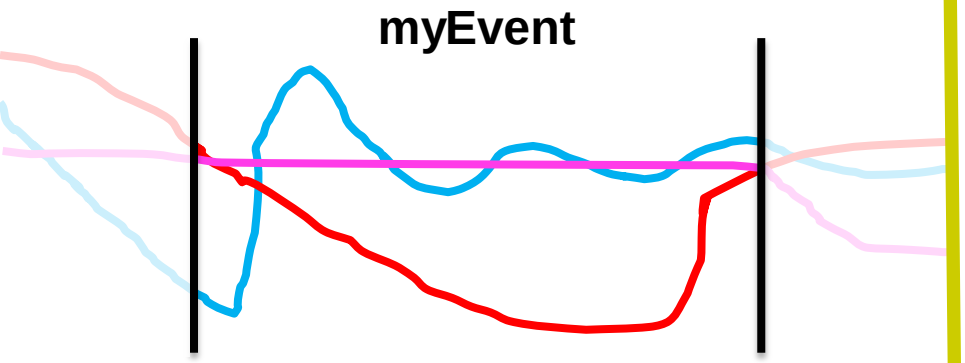
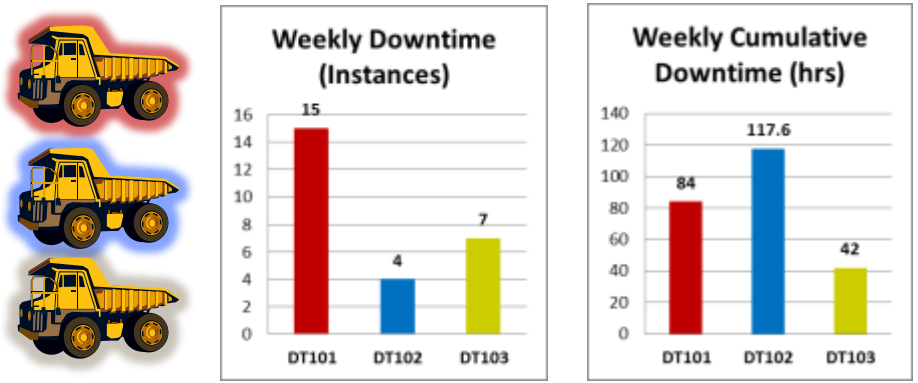
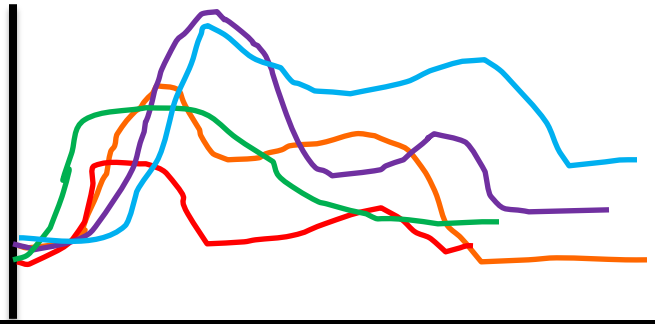
## Simplify Data Analysis




## Perform Asset Comparisons

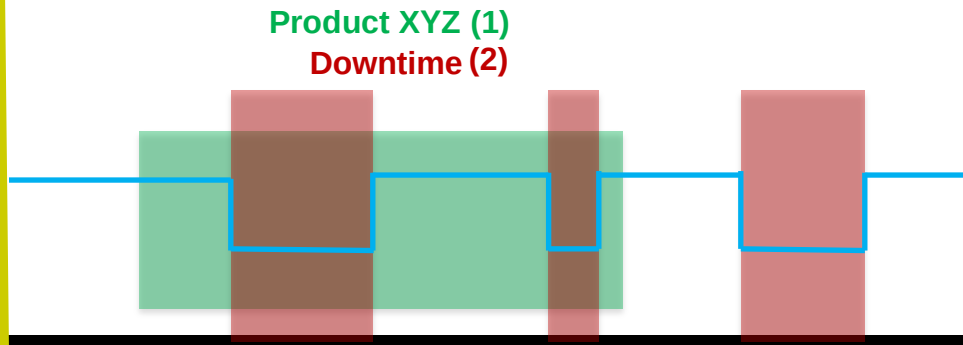



## Event Overlay Trend



| Name | Temp.Max |
|---|---|
| EF1 | 122.47 |
| EF2 | 109.34 |
| EF3 | 112.73 |
| EF4 | 98.61 |
| EF5 | 125.24 |

## Downtime Events




## Perform Comparisons

## Discover Relationships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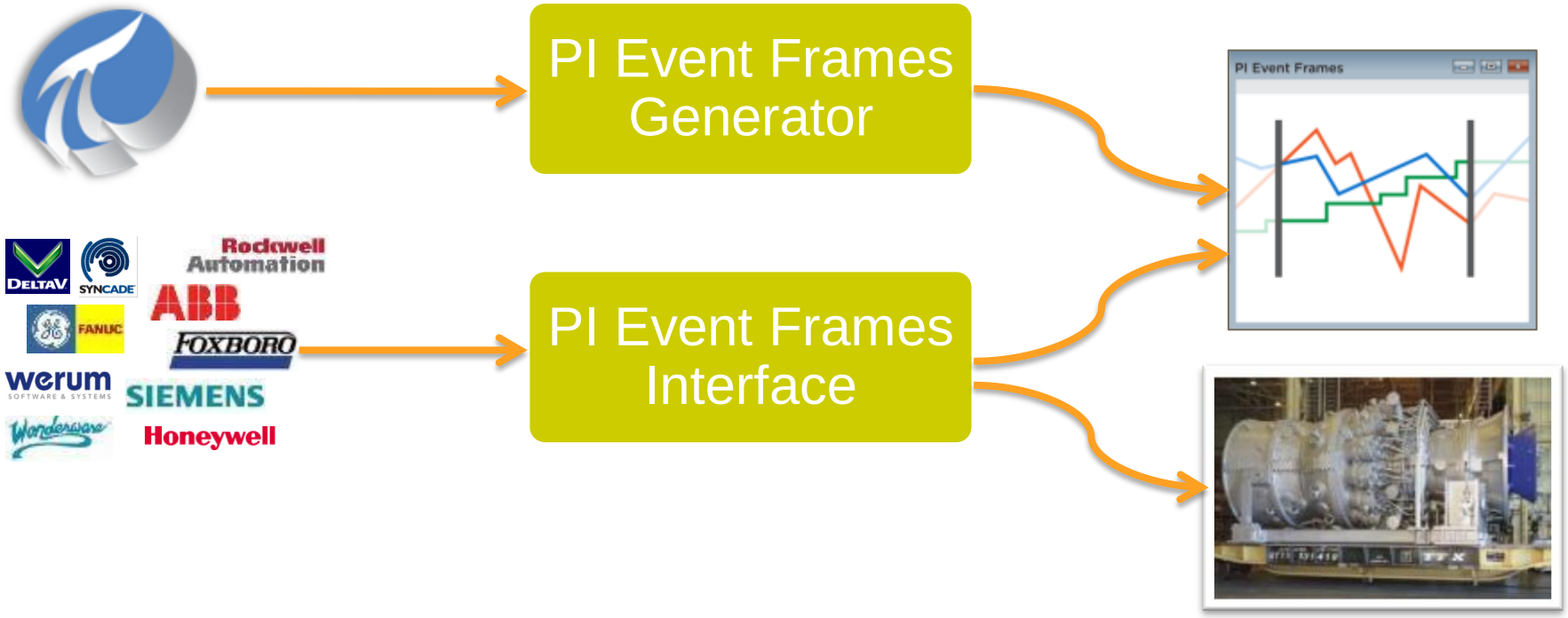
# PI Interfaces – Collect or Generate Events





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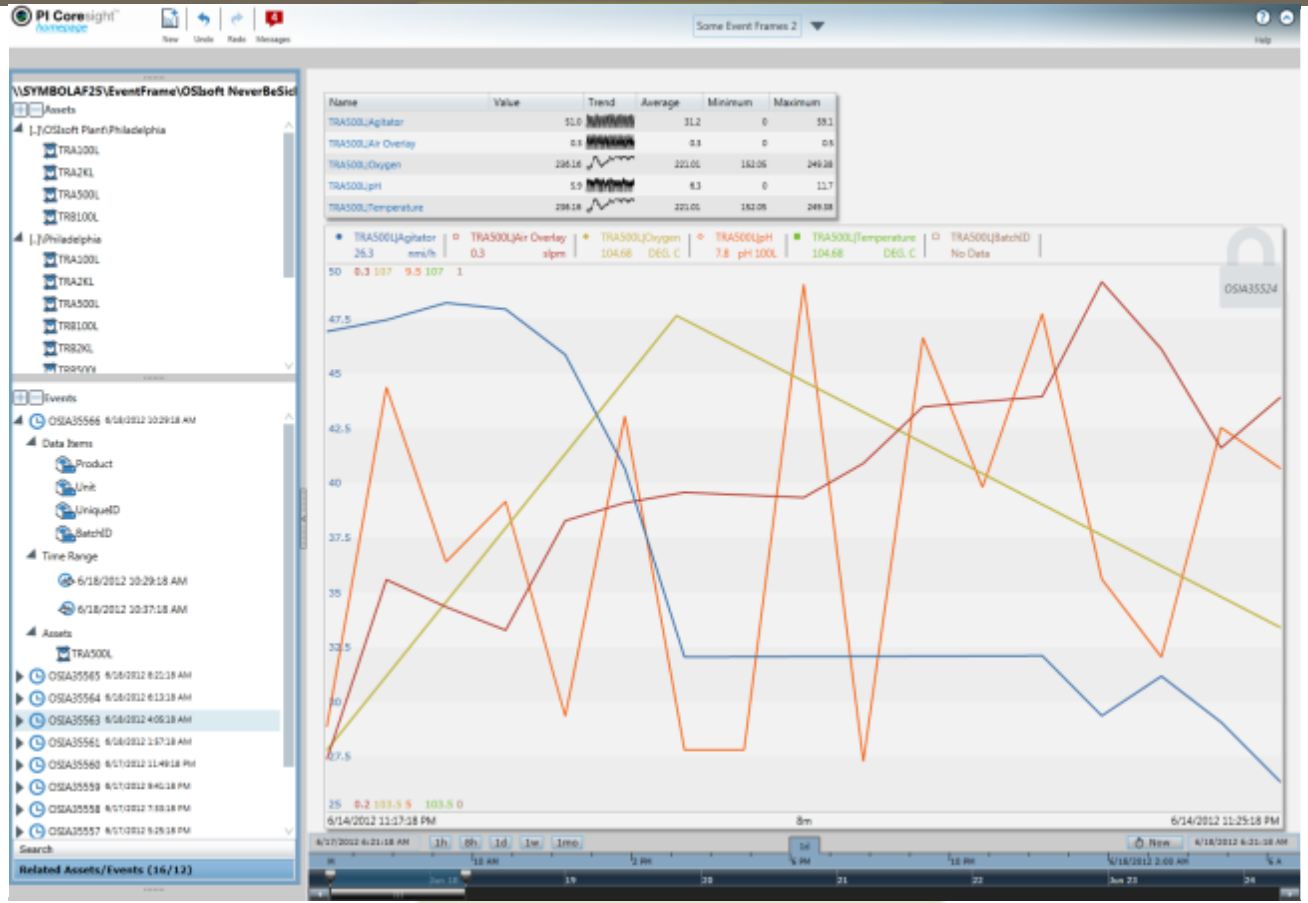
# PI Coresight - Discover and Visualize Events





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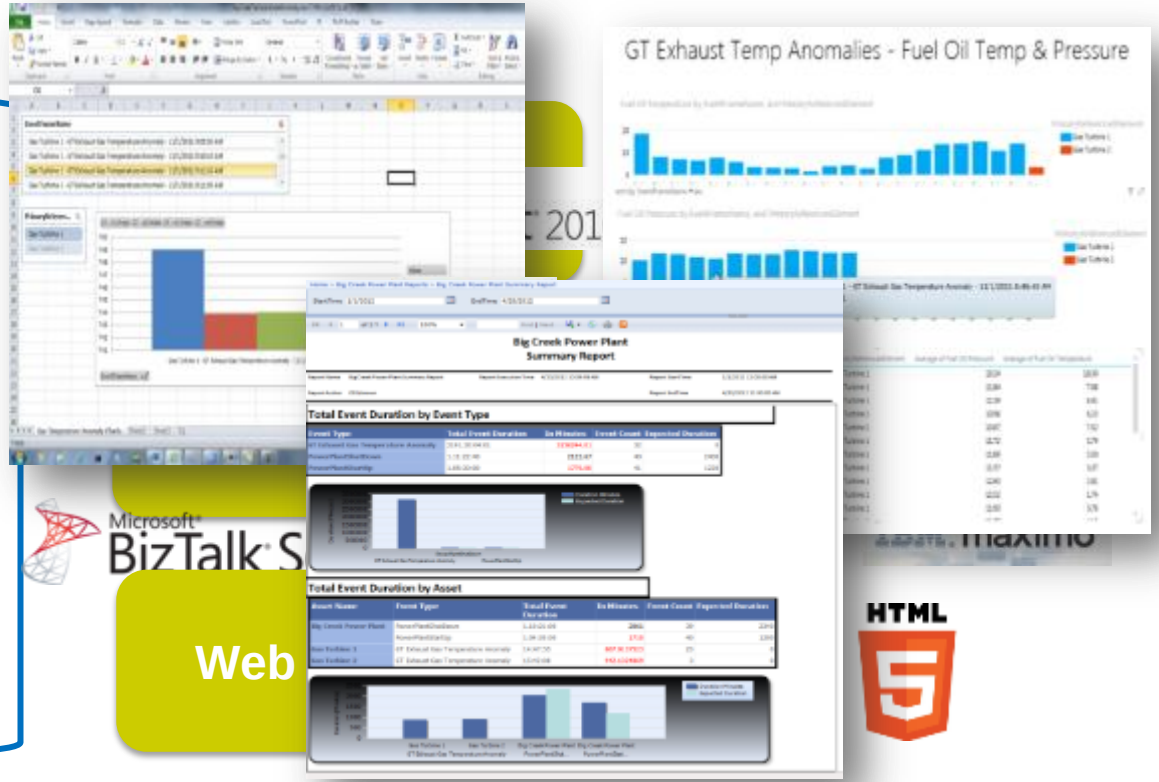
# PI Data Access – Integrate your events with other systems





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# The Rich Data Access: AF SDK 2012

Presented by **Andreas Schremmer**

vCampus Engineer



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