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REGIONAL SEMINARS 2012

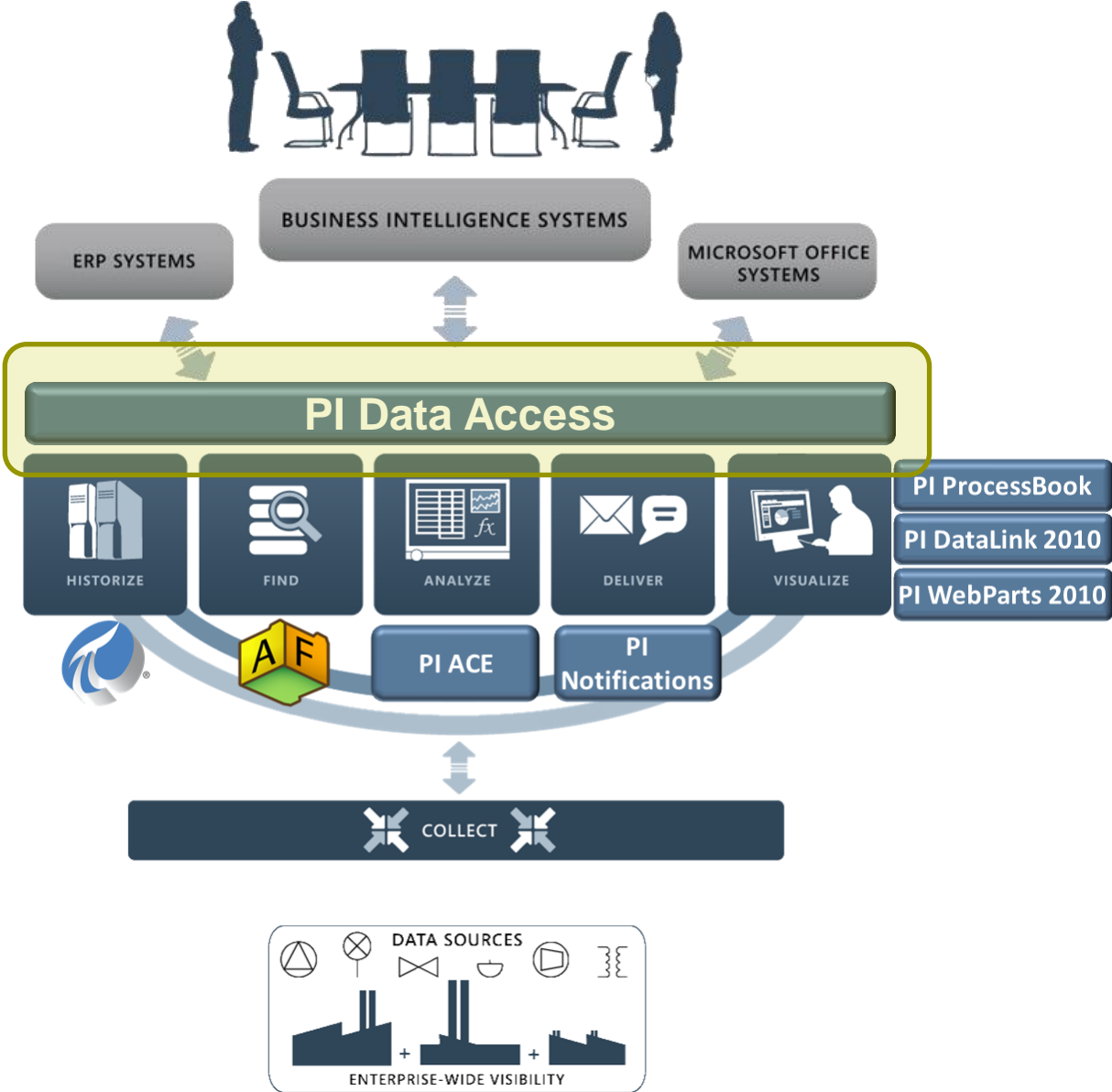
The **Power** of **Data**



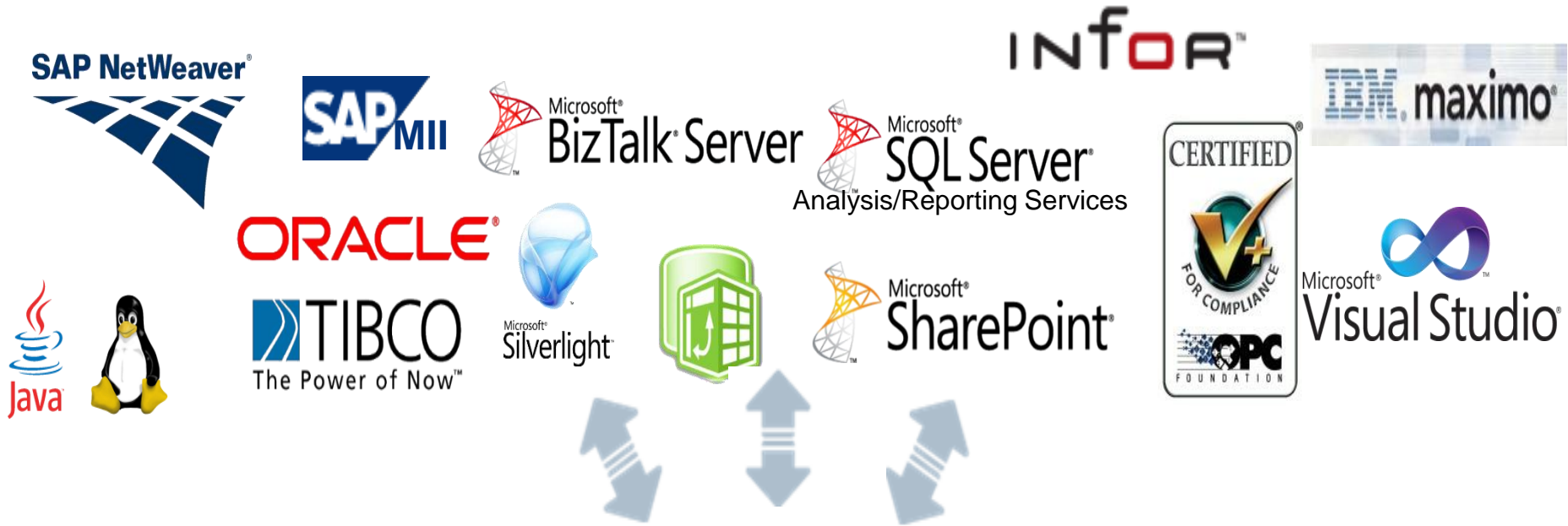
PI Asset Framework

Presented by **OSIsoft**

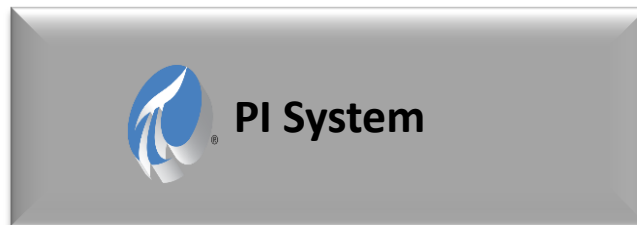
The PI System



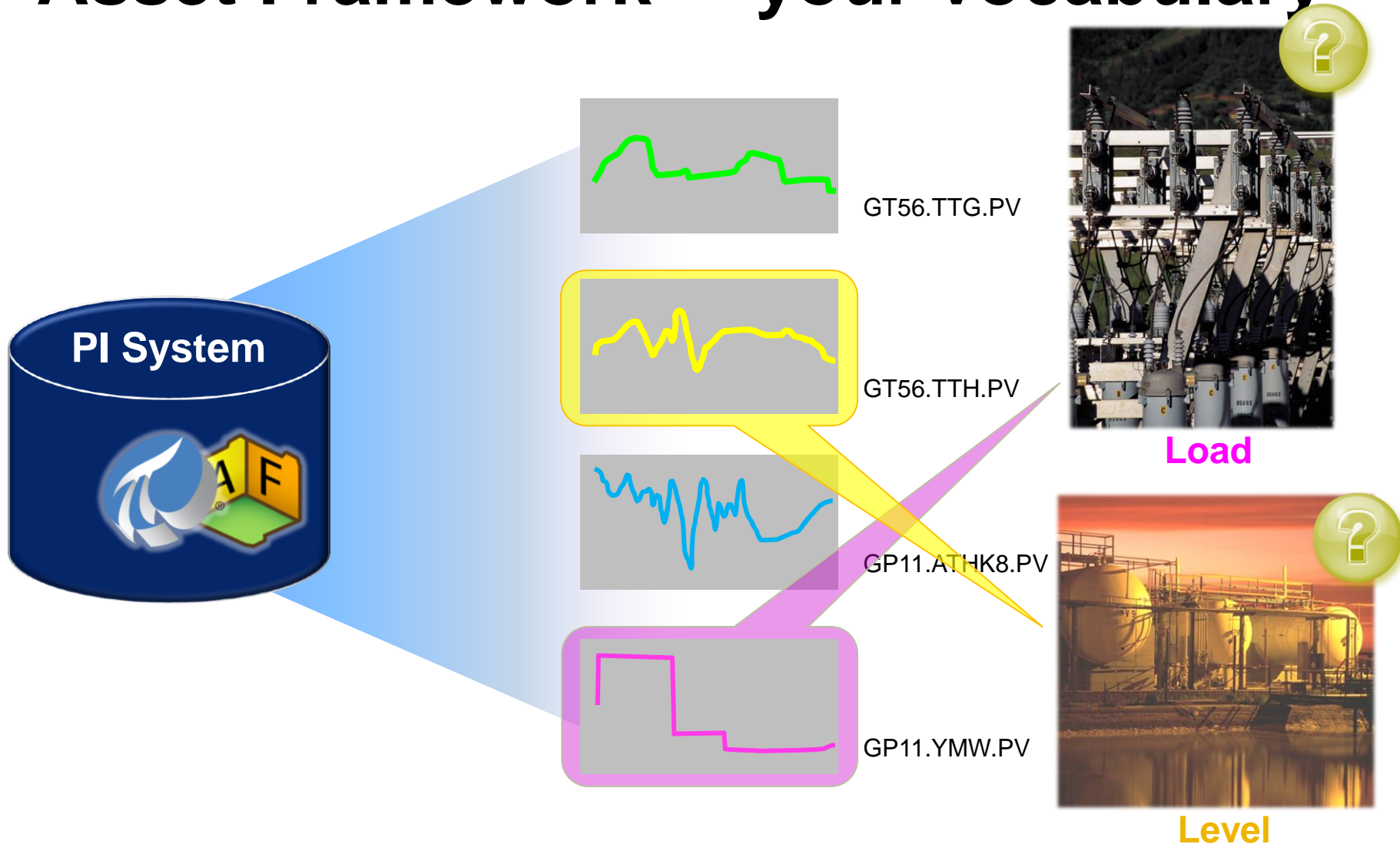
PI Data Access



PI Data Access family of products

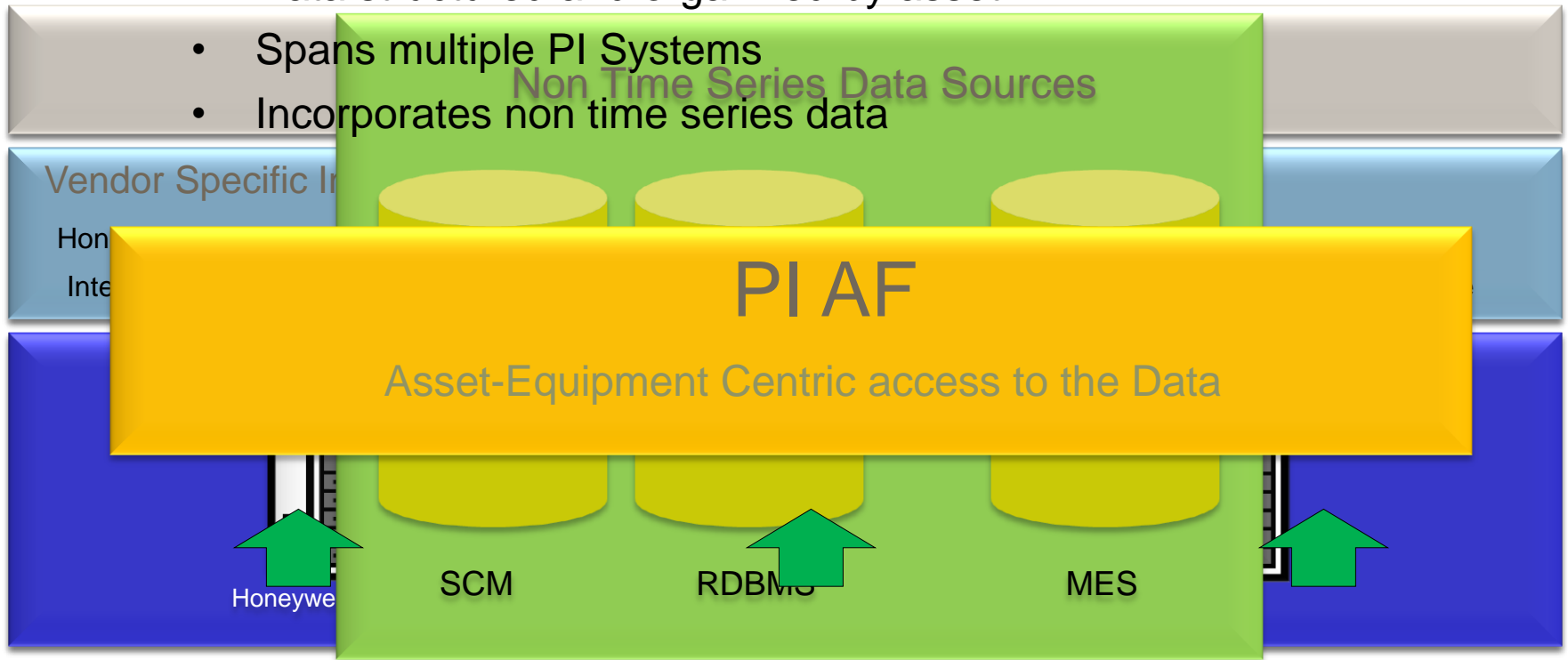


Asset Framework = your vocabulary



Spans all your data

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



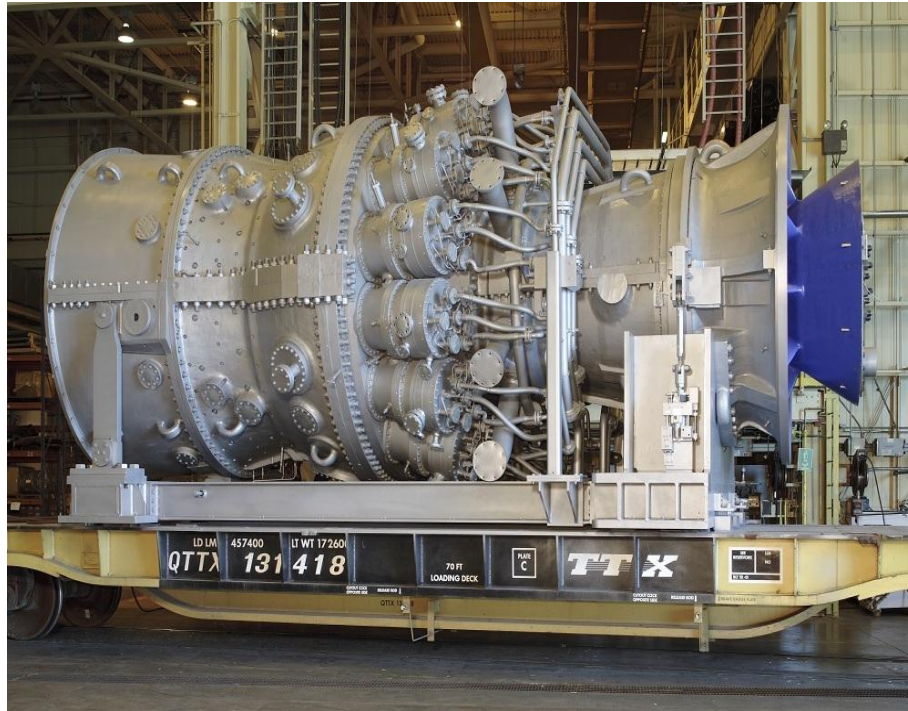
Asset Centric PI System

- **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 analysis and PI Notifications**
- **Simplify visualization and reporting**
- **Access your data via PI Data Access products**

Build a Complete Picture of Your Asset

PI Tags

- Inlet pressure
- Inlet flow
- Ambient temperature



PI Tags

- Exhaust temperature
- Exhaust flow
- Measured MW output

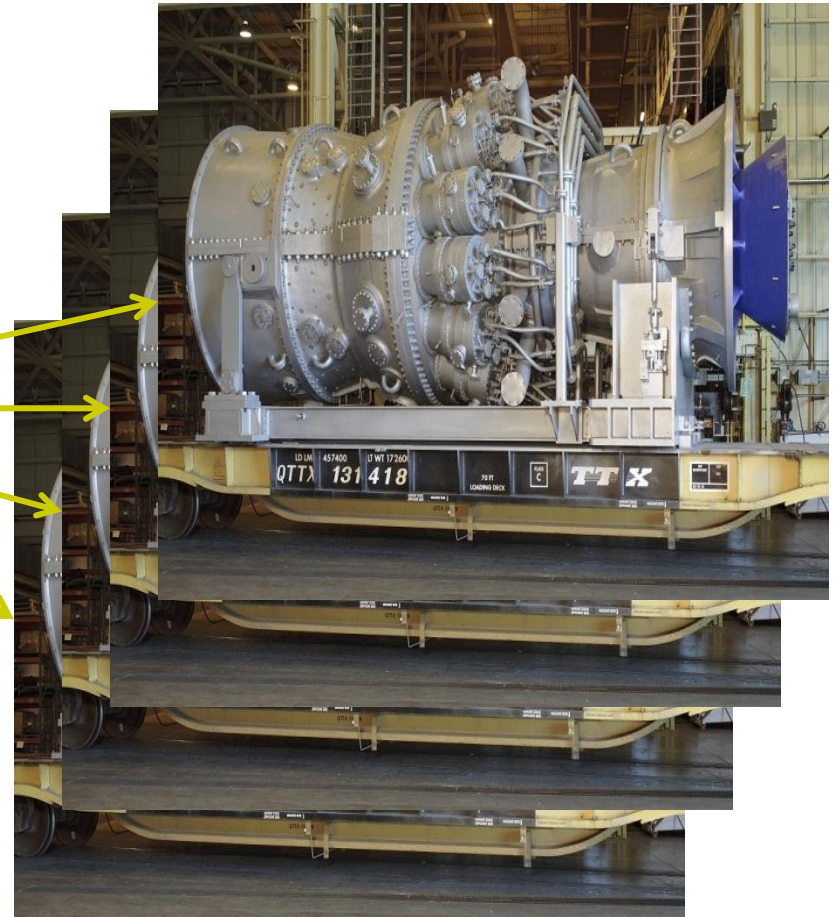
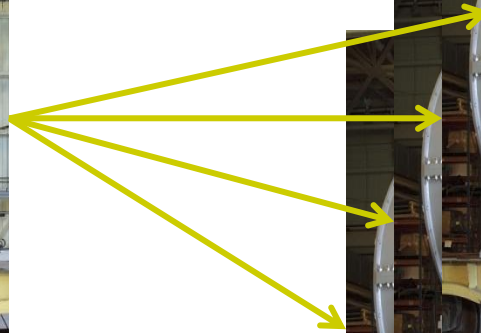
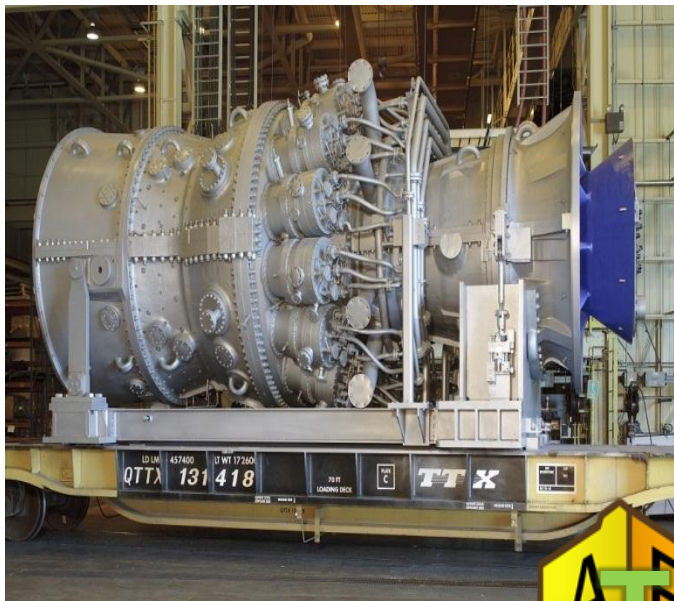
External Databases

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

Calculations

- Performance calculations
- KPI's

Common View for Similar Assets



Add Value to your PI System

The screenshot displays the UC2011-SK - PI System Explorer application. On the left, a tree view shows the hierarchy: Big Creek Power Plant, Condenser, Gas Turbine 1, Gas Turbine 2, HRSG 1, HRSG 2, Steam Turbine, and System Configuration. The 'Gas Turbine 1' element is selected. Below the tree, a sidebar contains sections for Event Frames, Library, Unit of Measure, MyPI, Notifications, and Contacts, with 28 Attributes listed at the bottom.

The main area shows a table of attributes for the selected element. The 'Compressor Inlet Temperature' attribute is highlighted in blue. Below the table, there are sections for 'Prices' and 'Power Factor'.

Attribute Name	Value
Compressor Discharge Pressure	16.2847557067871 bar(g)
Compressor Discharge Temperature	433.991912841797 °C
Compressor Inlet Temperature	19.9780979156494 °C
Exhaust Gas Pressure	0.0206421613693237 bar(g)
Exhaust Gas Temperature - #...	594.774108886719 °C
Exhaust Gas Temperature - #...	597.018737792969 °C
Exhaust Gas Temperature - #...	595.317443847656 °C
Exhaust Gas Temperature - #...	598.902770996094 °C
Fuel Oil Flow	-0.0620765015482903 m3/h
Fuel Oil Pressure	15.818398475647 bar(g)
Fuel Oil Temperature	33.3455696105957 °C
Gas Fuel Flow	70317.8671875 m3/h
Gas Fuel Pressure	36.21142578125 bar(g)
Gas Fuel Temperature	68.7641372680664 °C
Gas Turbine Speed	3000.62158203125 rpm
Gross MW Output	261.549621582031 MW
In Service Date	2/25/2009 12:00:00 AM
Inlet Guide Vane Angle	95.78909 %
Inlet Pressure Loss	1.60181736946106 mbar(g)

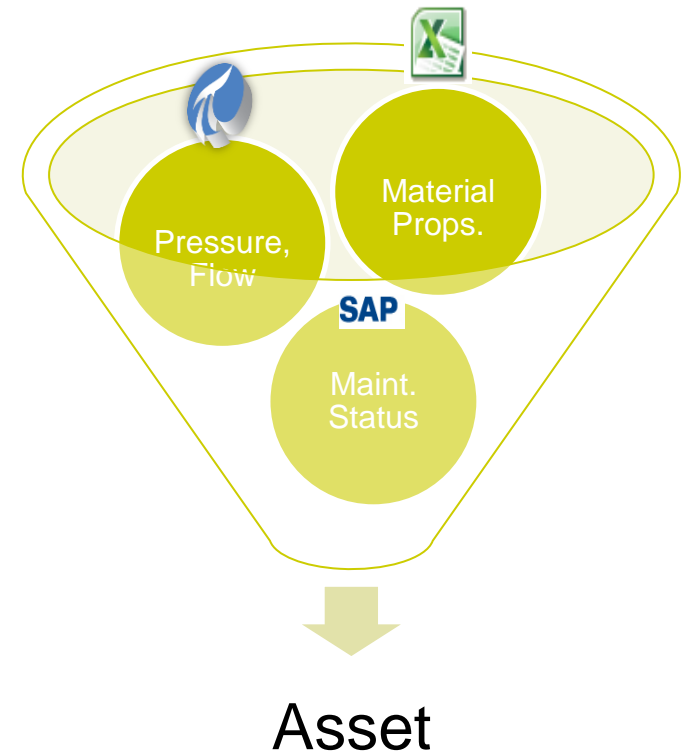
Prices

- Electricity Price
- Gas Fuel Price
- Oil Fuel Price

Power Factor

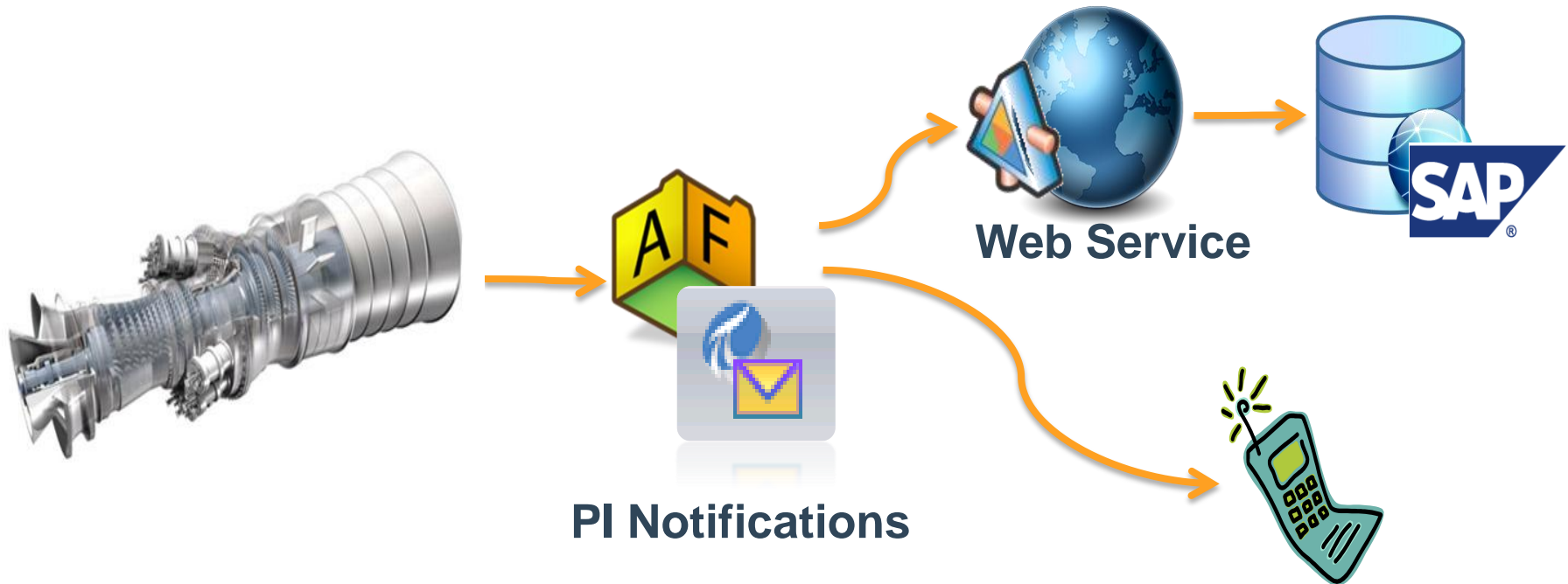
Add Value to your PI System

- **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



Add Value to your PI System

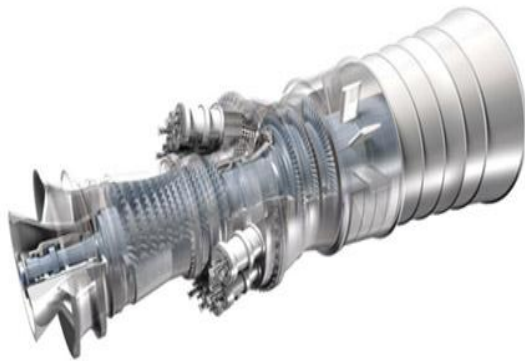
“One of GT exhaust thermocouples has been acting up... Let’s keep an eye on it and create a work order for maintenance if it fluctuates more than 5% in 5 seconds. Make sure Bob is notified of this also.”



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



How to begin

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



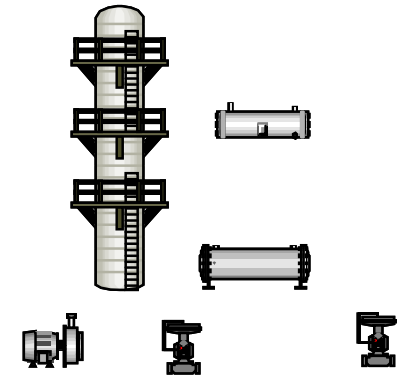
Attributes

4. Physical/logical asset structure



Hierarchy

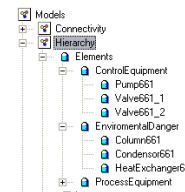
Condensor
Heatexchanger
Column
Valve
Pipe
Pump



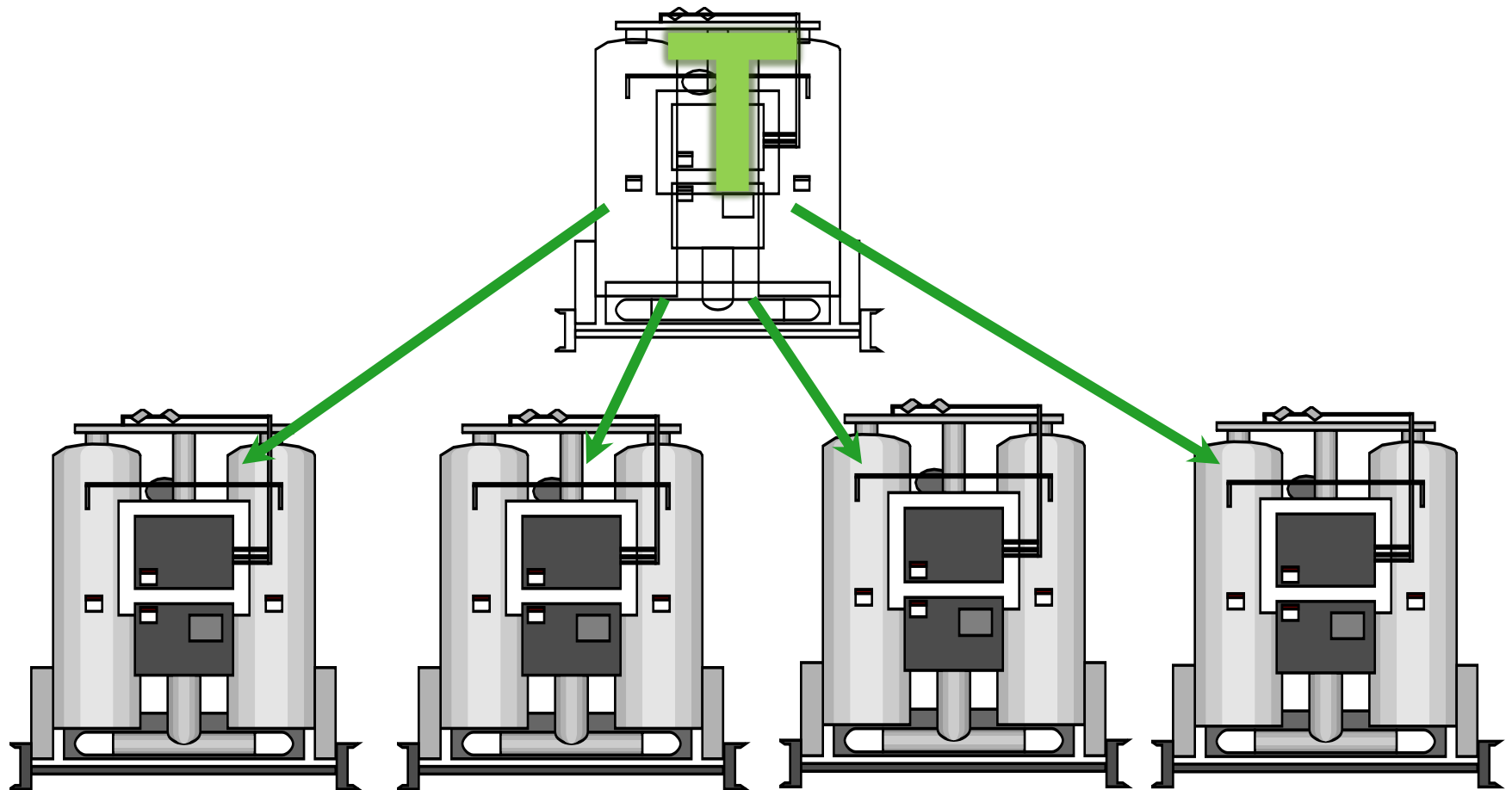
Column661
Condensor661
P661_1
P661_2
HeatExchanger661
Valve661_1
Valve661_2

OpeningGrade
InspectionResult
LastInspection
SerialNumber
XYZ

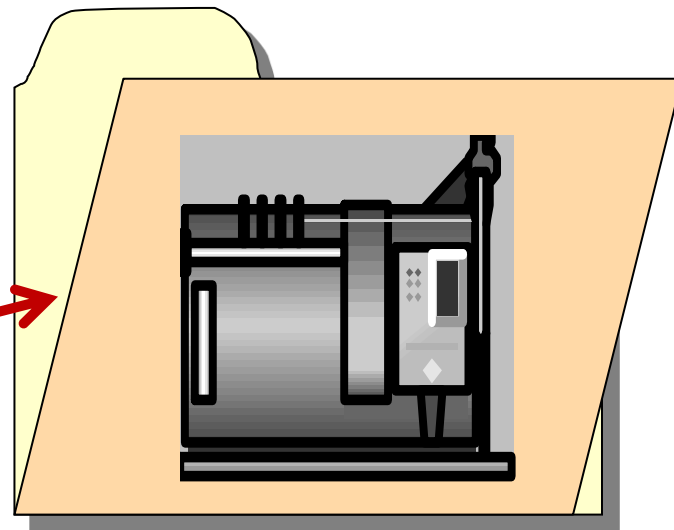
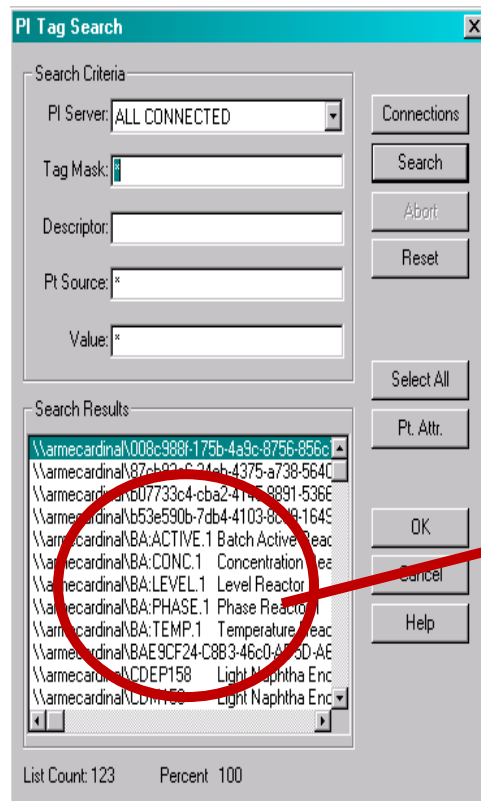
PI Point: \MOBILEVBC\Valve661_1.OpeningGrade
Table Lookup: SELECT InspectionResult FROM ...
Table Lookup: SELECT LastInspection FROM ...
Table Lookup: SELECT SerialNumber FROM ...
Formula: A=OpeningGrade:[A*0.98]



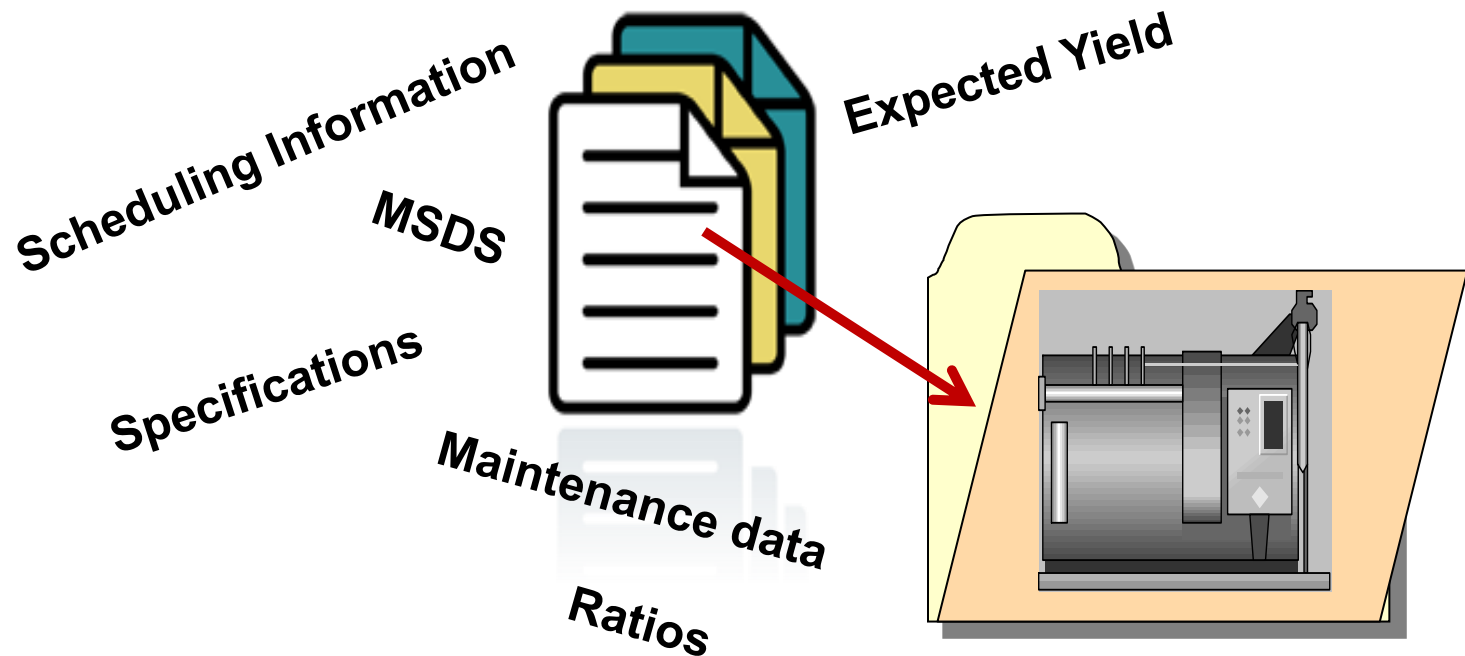
Manage and extend Elements by creating powerful **Templates**



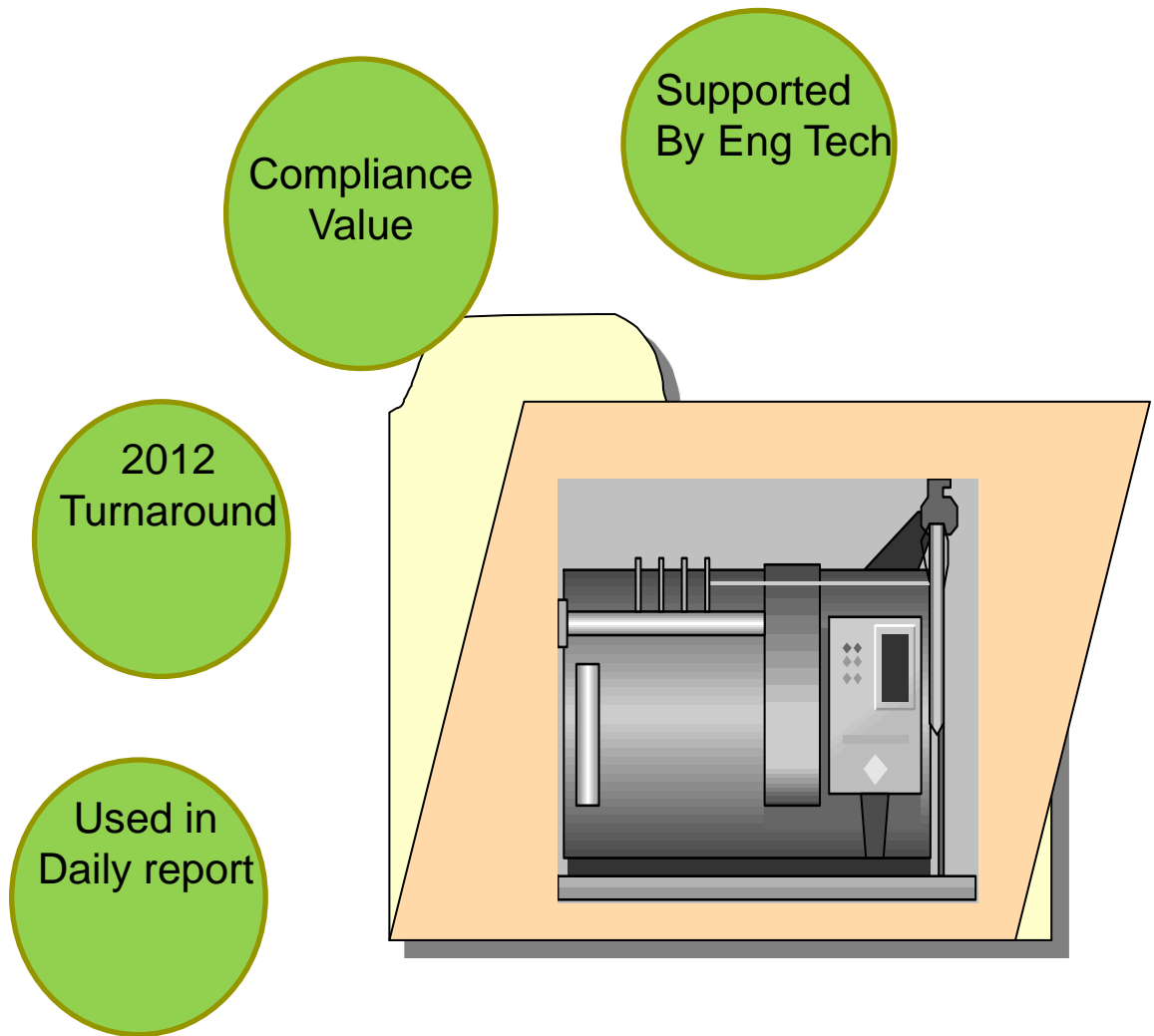
Group PI Tags into Elements which represent your Assets



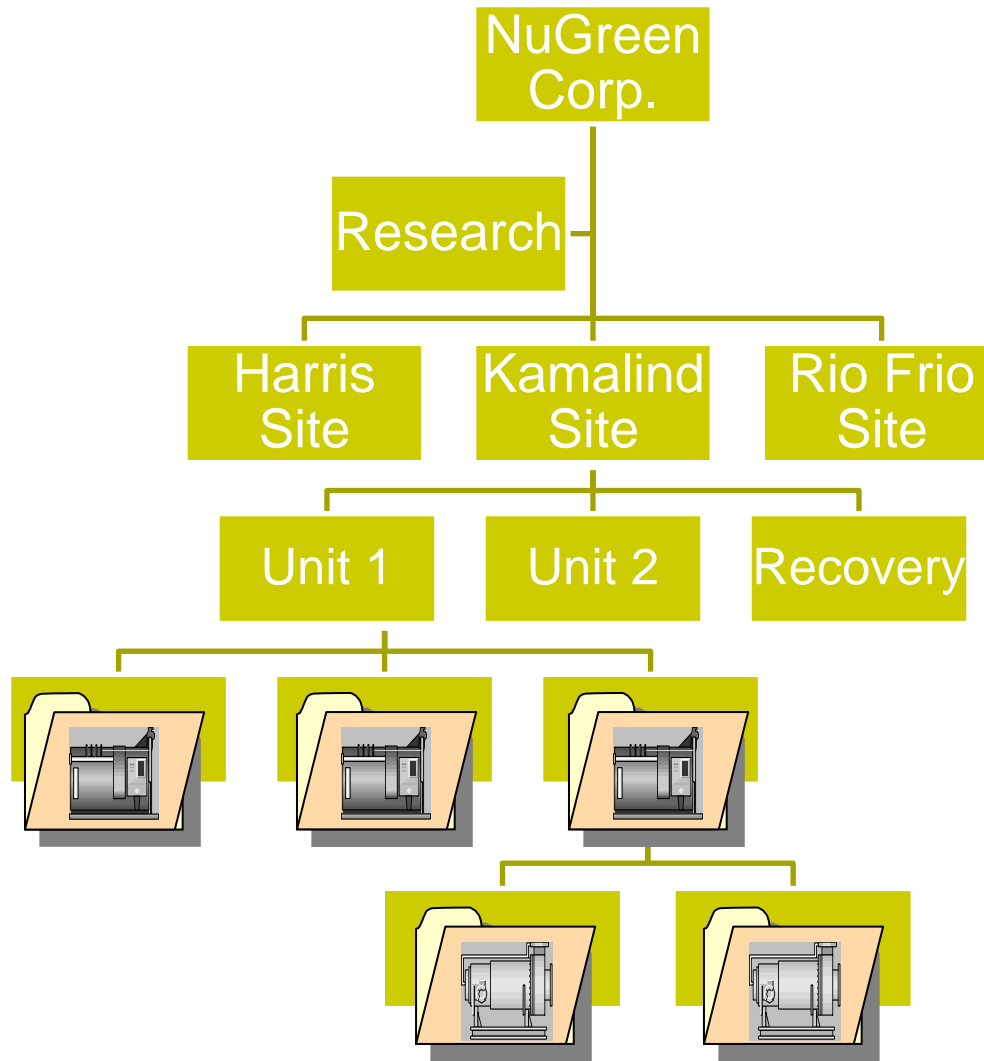
Add Efficiency Calculations, KPIs, Reference Data from Relational Databases and other information to add more Value



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



Organize the Assets into Hierarchies



It Will Take a Team

Process engineers— subject matter experts who understand the data well enough to build the calculations and define the relationships



&

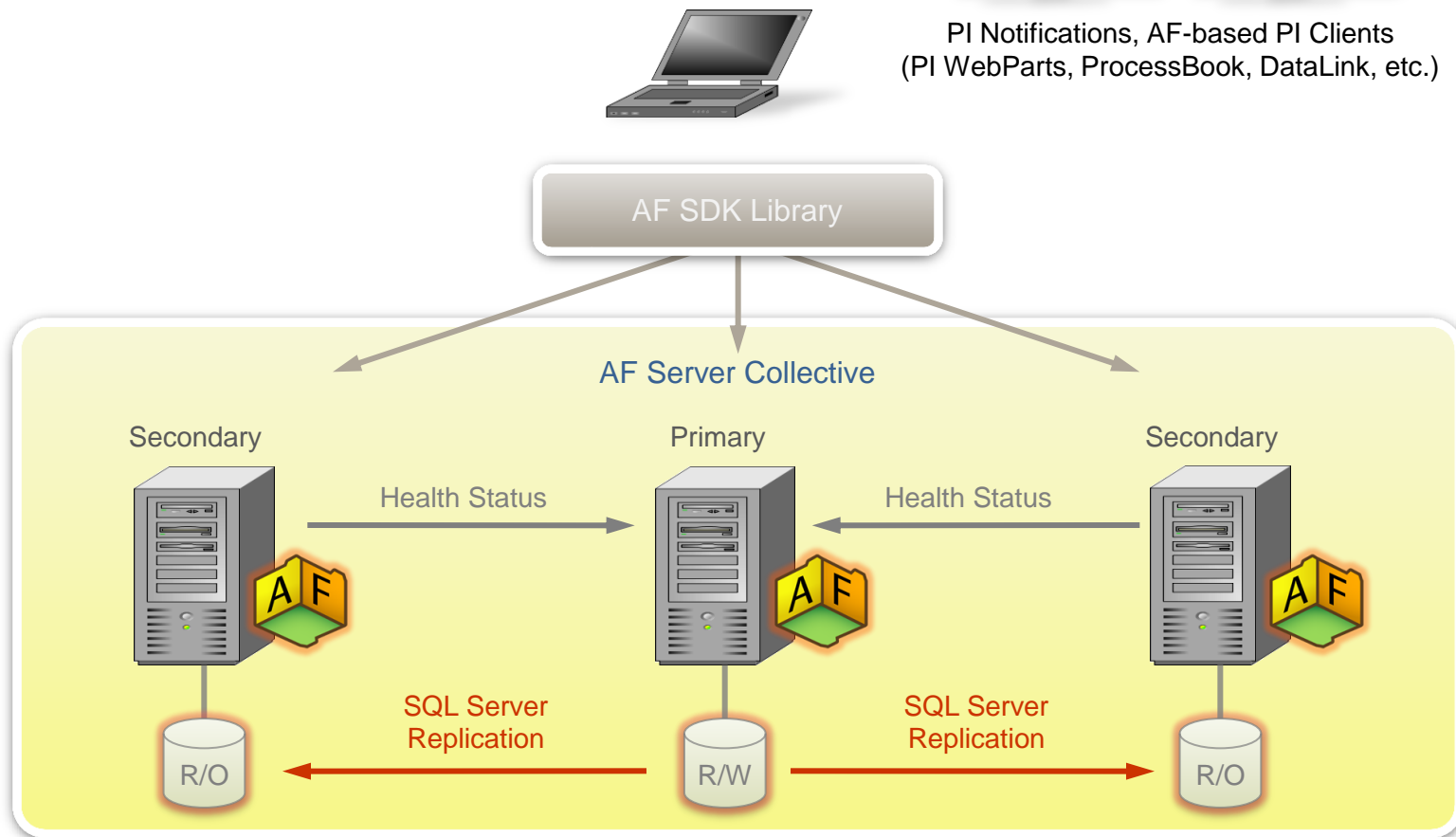
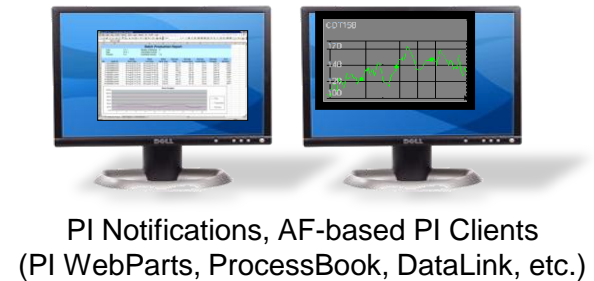


IT Technicians- who can use XML, .NET, and SQL to build the calculations, hierarchies, and link databases



Insight into PI Asset Framework

AF HA Collective



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

- Create **domain/industry specific** applications
- Focus on **doing it right**
- Personal development **PI System**
- **Community experience**
- Tech Conference: **OSIsoft vCampus Live!**



```
AFTimeRange tr = new AFTimeRange(new AFTime(tex
AFValues vals = _afDB.Elements["Pump123"].Attri

lstValues.Items.Clear();
foreach(AFValue val in vals)
{

    lstValues.Items.Add(val.Value.ToString() +
}
```

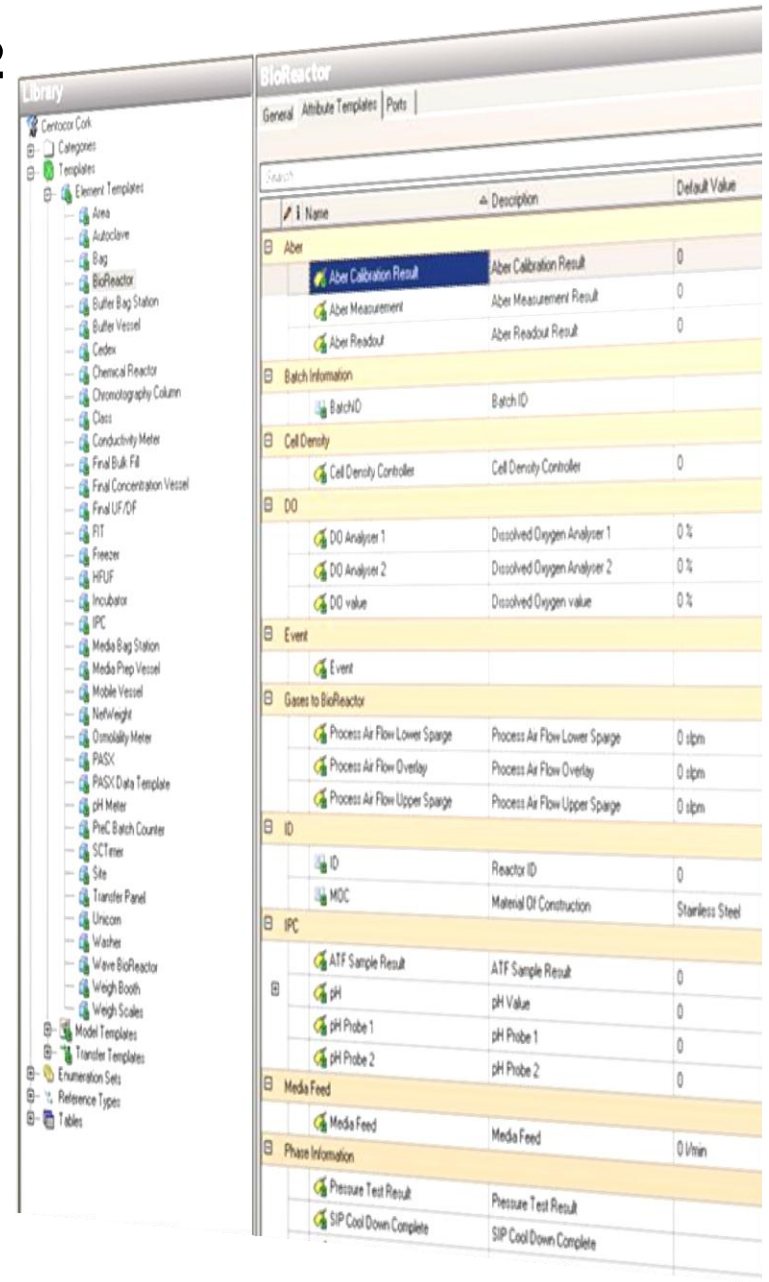
Mapping assets – User example UC 2012 PI Asset Framework – PI AF in Janssen

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.





THANK YOU

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