



OSIsoft.

REGIONAL SEMINARS

The **Power of Data**

2012



PI Asset Framework

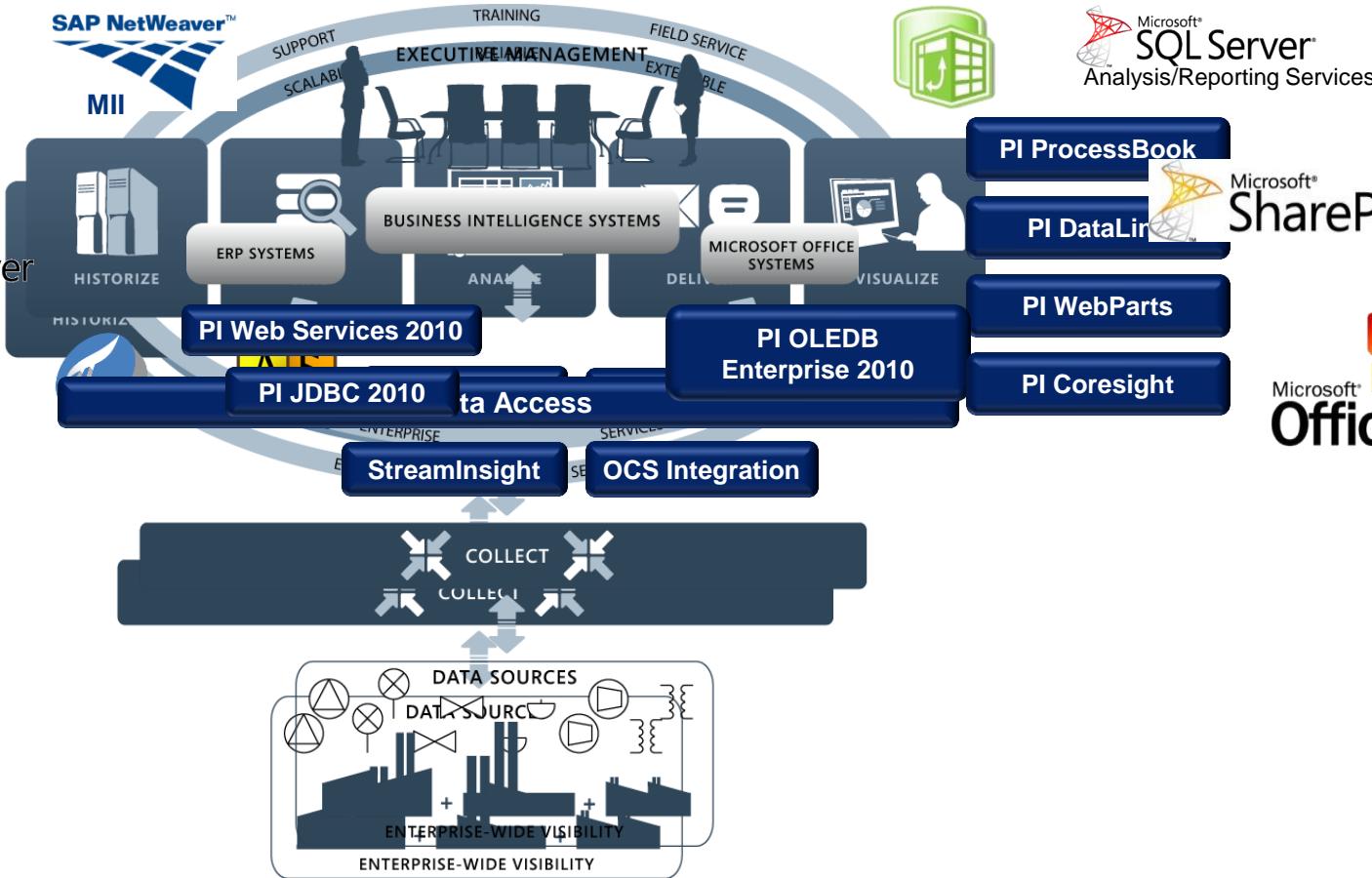
Presented by **Christian Leroux**

Senior Customer Support Engineer, EPM
OSIsoft España SL

The PI System



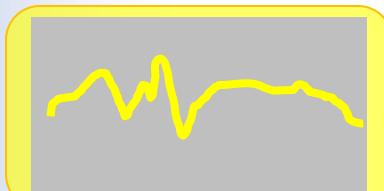
ORACLE®



Asset Framework = your vocabulary



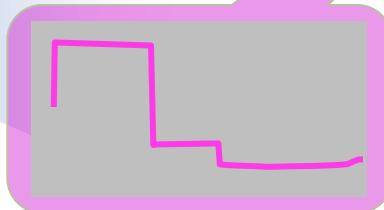
GT56.TTG.PV



GT56.TTH.PV



GP11.ATHK8.PV



GP11.YMW.PV



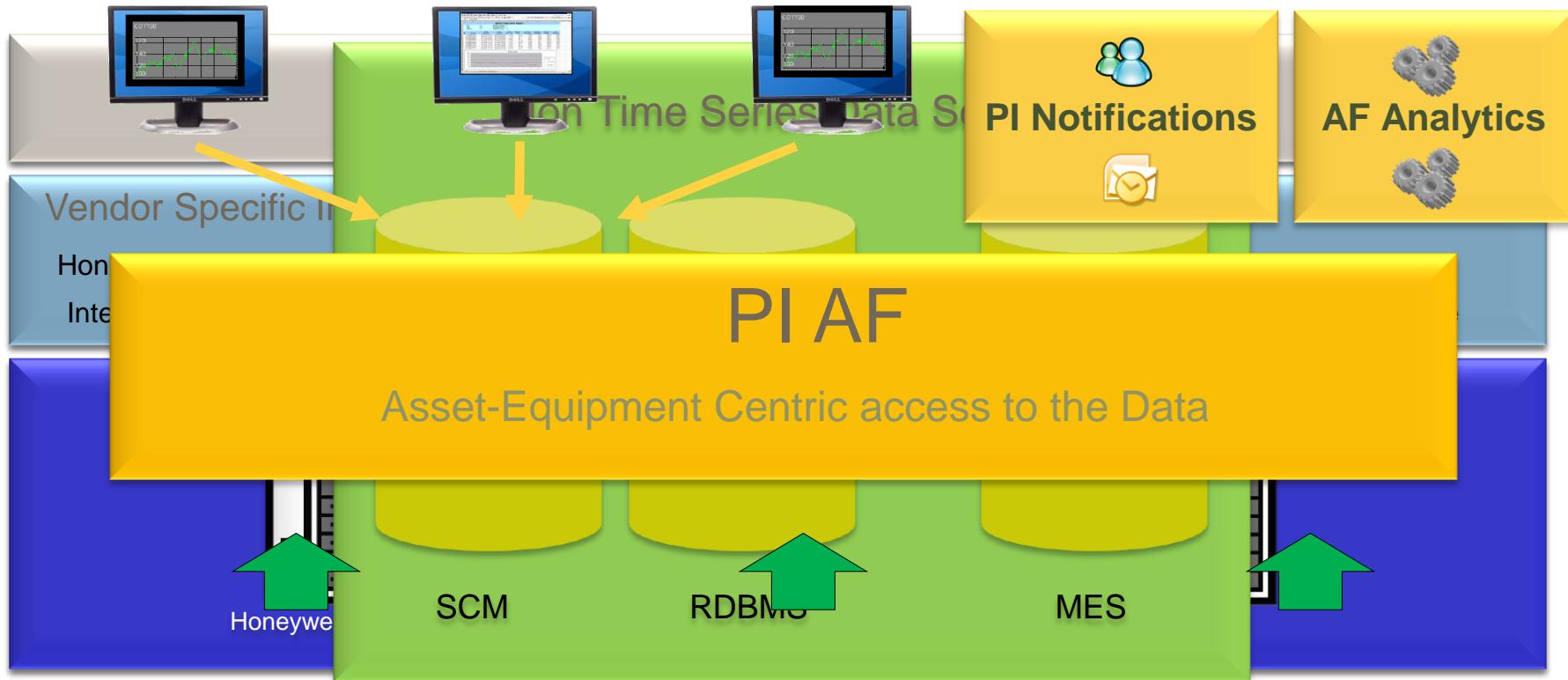
Load



Level

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 PI Notifications and analyses**
- **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



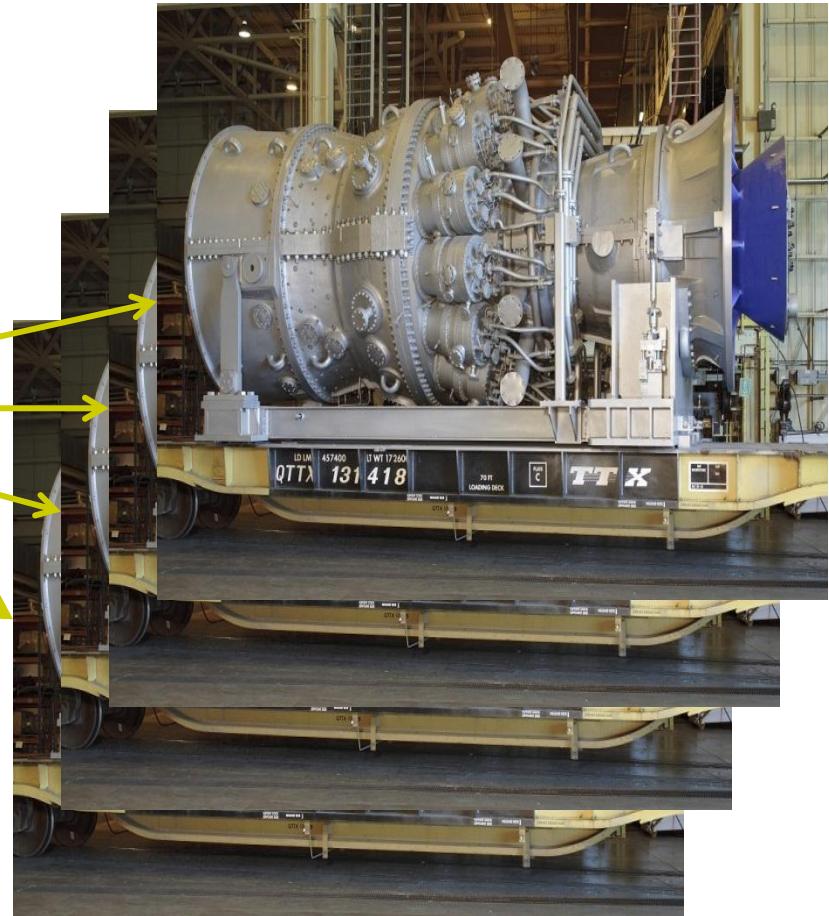
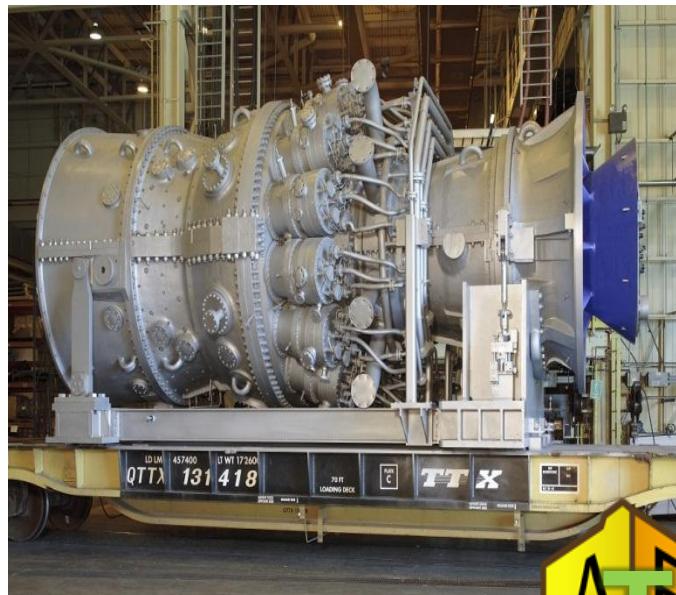
External Databases

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

Calculations

- Performance calculations
- KPI's

Common View for Similar Assets



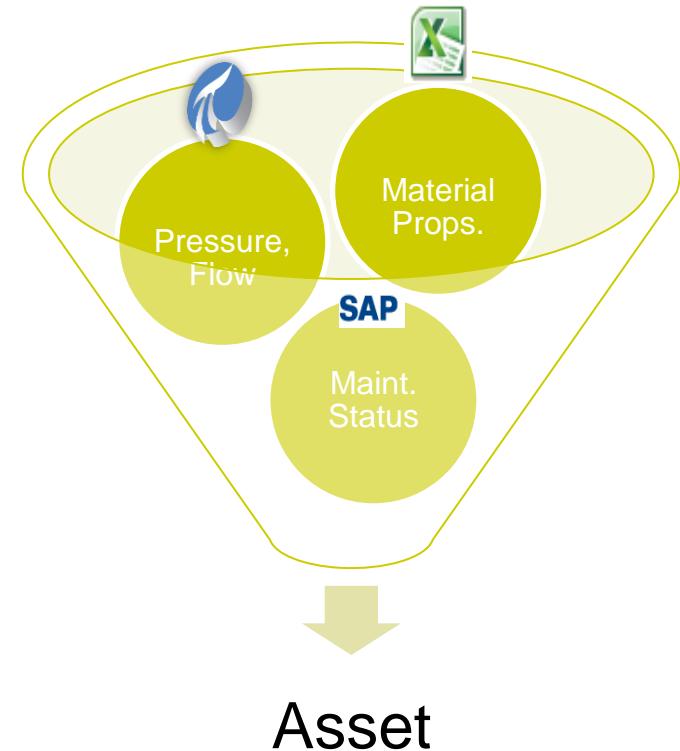
Add Value to your PI System

The screenshot shows the PI System Explorer interface with the title bar "UC2011-SK - PI System Explorer". The menu bar includes File, Edit, View, Go, Tools, and Help. The main window has a left sidebar titled "Elements" containing a tree view of the "Big Creek Power Plant" system, including nodes for Condenser, Gas Turbine 1, Gas Turbine 2, HRSG 1, HRSG 2, Steam Turbine, and System Configuration. Below the tree view is a "Prices" section under the "Event Frames" category, listing Electricity Price, Gas Fuel Price, and Oil Fuel Price. The right side of the screen displays a large table of data points:

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 - #1	594.774108886719 °C
Exhaust Gas Temperature - #2	597.018737792969 °C
Exhaust Gas Temperature - #3	595.317443847656 °C
Exhaust Gas Temperature - #4	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)

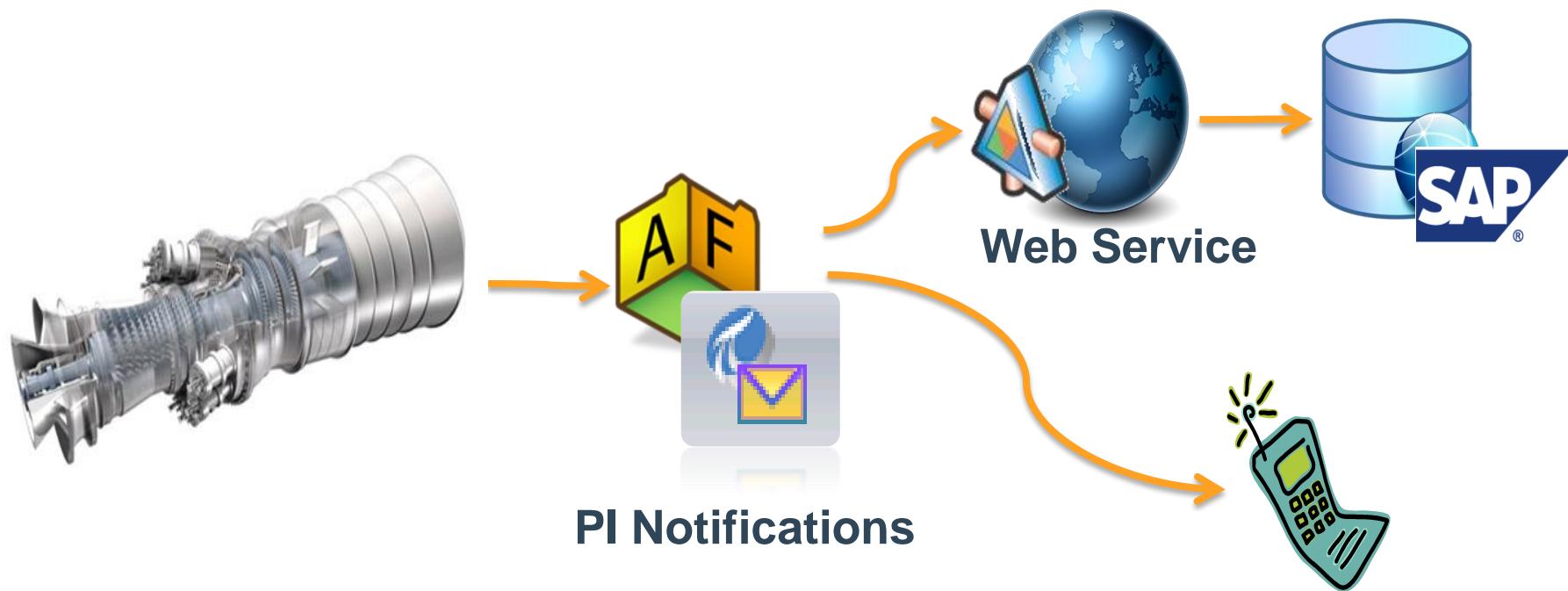
Add Value to your PI System

- **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

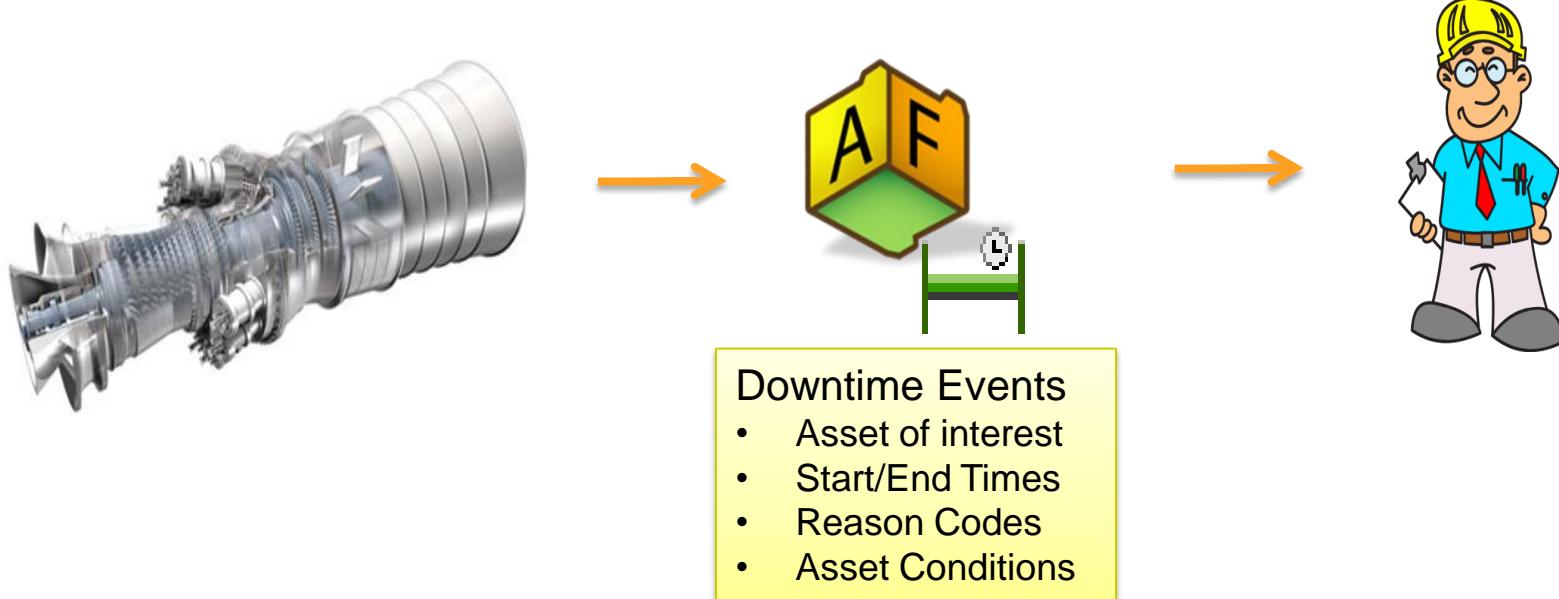
“One of GT exhaust thermocouples has been acting up... Let’s keep an eye on it and create a work order for maintenance if it fluctuates more than 5% in 5 seconds. Make sure Bob is notified of this also.”



Add Value to your PI System

Event Frames Are Part of Asset Framework

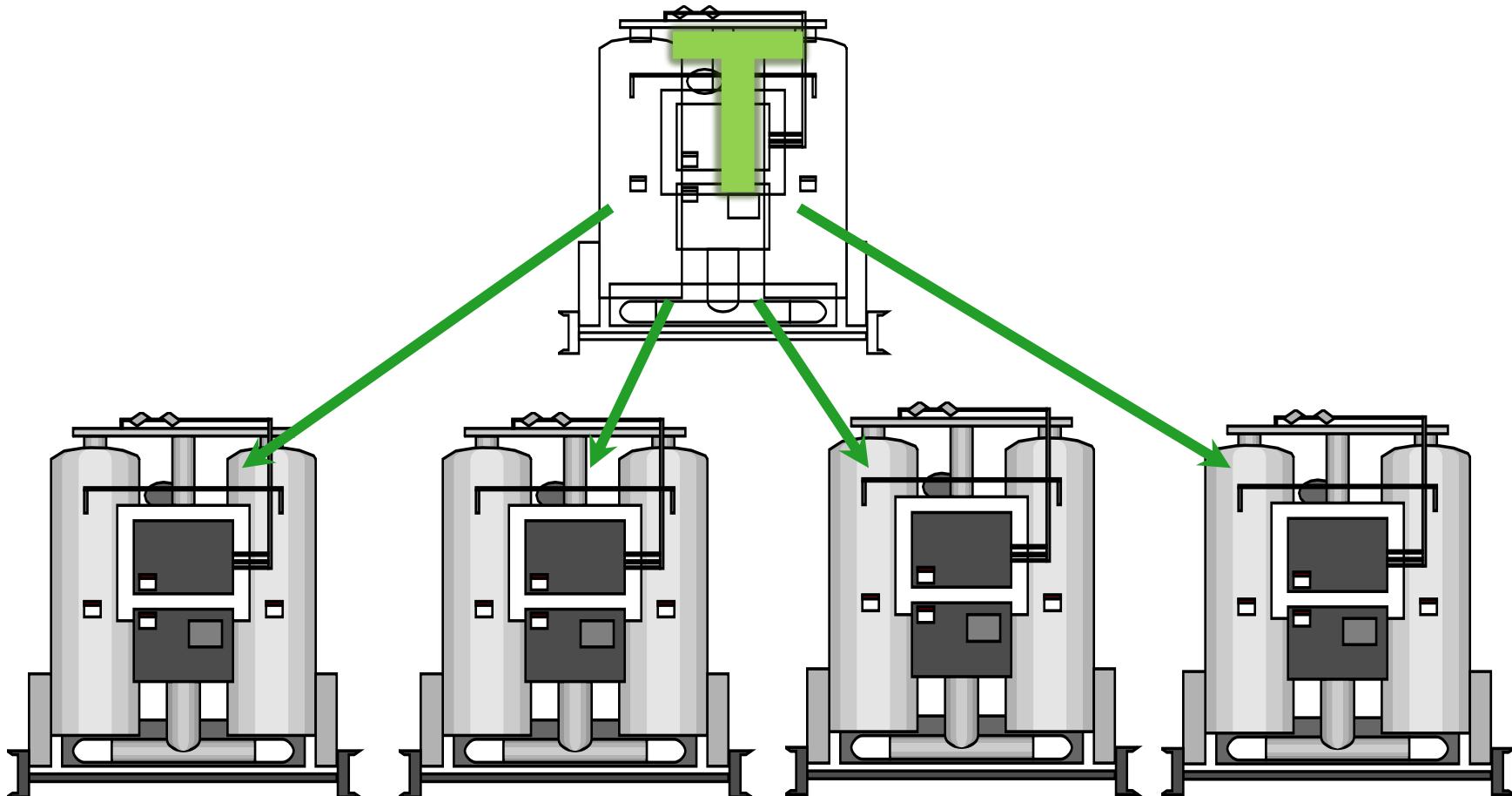
- GT #2 tripped again last night!!
- How many times has this happened in the last year?
- What were the operating conditions when it tripped?
- Let's find and gather all these events and analyze them.



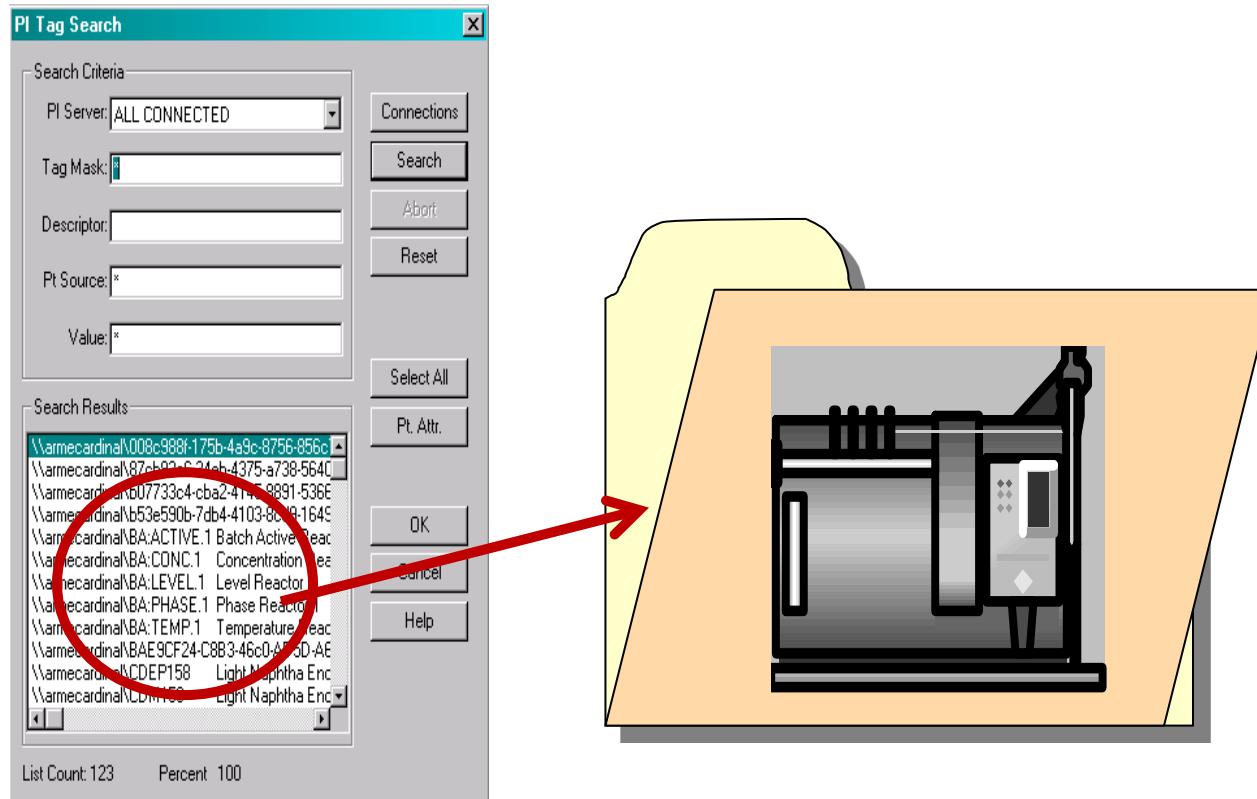


How to begin

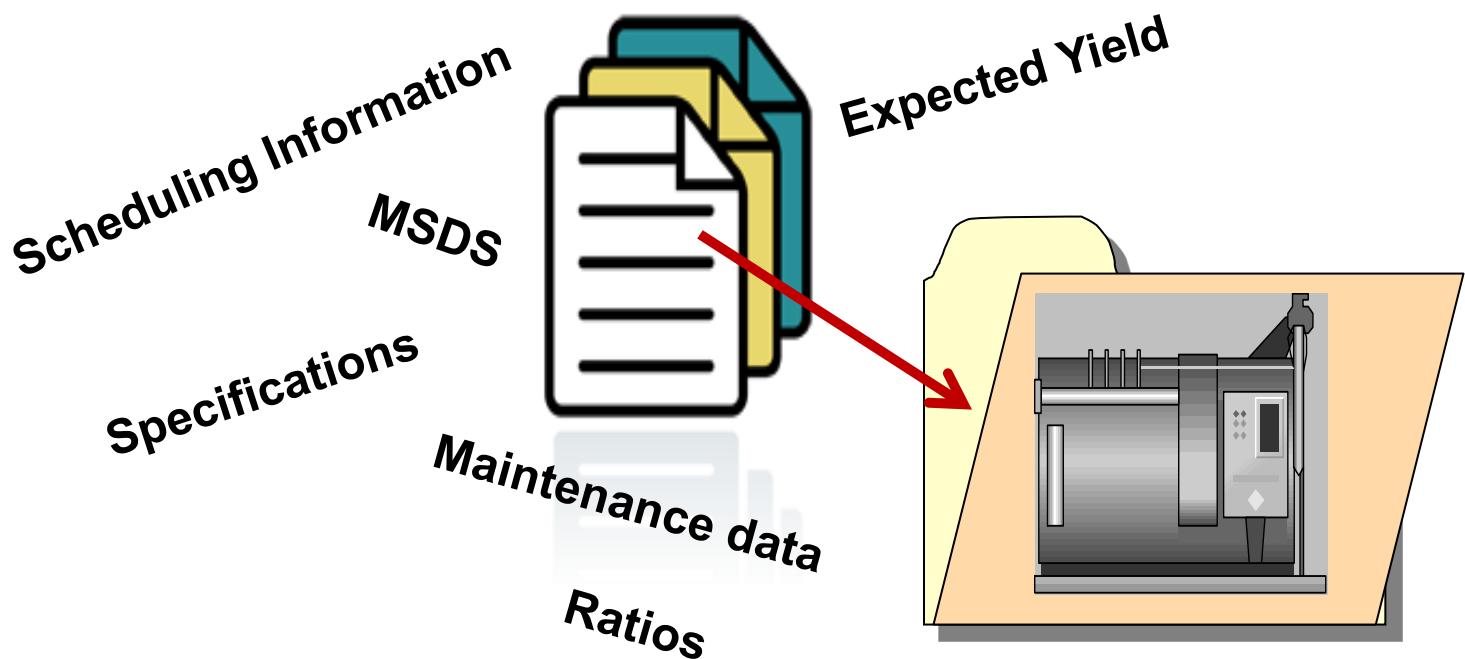
Manage and Extend Elements by creating Powerful **Templates**



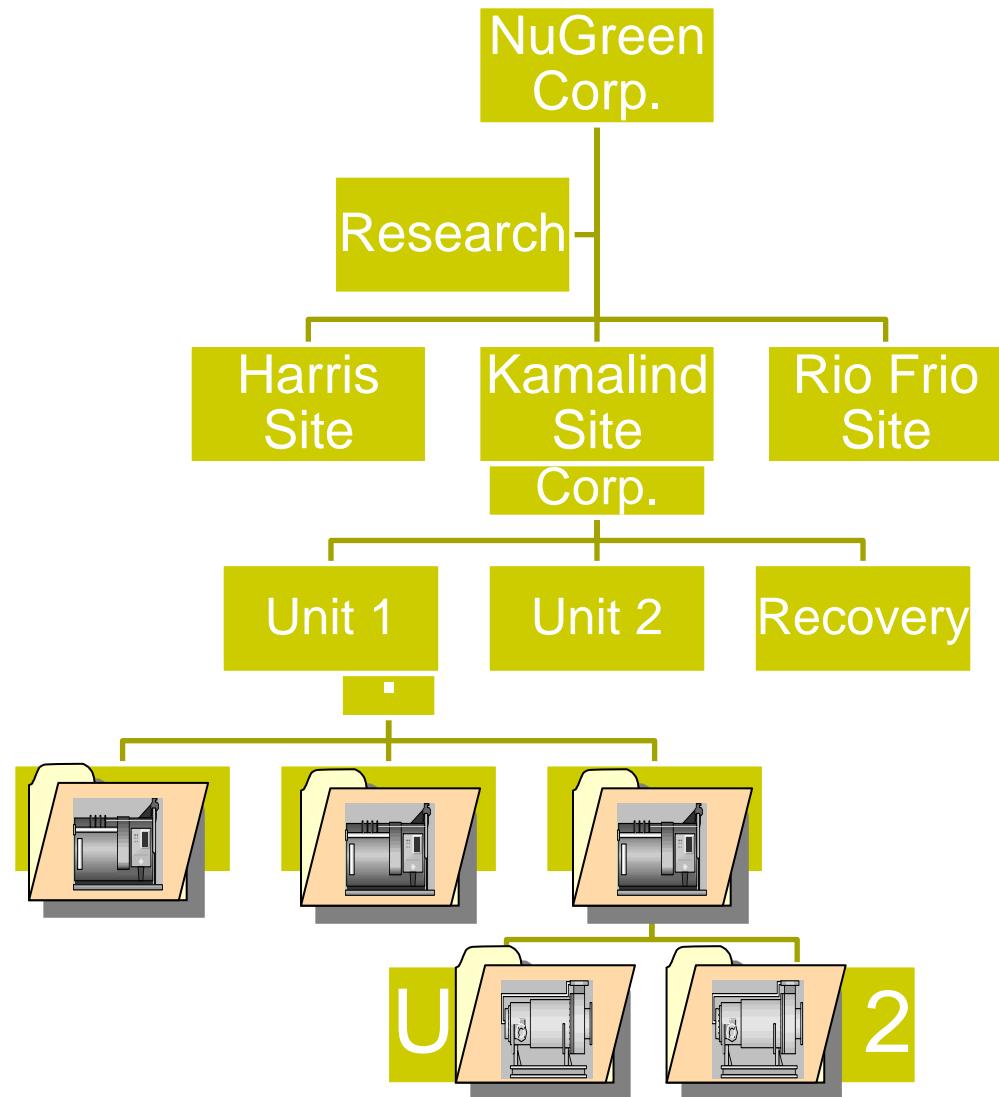
Sort Your Tags into Elements Which Represent Your Equipment



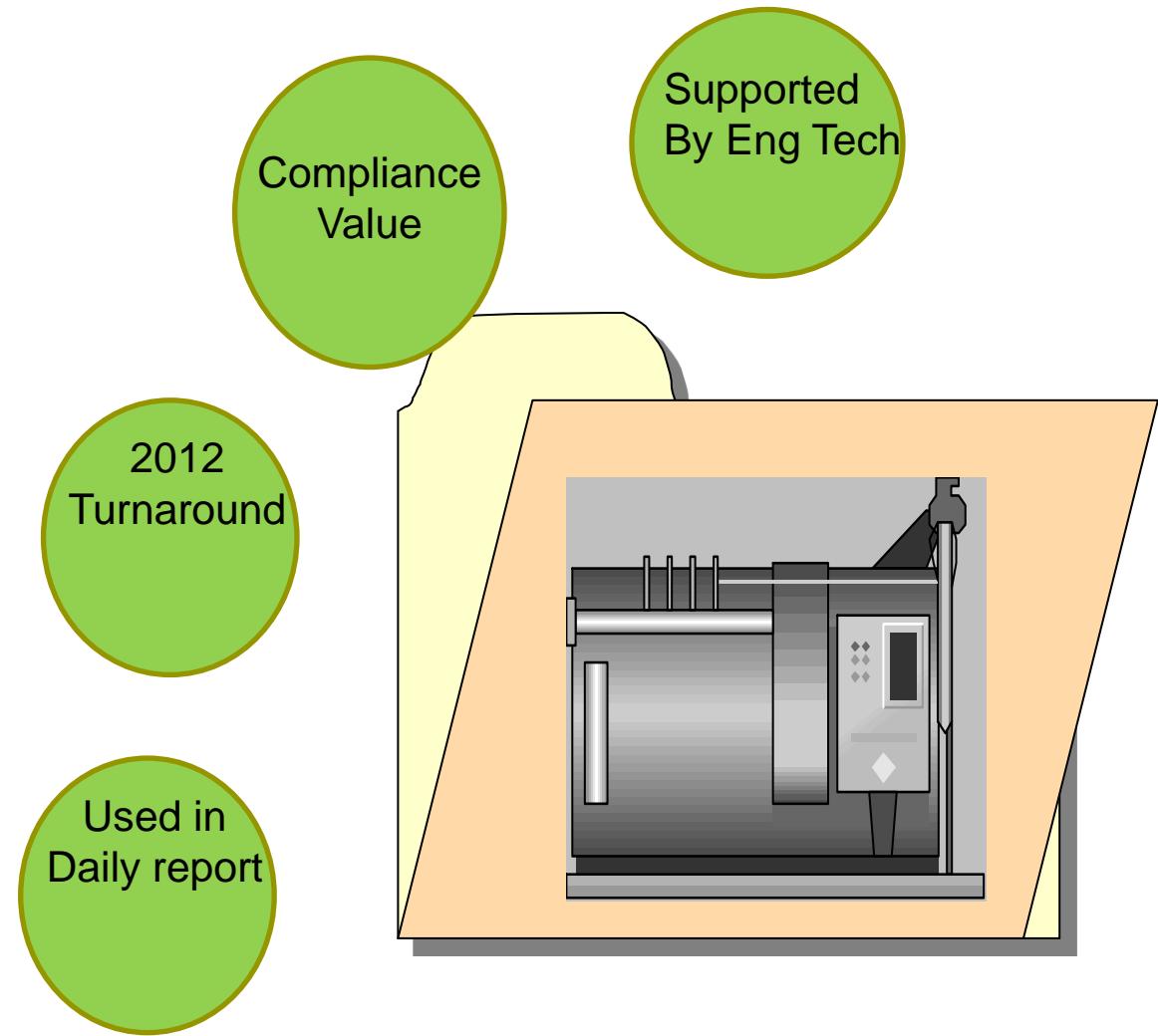
Add Efficiency Calculations, KPIs, Reference Data from Relational Databases and Other Information to Add More Value



Organize the Assets into Hierarchies



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



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

\\skwan-vm-af25\NuGreen - PI System Explorer (Administrator)

File Edit View Go Tools Help

Database Query Date Back Check In Refresh New Element Search

Elements

Elements

NuGreen

Search

Group by: Category Template

Name	Description	Category	Type	Template
NuGreen	Our Company E...	Locations	None	Enterprise

Elements

Event Frames

Library

Unit of Measure

Replication

MyPI

Notifications

Contacts

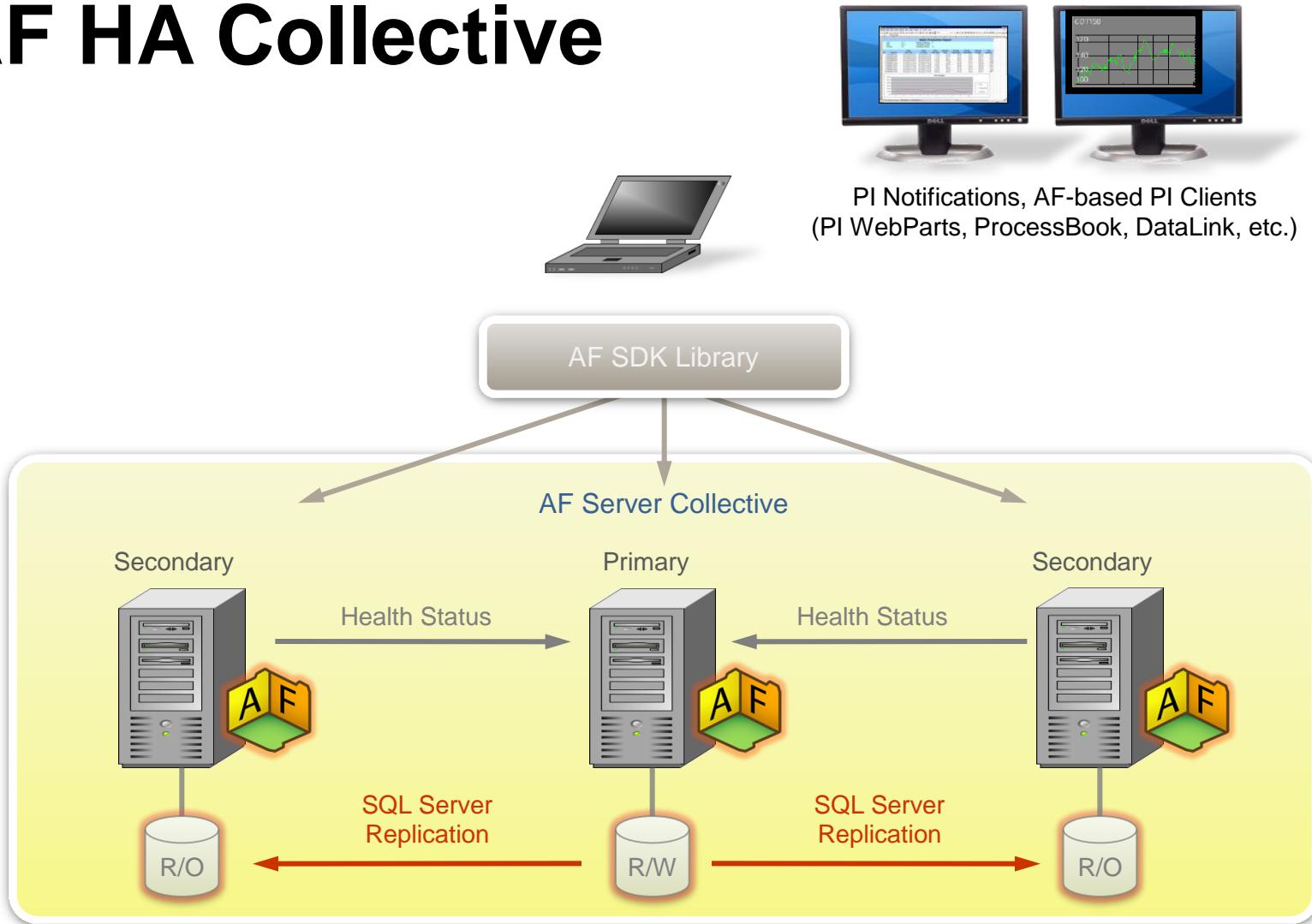
Model Analyses

This screenshot shows the PI System Explorer application interface. The title bar indicates the connection to \\skwan-vm-af25\NuGreen as an administrator. The menu bar includes File, Edit, View, Go, Tools, and Help. The toolbar contains Database, Query Date, Back, Check In, Refresh, New Element, and Search. On the left, a tree view under the 'Elements' heading shows 'Elements' and 'NuGreen'. The main pane displays a search results grid titled 'Elements' with columns for Name, Description, Category, Type, and Template. One result, 'NuGreen', is listed with the description 'Our Company E...', category 'Locations', type 'None', and template 'Enterprise'. A search bar at the top of the grid allows grouping by Category or Template. Below the grid is a large empty area. The bottom navigation bar lists various system components: Elements, Event Frames, Library, Unit of Measure, Replication, MyPI, Notifications, Contacts, and Model Analyses.



Insight PI Asset Framework

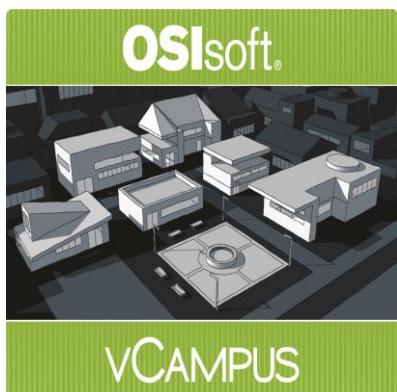
AF HA Collective



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 them to build unit based MBR elements that can be applied on other sites.

The screenshot shows the PI Asset Framework interface. On the left, a tree view of the Library contains categories like Centoco Cork, Categories, Templates, Element Templates, and various asset types such as Autoclave, Bag, BioReactor, Buffer Bag Station, Buffer Vessel, Cedex, Chemical Reactor, Chromatography Column, Class, Conductivity Meter, Final Bulk Fill, Final Concentration Vessel, Final UF/DF, RT, Freezer, HFUF, Incubator, PC, Media Bag Station, Media Prep Vessel, Mobile Vessel, NetWeight, Osmosity Meter, PAXX, PASX Data Template, pH Meter, Prof Batch Counter, SCTimer, Site, Transfer Panel, Unicom, Washer, Wave BioReactor, Weigh Booth, and Weigh Scales. It also includes Model Templates, Transfer Templates, Enumeration Sets, Reference Types, and Tables. On the right, a detailed view of the BioReactor asset is shown under the General tab. The table lists various attributes: Name, Description, and Default Value. The attributes include Aber Calibration Result, Aber Measurement, Aber Readout, Batch ID, Cell Density Controller, DO Analyser 1, DO Analyser 2, DO value, Event, Process Air Flow Lower Sparge, Process Air Flow Overlay, Process Air Flow Upper Sparge, Reactor ID, Material Of Construction (Stainless Steel), ATF Sample Result, pH Value, pH Probe 1, pH Probe 2, Media Feed, and Media Feed. The 'Aber' row is currently selected.

Name	Description	Default Value
Aber Calibration Result	Aber Calibration Result	0
Aber Measurement	Aber Measurement Result	0
Aber Readout	Aber Readout Result	0
Batch Information	Batch ID	
Cell Density	Cell Density Controller	0
DO	DO Analyser 1	Dissolved Oxygen Analyser 1 0 %
	DO Analyser 2	Dissolved Oxygen Analyser 2 0 %
	DO value	Dissolved Oxygen value 0 %
Event	Event	
Gates to BioReactor		
	Process Air Flow Lower Sparge	Process Air Flow Lower Sparge 0 lpm
	Process Air Flow Overlay	Process Air Flow Overlay 0 lpm
	Process Air Flow Upper Sparge	Process Air Flow Upper Sparge 0 lpm
ID	ID	Reactor ID 0
	MOC	Material Of Construction Stainless Steel
IPC	ATF Sample Result	ATF Sample Result 0
	pH	pH Value 0
	pH Probe 1	pH Probe 1 0
	pH Probe 2	pH Probe 2 0
Media Feed	Media Feed	Media Feed 0 l/min
Phase Information	Pressure Test Result	Pressure Test Result
	SIP Cool Down Complete	SIP Cool Down Complete



THANK YOU

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