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**UC**2010

**Real Time Information** — Currency of the New Decade

Hilton San Francisco Union Square | San Francisco, CA

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# Using Templates to Speed-up Configuration of your PI System

Martin Bryant, Field Service Engineer

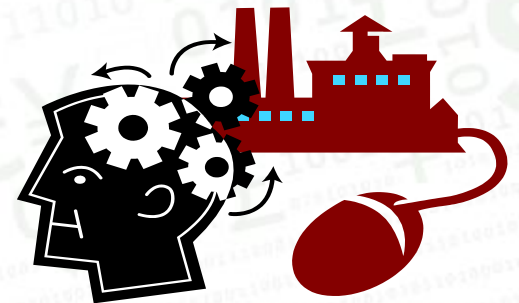
David Moler, Developer

Ales Soudek, Center of Excellence  
Engineer



# PI AF

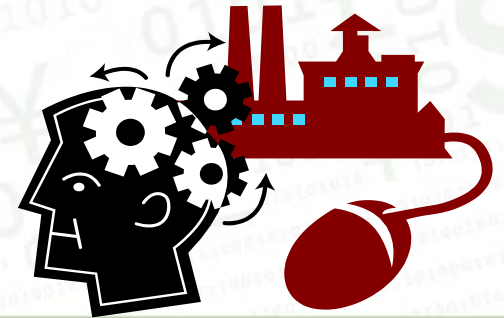
- A database of user configured “Process Object Models” called elements which represent the logical components – the assets – in your process.
- The elements form a data directory “middle layer” for PI clients which **transforms PI data into information.**





# PI AF

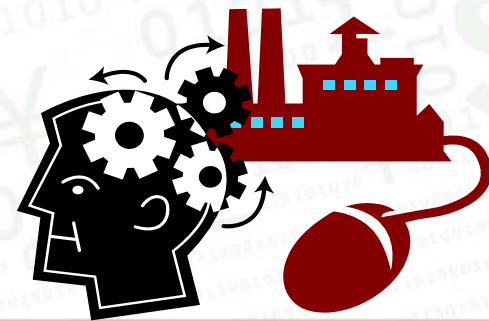
- **Integration** – combines PI data from multiple PI servers and non-PI data





# PI AF

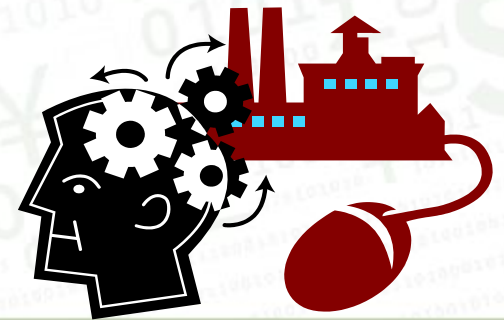
- Integration
- **Standardization / Normalization**
  - presents data from multiple PI servers, diverse control systems with a common view.





# PI AF

- Integration
- Standardization / Normalization
- **Context** – presents data not as unique items but as systems of meaningful information – invested with process knowledge, KPIs, and analysis

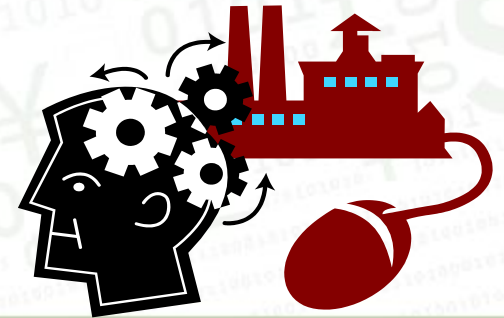


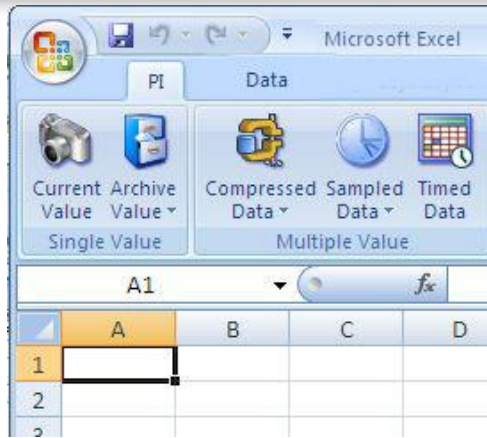




# PI AF

- Integration
- Standardization / Normalization
- Context
- **Collaboration** – multi-user record locking, Microsoft Windows Active Directory security, efficient and global PI sockets transport to our clients





## PI Datalink and Microsoft Excel are the primary way by which many if not most end users interact with PI data.

- This offers many advantages: users with powerful process knowledge already know how to use the world's leading data forge.
- **However, IT pros know though that spreadsheets have poor systems discipline: backup, documentation, version control, multi-user access.**
- Spreadsheets are great for one-time engineering analyses, or reporting in small groups, but they are not a good platform for mission critical applications or global collaboration.





**PI AF** brings IT systems discipline to real-time and historical PI data and analysis. Allowing people to build re-useable models that protect domain knowledge and serve as analysis and decision platforms for people and their applications.

An investment in  
**reducing the cost of curiosity...**

Okay, okay, okay... but...

PI AF is supposed to save me time, but how can I get to these rewards when it will require me to organize thousands or tens of thousands of assets – all configured with calculations and structure?



## Where do I find my assets?

*If you have a good PI Module Database, use*  
our new **PI 2010 PI-MDB / PI AF bridge**

## Where do I find my assets?

*If you have a good PI Module Database, use our new PI 2010 PI-MDB / PI AF bridge*

*If you have DeltaV, use the*  
**DeltaV asset connector**

## Where do I find my assets?

*If you have a good PI Module Database, use our new PI 2010 PI-MDB / PI AF bridge*

*If you have DeltaV, use the DeltaV asset connector*

*Otherwise find your assets in your maintenance, engineering/ instrumentation, or accounting databases and **import them with XML, the AF-SDK or the AF1/Excel element loader.** Then relate them to tags..*

# One Step at a Time...

Don't feel like you have to have a comprehensive database to get value!

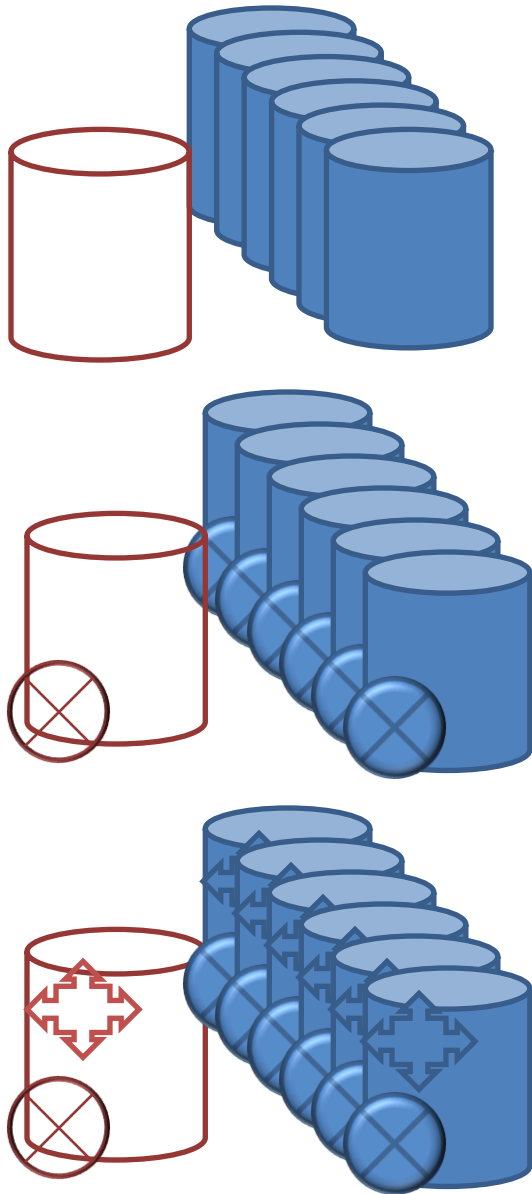
You can use PI AF like a spreadsheet supporting the analysis of specific problems

**Grow the database one problem,  
one solution at a time**



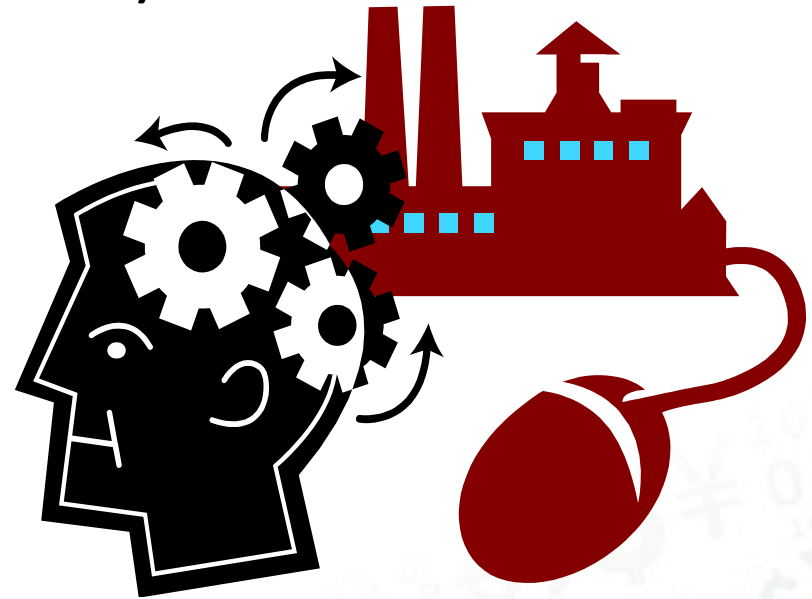
The power of PI AF is in the templates:



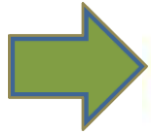


**PI AF templates are strong** templates, dynamically tied to the elements so that you can **maintain** many elements with your template and **grow** your AF database as an analysis tool.

# To get great templates – you need input from Subject Matter Experts (SMEs)



- Import asset data with IT / technology experts
- Build templates with subject matter / process experts



*Realizing the Power of Templates...*

**PI modules migrated to simple PI-AF2  
elements become more powerful and  
maintainable with AF2 Templates.**

PI 2010 (pre-beta) with PI AF Client 2.2 (pre-beta)  
with PI Processbook 3.2

**Martin Bryant, Field Service Engineer & Trainer**

## Elements

## Elements

- Chemical Flow Meter1
- Chemical Tank1
- DFPI2010RC ModuleDB
- AF2ReplicationTest
- BATCHUNITS
- DevNet
- Equipment\_Library
- FastModule
- IT Infrastructure
- MiniMills
- Nisqually Creamery
- OSIHENav
- OSIHydroElectric
- Paper Company
- Paper Company VBC
- PowerCo
- ProcessTemplates
- Pulp and Paper Demo
- R-2401
- R-2402
- SemiCo2
- Structured Rounds
- Test Module

## Elements

## Event Frames

## Library

## Unit of Measure

## MyPI

## Notifications

## Contacts

## Elements

## Elements

Group by: ☐ Category ☐ Template

Search

	Name	Description	Category	Type	Template
	Chemical F...			None	Chemical Flow Meter
	Chemical ...			None	Chemical Tank
+	DFPI2010...			None	
+	Nisqually C...			None	
+	OSIsoft En...			None	
	Palapa Ra...			None	Palapa
	PalapaClub			None	Palapa
	T101			None	Tank

## Element Templates

Filter

- Chemical Flow Meter
- Chemical Heat Exchanger
- Chemical Pump
- Chemical Reactor
- Chemical Tank
- Palapa
- Power Dist BaseInput
- Power Dist BaseMeter
- Power Dist Measurement
- Power Dist MeasurementW
- Power Dist SilverSpringsM
- Power Gen Flow Meter
- Tank

## Elements

- [-] SemiCo2
- [-] Structured Rounds
- [-] Tank Farm
  - Tank1002
  - Tank1008
  - Tank1010
  - Tank1013
  - Tank1017**
  - Tank1023
  - Tank1028
  - Tank1032
  - Tank1038
  - Tank1047
  - Tank1059
  - Tank1073
  - Tank1091
  - Tank1096
  - Tank1098
  - Tank1099
- [-] Test Module
- [-] TestModule3
- [-] TransDistribuCo
- [-] Water
- [-] XYModule

## Elements

## Event Frames

## Library

## Unit of Measure

## MyPI

## Notifications

## Contacts

## Tank1017

General Child Elements Attributes Ports Version

Filter

Name	Value
Capacity	25000 US gal
Density	2100 kg/m3
Level	79.26389 %
Mass	157524.399422425 kg
Material	WX1200
Volume	75011.6187725833 L

Group by: ☐ Category

Name: Capacity

Description:

Configuration Item: ☒

Categories:

UOM: US gallon

Value Type: Double

Value: 25000 US gal

Data Reference: <None>

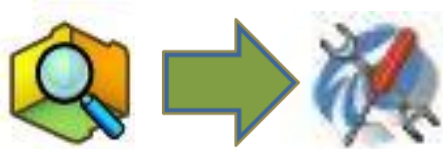
Settings...

## Data References

Filter

- [-] Formula
- [-] IntermediateVariable
- [-] PI Point
- [-] PI Point Array
- [-] Table Lookup





*Realizing the Power of Templates...*

**More advanced template features,  
including using PI-AF2 templates to build  
and maintain PI tags...**

PI AF 2.1 with PI AF 2.1 client (PI System Explorer)  
with PI Processbook 3.2

**Ales Soudek, Center of Excellence Engineer**

## Tank Inventories

General Child Elements Attributes Ports Version

Search



	Name	Value
⊞	<None>	

Name:

Description:

Configuration Item: ☐

Categories

UOM:

Value Type:

<Anything>

Value:

10 Minutes

Data Reference:

Settings...



C:\Users\asoudek\Documents\Inventory Example.pdi

4/8/2010

4/8/2010

Relative Display

Mask

Items of Interest

Group by: ☐ Template

Bullet Tank 02

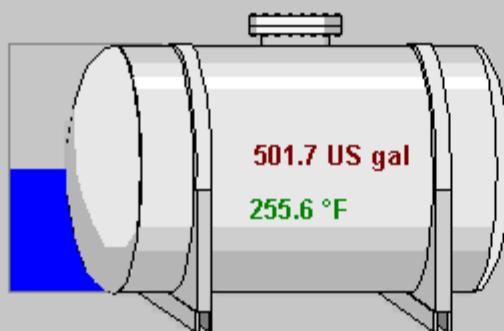
Bullet Tank 03

101

Storage Tank 1702

## Bullet Tank 02

10.1 ft



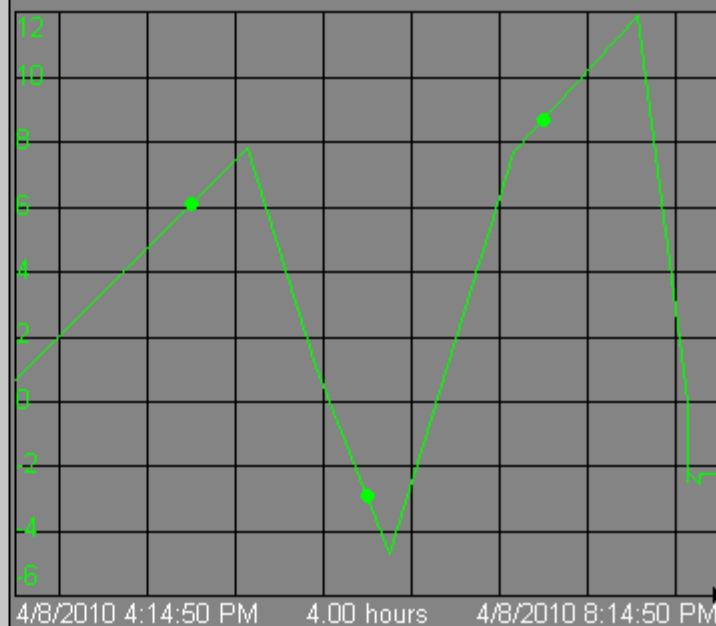
501.7 US gal

255.6 °F

Duration for Inventory Change

10m

## Rolling Inventory Change











• E Inventory Change  
-2.23237  
US gal

## Bullet Tank Template

[General](#)
[Attribute Templates](#)
[Ports](#)

Search

	Name	Description	Default Value
+	 Closing Gauge Level		0 ft
+	 Closing Volume		0 US gal
	 Duration		
	 Duration Index		1
	 Inventory Change		0 US gal
	 Opening Volume		0 US gal
+	 Tank Pressure		0 psi
+	 Tank Temperature		0 °F

Name: Closing Gauge Level

Description:

Configuration Item: ☐

Categories: Operating Data

UOM: foot

Value Type: Double

Default Value: 0 ft

Data Reference: PI Point

Settings...

```

\\%Server%\%Element%.%Attribute
%.PV;TimeMethod=Interpolated;ReadOnly=False;ptclassna
percent=%@.|Compdevpercent%;excdevpercent=%@.|Exc
Location1%;location2=%@.|Location2%;location3=%@.|Lo
Location4%;location5=%@.|Location5%;pointsource=%@.|
%@.|Step%;typicalvalue=%@.|TypicalValue%;zero=%@.|Z
    
```

## Inventory Template

General Attribute Templates Ports

Search



i	Name	Description	Default Value
	Duration		1 Hour
	Duration Index		1

Name: Duration

Description:

Configuration Item: ☐

Categories

UOM: <None>

Value Type: Duration

Default Value: 1 Hour

Data Reference: <None>

Settings...

# Templates help you even further...

With **PIOLEDB (4)/AF** you can use your templates to present PI AF and PI data for SQL queries...

The screenshot shows the PI AF Library on the left and the 'Cooling Fan' template configuration on the right. The Library tree shows 'NuGreen' > 'Templates' > 'Element Templates' > 'Cooling Fan'. The 'Cooling Fan' configuration window has tabs for 'General', 'Attribute Templates', and 'Ports'. The 'Attribute Templates' tab is active, showing a table of attributes.

Name	Description	Default Value
Asset Name	Asset Process ...	U
Blades	Blade Material	
Installation...	Installation Date	1/1/0001 12:0...
Manufactu...	Equipment Man...	
Model	Manufacturer ...	
Motor Amps	Motor Amps	0
Motor Amp...	Motor Amps PI ...	
Plant	Plant Name	
Power	Relative Power	11
Process	Process Name	

The attributes in the template  
- become columns you can query  
and return...



**Element Search**

AF System: DFPI2010RC ... Connect

Database: NuGreen ... ...

Where Search Root: NuGreen\Little Rock\Extruding Process\Equipment ... ☒ Search Sub-Elements

Name is:

Category is: <All>

Template is: Cooling Fan

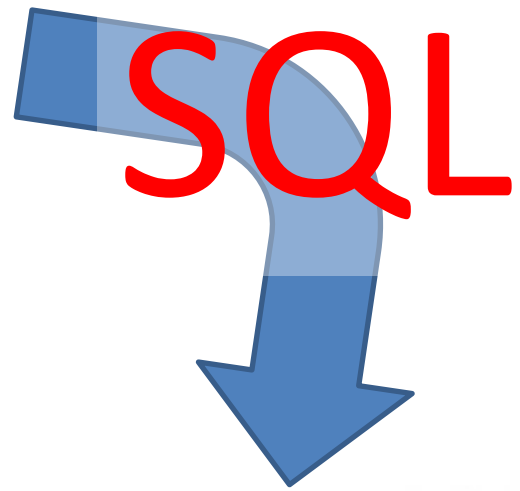
Type is: Any

Max. count: 1000

Search Cancel Search

Search results: The search found 3 Elements matching the search criteria.

Name	Path	Description	Category	Type	Template
F-711	\\DFPI2010RC\...	Cooling Fan F-711	Equipment Assets	None	Cooling Fan
F-723	\\DFPI2010RC\...	Cooling Fan F-723	Equipment Assets	None	Cooling Fan
F-789	\\DFPI2010RC\...	Cooling Fan F-789	Equipment Assets	None	Cooling Fan



**SELECT eh.Path + eh.Name Element, tc.\***  
**FROM [NuGreen].[Asset].[ElementHierarchy] eh**  
**CROSS APPLY [NuGreen].[DataT].[TransposeSnapshot\_Cooling Fan](eh.ElementID) tc**  
**WHERE eh.Path LIKE N'\NuGreen\Little Rock\Extruding Process\%'**  
**OPTION (FORCE ORDER)**

Query Results

```
SELECT eh.Path + eh.Name Element, tc.*
FROM [NuGreen].[Asset].[ElementHierarchy] eh
CROSS APPLY [NuGreen].[DataT].[TransposeSnapshot_Cooling Fan](eh.ElementID) tc
WHERE eh.Path LIKE N'\NuGreen\Little Rock\Extruding Process\%'
OPTION (FORCE ORDER)
```

	Element	Asset Name	Blades	Installation Date	Manufacturer	Model	Motor Amps	Motor Amps Tag	Plant	Power	Power Savings	Power(2007)
1	\NuGreen\Little Rock\Extruding Process\Equipment\F-723		Stainless	5/16/1985 8:00 AM	Tomado Cool	TC-994		F723_E889	Little Rock			68
2	\NuGreen\Little Rock\Extruding Process\Equipment\F-711		Stainless	4/7/1980 8:00 AM	Land Jet	LJ-609		F711_E710	Little Rock			75
3	\NuGreen\Little Rock\Extruding Process\Equipment\F-789		Fiberglass	3/12/1956 7:00 AM	Tomado Cool	TC-390		F789_E410	Little Rock			94

Now that we have our process data organized into AF2 information, how do we avoid getting right back to where we started with..

*too much information?*



## PI Notifications

More than an e-mailing program,  
a real time, continuous event filter  
which brings the right information to  
you at the right time – with the right tool

## Configure

## Trigger

## Notify



Configured from  
AF2 Elements



Filtered with  
sophisticated  
rules



Recipients  
selected from  
Active Directory

Triggered with real-time  
monitoring of live data



# PI Notifications

All triggers, notifications, and  
acknowledgements are historized



E-mail  
Or I-M



PI Processbook  
MyPI Desktop  
or PI-Webparts



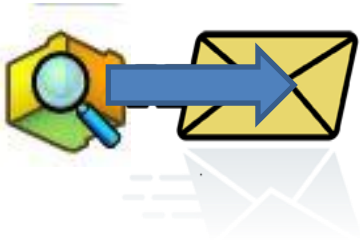
Webservice



Extensible

**Q: But I have many people who want to know many things, won't this become unmanageable?**

**A: PI Notification Templates**

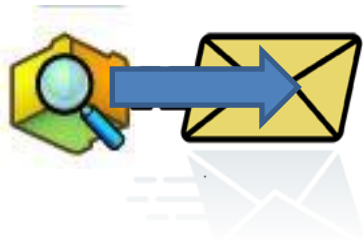


*Realizing the Power of Templates...*

## PI Notifications Templates

PI Notifications 1.1 with  
PI AF 2.1 and PI AF 2.1 client (PI System Explorer)

**David Moler, Developer**



## *Realizing the Power of Templates...*

Define information once

- Fewer errors
- Automatically in sync
- Configuration/maintenance can scale

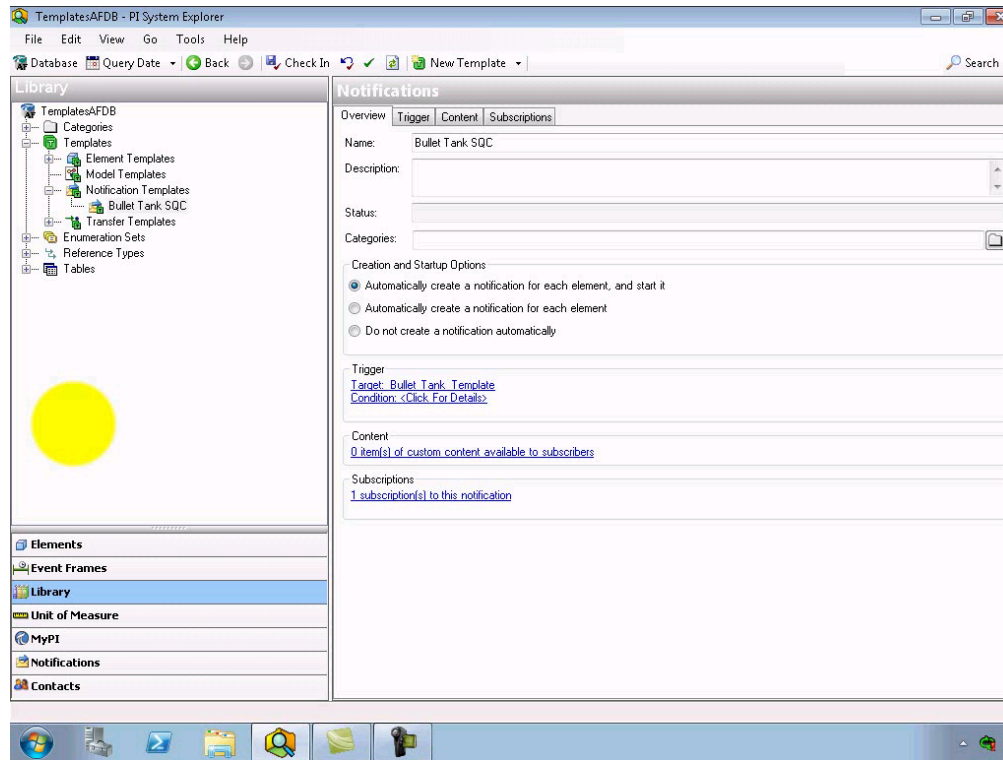
Override where necessary

- Change time rule
- Define specific content
- Add/modify subscribers



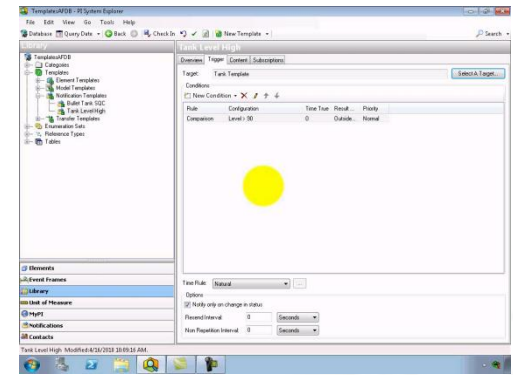
# Familiar configuration

- Trigger, Content, Subscribers
- Only instances have History

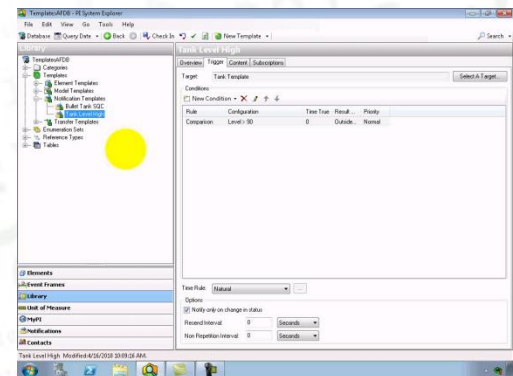


# Keep in sync with process model

## Bulk creation – quickly apply new template to existing elements

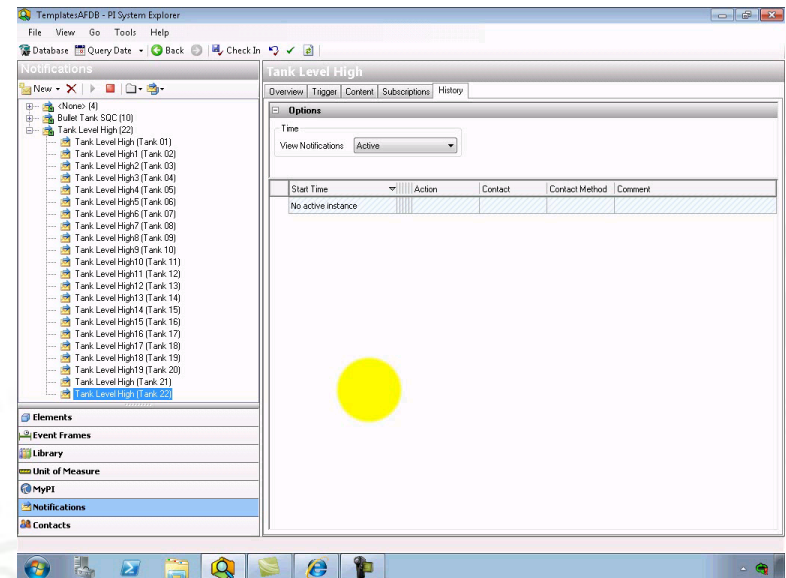
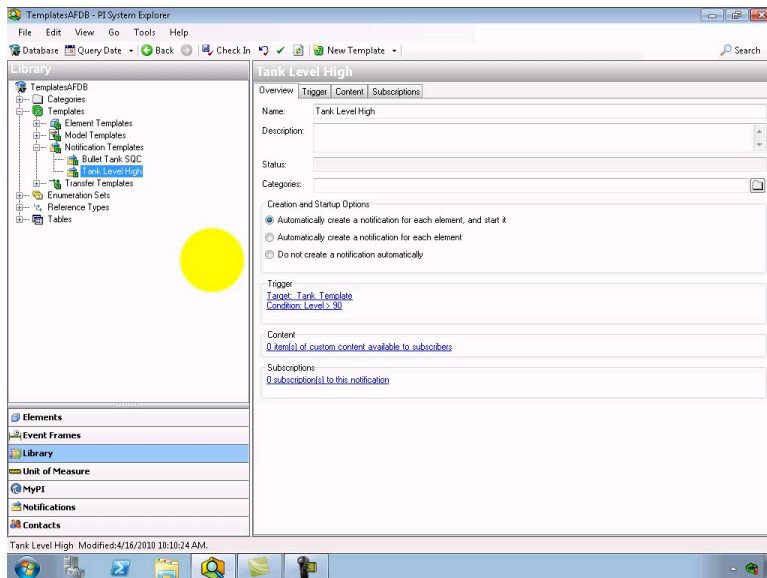


## Auto creation – automatically apply template to new element



# Content from a Template

As more information is exposed through element templates, content & subscriptions can be managed centrally



*Coming soon to a PI system near you:*



PI 2010 – with the power of AF  
the power of templates



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Thank you

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