2016 OSIsoft TechCon

Tips and Tricks with PI System Explorer and PI Builder

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Introduction

In this lab, you will learn some tips and tricks on using the PI System Explorer (PSE) and the PI Builder. These are things that you may not be aware of and will help you in using these two application in a more effective manner. The material is presented in two parts: Part 1 focusses on the PSE and Part 2 on the PI Builder. The Appendix contains some more tips and tricks that we will not have time for during this lab. Hope you find them useful.

Login Step by Step:

- 1. Log into the machine PISRV01
- 2. Username: pischool\student01
- 3. Password: student

Part 1 – PI System Explorer (PSE)

Open the PSE and make sure you are on the **TechCon2016** database.

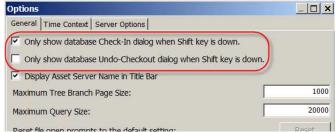
Hiding Check In and Check out Dialogs

Contrary to popular belief, you do not need to perform a **Check In** all the time when you are working in the PSE. The only reason to do that is to make the changes available to external PI AF Clients. When you do perform a **Check In** it is a time saving not to have to have the **Check In** dialog pop-up every time and then having to click the **Check In** button.

1. Change the options for **Check In** to hide the dialog, create a new element, and check it in without the dialog popping up.

Step by step:

- a. If you are not in the **Elements** view press the **Ctrl+1** key combination
- b. In the menu, navigate to **Tools>Options...**
- c. In the **Options** dialog check the Check Box **Only show database Check-In dialog when Shift key is down**



- d. Click the **OK** button
- e. Press the **Ctrl+S** key combination. The changes are now checked in.

2. Create a new element and check it in, but have the Check In dialog appear first.

Step by step:

- a. You can do this in two ways. The first one is to use the **Options** dialog, as above, and unchecking the Check Box **Only show database Check-In dialog when Shift key is down**
- b. Then you can check in using either the **Ctrl+S** key combination or clicking the Check In in the Toolbar. The dialog will appear and then click the **Check In** button.
- c. The second way is to hold the **Shift** key down and click the Check In in the Toolbar. Note, you cannot use the **Ctrl+S** key combination with holding down the **Shift** key.

Searching and Filters

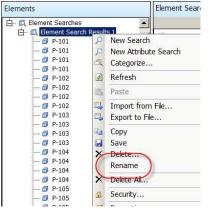
1. Create search view named My Pumps containing all the pumps from Facility1.

Step by step:

- a. If you are not in the Elements view press the Ctrl+1 key combination
- b. Press the F3 key, and select Facility1 for the Element Search Root and Pump for the Template and click the OK button.

Root:Facility1 Temp	ate:Pump	× •	Search
	Criteri	a	18
Name:			×
Element Search Ro	et: Facility1		×
All Descendants:	True		×
Template:	Pump		▼ ×
Category:	<all></all>		▼ ×

c. You can rename the search results in two ways. One way is to right click the Element Search Results 1 in the Browser pane and select Rename. Type in My Pumps and press the Enter key. The other is click on the Element Search Results 1 and the press the F2 key, type in My Pumps and press the Enter key.



2. Then in the **Viewer** pane of the PSE filter the results to show pumps in **Area1** only.

- a. In the **Viewing** pane all the pumps are listed.
 - To filter out pumps that belong to **Area1** we first need to add an **Attribute** to the header to make it visible.
 - An **Attribute** named **Area** has been configured in the **Pump** template to retrieve the name of the pump's grandparent. (You can look in the **Pump** template to see how this is done).
 - Right click on the gray area of the header and select **Column Visibility>Select Attributes**.

Filter				
Name Description	م م ال	New Search New Attribute Search Categorize		
■ @ P-101 ■ @ P-101		Column Visibility	 Template 	
■ 줽 P-101 ■ 줽 P-102 ■ 舜 P-102	٩	Show Full Paths Refresh	Name Description	
■ @ P-102	12%	Paste	Category	
■ ∰ P-102 ■ ∰ P-103		Import from File Export to File	Type Template	
■ ∯ P-103 ■ ∯ P-103 ■ ∯ P-103	Ca.	Copy Copy Cell	Show Attrit Select Attri Attribute C	
■ ∰ P-104 ■ ∰ P-104	×	Copy Path Save Delete		
■ ∰ P-104 ■ ∰ P-104 ■ ∰ P-105	×	Rename Delete All		

b. In the **Select Attributes** dialog select the row with the name **Area** and click the button. Then click the **OK** button.

Add Attributes from Template:	a Pump	-
Add Attributes from Element:	Facility1\Area4\Rotating Equipment\P-101	P
Others:	Enter a semicobin separated list of names to use as attribute columns:	Add
Attributes:	Attributes:	
2-101	Group by: Category Template	-
iltèr	₽ • »	+
Name A Description Cat	egory	*
💷 Area		-
		×
		*

c. In the **Filter** area (white space above the header in the **Viewing** pane) type in **Area1**.

Areal					
Name	Description (Area	1		
🛚 🗊 P-101		Area1	T		
🖻 🗊 P-102		Area1	T		
🛚 🗊 P-103		Area1			
🖩 🗊 P-104		Area1			
🗉 🗊 P-105		Area1			
🛙 🗊 P-106		Area1	I		
🛚 🗊 P-107		Area1			
🛙 🗇 P-108		Area1			
🗉 🗊 P-109		Area1	1		
🖬 🗊 P-110		Area1	I		
🖻 🗊 P-111		Area1	J		
🗉 🗊 P-112		Areal	1		

d. Now only pumps in **Area1** show up in the **Viewing** pane. (**Note:** filters can be used almost anywhere there is a list and will filter on any columns that are displayed. This includes Tables.)

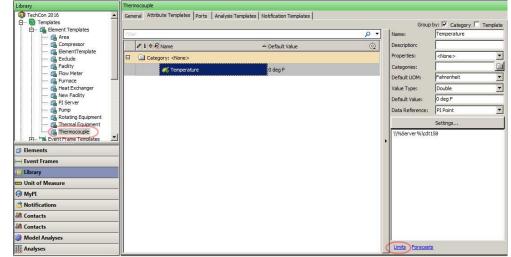
Attribute Traits

This is a new feature of the upcoming release **PI AF 2.8**. There are two types of traits – Limits and Forecasts. These are will be used in the new Coresight 2016 release to show and trend these for the Attribute in question, and Coresight automatically knows that these are the Traits for this Attribute.

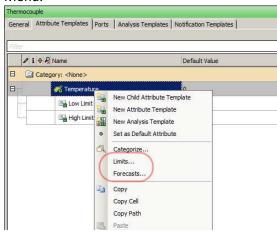
Approach: Add high and low limits to the Attribute **Temperature** in the **Compressor** Template. Add high and low limits; rename these to **High Limit** and **Low Limit** and fixed values of 150 and 50, respectively. Then reset the **Low Limit** to be the **Minimum** limit and the **High Limit** to be the **Maximum** limit.

Step by step:

- a. Press the **Ctrl+3** key combination to navigate to the **Library** view.
- b. Select the **Thermocouple** Template under **Element Templates**. Click on the **Attribute** tab in the **Attribute Viewing** pane and select the **Temperature** Attribute.
- c. Click the <u>Limits</u> at the bottom right corner of the **PSE** Window.



d. You can also **Right-Click** the **Temperature** Attribute and select **Limit** from the **Right-Click** Menu.



e. In the Limits Window select the Lo and Hi check boxes. Then in the Attribute column rename these to Low Limit and High Limit, respectively. Enter 50 for the Value of the Low Limit and 150 for the Value of the High Limit. Then click OK. (Note: The units of measure for the limits are inherited from the Parent-Attribute.)

emp	erature				
	Trait	Attribute	Value	Data Reference	Settings
П	Minimum	Minimum	0	<none></none>	
	LoLo	LoLo	10	<none></none>	
V	Lo	(Low Limit)	50 deg F	<none></none>	
	Target	Target	50	<none></none>	
2	н	(High Limit)	150 deg F	<none></none>	
Π	HiHi	НН	90	<none></none>	
П	Maximum	Maximum	100	<none></none>	

f. Click on the + next to the **Temperature** Attribute to view the newly created Child-Attributes. Select the **Low Limit** Attribute and click on the combo box next to the **Properties**. This shows that the current selected Attribute is the **Lo** Trait.

6-			<mark>۶ -</mark>	Name:	Low Limit
/ i (R Name	Default Value	0	Description:	
🗐 c	ategory: <none></none>		(Properties:	Lo
	🥳 Temperature	0 deg F		Categories:	Configuration Item
- 1	Low Limit	50 deg F		Default UOM:	Hidden Indexed
	🖫 High Limit	150 deg F		Value Type:	Manual Data Entry
1				Default Value:	— Limits— Minimum
				Data Reference:	LoLo
					✓ Lo Target
					🗆 Hi
			, i	1	HiHi Maximum
					- Other Traits
					Forecast

g. Click on the check box next to the Minimum Trait. Do the same for the High Limit Attribute, except click the check box next to the Maximum Trait.

				and boths	by: 🔽 Category 🗌 Te
			<u>۶ ج</u>	Name:	High Limit
🖉 i 🔶 🧖 Name		Default Value	٩	Description:	
Category: <none></none>				Properties:	Maximum
Kan Temperat	ure	0 deg F		Categories:	Configuration Item
	it	50 deg F		Default UOM: Hidden	
Eigh High Lin	it	150 deg F		Value Type: Default Value:	Manual Data Entry
				Data Reference:	Minimum LoLo
					Lo
					Target
				0	Maximum
					Other Traits

h. **Note**: In the Limits Window, you can use Data References to assign dynamic values instead of just static ones, as we did above.

mp	erature				
Г	Trait	Attribute	Value	Data Reference	Settings
7	Minimum	Low Limit	50 deg F	PI Point 💌	%Server%\%Element%.%Attribute%
	LoLo	LoLo	10	<none> Attribute Alias</none>	
Π	Lo	Low Limit	50	Formula PI Point	
Π	Target	Target	50	PI Point Array Rollup	
Π	Hi	High Limit	150	String Builder String Concat	
	нн	HiHi	90	String Parser2 Table Lookup	
~	Maximum	High Limit	150 deg F	Time Parts URI Builder	

Hidden and Excluded Attributes

There are new capabilities to hide and/or exclude Attributes for Elements and will affect the accessibility of these Attributes via the client tools ProcessBook 2015, Coresight 2015, and DataLink 2015.

Approach: Use the Exclude Template to make the Item2>Upper Limit child-Attribute set to be Hidden and Item3 Attribute set to be Excluded. Create two new Elements based on the Exclude Template and rename them Exclude1 and Exclude2. For Exclude1, change the Properties to Excluded. Open ProcessBook, create a new ProcessBook Display File (pdi), and show the AF Browser and AF Property panes. Select the Elements Exclude1 and Exclude2 in turn and see what Attributes show up in the AF Property pane.

Step by step:

- a. If you are not in the Library view press the Ctrl+3 key combination
- b. Select the **Exclude** Template under **Element Templates**. Click on the **Attribute** tab in the **Attribute Viewing** pane.

c. Show the child-Attribute for the **Item2** Attribute by clicking the ⊞ sign, select the **Upper** Limit child-Attribute. For the Properties click the **Hidden** check box.

15		<mark>ب</mark> م	Name:	Upper Limit
/ i	♦ 🕂 Name	Default Va()	Description:	
1	Category: <none></none>		Properties:	Hidden
	🖫 Item1	0	Categories:	Configuration Item
- 1	Item2	0	Default UOM:	☐ Indexed
(R 📑 Upper Limit	0	Value Type: Default Value:	la la
	Hem 3	0	Data Reference:	<none></none>
				Settings

d. Select the Item3 Attribute and for the Properties click the Excluded check box.

	• م	Name:	by: 🔽 Category 🗌 Tem Item3
₹ <mark>R</mark> Name	Default Va	Description:	1
ategory: <none></none>		Properties:	Excluded
📑 Item 1	0	Categories:	Configuration Item
Item2	0		Indexed Hidden
🦧 📑 Upper Limit	0	Contraction of the second	
Litem 3	0	Data Reference:	<none></none>
	Item2	R Name Default V2 ategory: <tone> Image: Item 1 0 Image: Item 2 0 Image: Item 2 0 Image: Item 2 0</tone>	€ R Name Default Va⊙ latgory: <none> Properties: latgory: <none> Categories: lattime 0 lattime 0</none></none>

- e. Create a new Element by right clicking on **Elements** and select **New Element**. Press the **F2** key and type **Exclude1** to rename it.
- f. Create another Element named **Exclude2** in the same way.
- g. Select Exclude1 and click on the Attribute tab in the Attribute Viewing pane. Select the Item1 Attribute and click the combo box next to Properties and select Excluded.

clements	Excude1				
읍· G <none></none>	General	Child Elements Attribut	Ports Analyses Versi		up by: 🗐 Cotegory 🗐 Templo
Parent1 Parent2 P		El Item1	← Value	Name: Description: Properties: Categories: Default UOM:	Ttem 1 Excluded Excluded Excluded Hodden Excluded
		i Iten3	0	Value Type: Value: Data Reference	Indexed Excluded

h. Show the child-Attribute for the Item2 Attribute by clicking the 🗄 sign. Note, the

Hidden Attributes are designated by R next to the Attribute, the **Excluded** Attributes show *Excluded* for the Value. When the template symbol **next** to the Attributes turns red **then the Excluded** property was set at the Template level.

Exclud	de 1			
Gene	ral Chil	d Elements Attribute	s Ports Analyses Ve	rsion
File	í.			، م
	: • •	🞗 Name	△ Value	٩
		Item 1	Excluded	
B		Item2	0	
		🧏 💷 Upper Limit	0	
		💷 Item 3	(Excluded)	

i. Press the **Ctrl+S** key combination to Check In your changes. Then open ProcessBook and click the symbol in the menu bar. In the dialog select the **ProcessBook Display File** radio button and click the **OK** button.

ProcessBook (.piw) File ProcessBook Entry ProcessBook Display (.pdi) File splay Name: Display 1	Тур	e			
ProcessBook Display (.pdi) File splay Name:	C	ProcessBo	ook (.piw) F	ile	
splay Name:	C	ProcessBo	ook Entry		
isplay Name:		ProcessBo	ook Display	(.pdi) File	
	-		Post Display	(cpuly rac)	2
Display1	1.00				
as to see a second s	Disp	lay1			

j. Click View in the menu and select AF Browser. Click View again and select AF Property.



k. These two panes are now displayed and you can click elements in the **AF Browser** pane to see the attributes for that Element. Select the **Exclude1** Element and notice that only the **Item2** Attribute is displayed.

F Browser	10	+ · ×	Display1
TechCon2015	1	<u> </u>	
	1		
	Update Sym	bols	
Elements			
Exclude1			
Exclude2			
9- 🗇 Facility1			
B- 🗇 Facility2			
B- 🗇 Parent 1			
🗇 Parent2			
			JI
Excluded attributes a	re hidden.		
	CALCUMPTION .		
China			
Filter			
/fter tal⊕ & Name	A Va	Le	

I. Select the Exclude2 Element and Item1 and Item2 Attributes are displayed.

(Note: The following table shows which PI clients support the hidden and excluded features.)

Client	Hidden	Excluded
ProcessBook	Not Supported	Supported
DataLink	Supported	Supported
Coresight	Supported	Supported

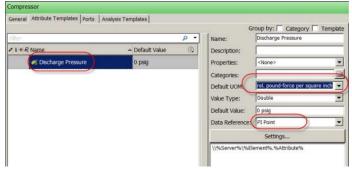
Tip for No PI Tag Naming Convention

This is a tip for mapping PI tags to Elements when there is no tag naming convention that can be applied to the Element Template.

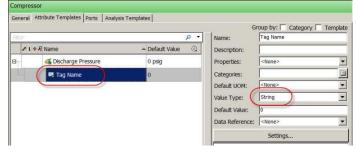
Approach: Add a new Attribute named **Discharge Pressure** to the **Compressor** Template, change the Units of Measure to **psig**, and make it Data Reference **PI Point**. Then add a child-Attribute to this Attribute called **Tag Name**.

Step by step:

- i. Press the Ctrl+3 key combination to navigate to the Library view.
 - Then select the **Compressor** Template under **Element Templates**.
 - Click on the **Attribute** tab in the **Attribute Viewing** pane.
 - Right click anywhere on the white space in the **Viewing Pane** and select **New Attribute Template**.
 - Select the Attribute, press the F2 key, and type Discharge Pressure.
- j. For the **Data Reference** select **PI Point**. Click inside the combo box for **Default UOM** and type in **psig**.



k. Select the **Discharge Pressure** Attribute. Right click and select **New Child Attribute Template**. Press the **F2** key and type **Tag Name**. Change the **Value Type** to **String**.



I. Press the **Ctrl+S** key combination to Check In your changes. Later in the PI Builder exercise, we will use this template to enter PI Tags for the compressors.

Substitution parameters

Approach: Using the **Compressor** Template created above, configure the **Discharge Pressure** Attribute to use the value of the child-Attribute **Tag Name** for the PI point tag name. Then create an Element at the root level named **PI Servers** with an Attribute named **Server1**. Enter the server name into this Attribute (The server name is the machine name that you logged into). Then replace the **%Server%** in the configuration of the **Discharge Pressure** Attribute to get the value of the **Server1** Attribute in the **PI Servers** Element you just created.

Step by step:

- a. Press the Ctrl+1 key combination to go to the Elements view.
- b. Create an Element **PI Servers** based on the **PI Server** Template, and name it **PI Servers**.

Elen	nents	1	
Sea	rch.		
		Name	Description Template
	ľ	🗇 Centrifugal Pu	Choose Element Template
		Copied Element	Parent: TechCon 2016
Đ		🗊 Facility1	
Ð	Facility2	Add child element using the reference type:	
		Moved Elemen	→ Parent-Child
		Parent1	
Œ		Parent2	
		Referenced El	Element Template:
			Image: Second
	ŧ	<u>Search</u>	Image: Second

c. Click on the **PI Servers** element, then click on the **Attribute** tab in the **Attribute Viewing** pane. Enter the server name into the **Server1** Attribute.

Elements	PI Servers
Elements Elements Copied Elements Facility1 Facility2 Moved Elements Parent1 Facility2 Parent2 Referenced Elements PI Servers Element Searches	PI Servers General Child Elements Attributes Ports Analyses Version Fitter Category: <none> Server1 OSIBIAles</none>

- d. Press the **Ctrl+3** key combination to navigate to the **Library** view. Then select the **Compressor** Template under **Element Templates**. Click on the **Attribute** tab in the **Attribute Viewing** pane.
- e. Select the Discharge Pressure Attribute and set the Data Reference to PI Point. Click the Settings button, then in the PI Point Data Reference dialog type
 %@\PI Servers|Server1% in the field next to the Data Server, and then type
 %@.|Tag Name% in the field next to the Tag Name.
- f. One last thing, my preference is never to use <default> units for a measurement. So click on the Source Units combo-box and select psig from the available units of measure.

PI Point Data Referen	ice		×
Data server: 9	@\PI Servers Serv	er1% 💽	
• Tag name: 9	6@. Tag Name%) 🕨 🔎	
Tag Creatio	n —		1
O Attribute:		•	1
Unit of Measure			1
Source Units:	<default> (psi 💌</default>	1	
Value retrieval metho	<default> (psig) atm(g) bar(g)</default>]
By Time:	barg	-	
Relative time:	inHg(g) kg/cm2(g) kg/m2(g)		
By Time Range:	kPa(g) mbar(g) mbarg	•	
Calculation basis:	mmHg(g)	/eighted 💌	
Min percent good	N/m2(g) Pa(g) psig		
	torr(g)		
Read only			
	OK	Cancel	
			///

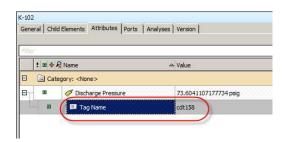
g. Click the **OK** button.

Note: The other way to do this is (once you become familiar with the syntax), is to delete the text under the **Settings** button and type

\\%@\PI Servers|Server1%\%@.|Tag Name%;UOM=psig directly.

Name:	Discharge Pressure	
Description:		
Properties:	<none></none>	-
Categories:		۲
Default UOM:	rel. pound-force per square inch	•
Value Type:	Double	•
Default Value:	0 psig	
Data Reference:	PI Point	•
	Settings	
(\%@\PI Servers	Server1%\%@. Tag Name%;UOM=psig	

- h. Press the Ctrl+1 key combination to go to the Elements view.
- Select the first compressor element (name starts with K) in the Browser pane (Facility1>Area1>Rotating Equipment) then click on the Attribute tab in the Attribute Viewing pane.
- j. Select the child-Attribute **Tag Name**, press the **F2** key, and type **cdt158** for the value. Press the **F5** key to refresh. The **Discharge Pressure** Attribute is now receiving data.



k. Press the **Ctrl+S** key combination to Check In your changes. Later in the PI Builder exercise, we will use this template to enter PI Tags for the other compressors.

Categories and Multi-select editing

1. Assign Categories for the Attributes in the **Heat Exchanger** Template and for both the flow rate Attributes and assign **Process Information** Category and **gpm** UOM to both at the same time.

Step by step:

- a. If you are not in the Library view press the Ctrl+3 key combination
- b. Then select the **Heat Exchanger** Template under **Element Templates**. Click on the **Attribute** tab in the **Attribute Viewing** pane.
- c. Select the **Group by: Category** check box. (**Note:** an Attribute can belong to multiple Categories, the **Shell Side Density** and **Tube Side Density** belong to two Categories in this example.)

Genera	Attribute Templates Ports Analysis Te	emplates		C	by: 🔽 Categ
Filter		Q	-	Name:	by: IV Categ
0	• i ♦ 🖗 Name	← Default Value ④	1	Description:	
8	Category: <none></none>			Properties:	<none></none>
	Shell Side Flow Rate In	0		Categories:	Fluid Proper
	Tube Side Flow Rate In	0		Default UOM:	
⊟ (Category: Fluid Properties			Value Type:	-
	Shell Side Density	0 lb/ft3		Default Value: Data Reference:	
	Tube Side Density	0 lb/ft3		Data Reference:	2
•	Category: Lab Data				Settings
	Shell Side Density	0 lb/ft3			
	Tube Side Density	0 lb/ft3			
8 (Category: Material Properties				
	Shell Side Material	WX1000			
	👪 Tube Side Material	HC1500			
8 (Category: Temperatures				
	🔡 Cold Side Inlet Temperature	0 delta º₽			
	Hot Side Inlet Temperature	0 delta ºF			

d. Select the Shell Side Flow Rate In Attribute, hold down the Ctrl key and select the Tube Side Flow Rate In Attribute. Both are now selected. Click the solution next to the Categories text box and click the Process Information check box.

	eral Attribute Templates Ports Analysis Tem			Gen	eral Attribute Templates Ports Analysis Templat	5
Filte		• م	Name:	64		P
	I ♦ R Name	A Default Value	Description		I ♦ R Name	← Default Va
9	Category: <none></none>		Properties		Category: Fluid Properties	
L	Ba Shell Side Flow Rate In	0	Categorie: Default UC		Shell Side Density	0 lb/ft3
U	5월 Tube Side Flow Rate In	0	Value Type		Tube Side Density	0 lb/ft3
•	Category: Fluid Properties	Categorize	× a		Category: Lab Data	
	Shell Side Density	Use the checkboxes to assign categories:	ie	Cerces	Shell Side Density	0 lb/ft3
	III Tube Side Density	Name Description			Tube Side Density	0 lb/ft3
	Category: Lab Data	Fluid Properties			Category: Material Properties	
	Shell Side Density	Material Properties		-	Shell Side Material	WX 1000
	🖬 Tube Side Density	Process Information			S Tube Side Material	HC1500
Ξ	Category: Material Properties	[iemperatures				HC1500
	Shell Side Material				Category: Process Information	
	Tube Side Material				a Shell Side Flow Rate In	0
	Category: Temperatures				ung Tube Side Flow Rate In	0
	Cold Side Inlet Temperature				Category: Temperatures	
	Hot Side Inlet Temperature				Cold Side Inlet Temperature	0 delta °F
		New Category OK	Cancel		Hot Side Inlet Temperature	0 delta ºF

e. In the Default UOM field type in gpm and press the Enter key.

Filter		P -	Name:	Shell Side Flow Rate In, Tube S
	/ i ♦ 🖗 Name	△ Default Va🚱	Description:	
	Category: Fluid Properties		Properties:	<none></none>
	Shell Side Density	0 lb/ft3	Categories:	Process Information
	Tube Side Density	0 lb/ft3	Default UOM:	apm 🚬
8	Category: Lab Data		Value Type:	Double
	🖫 Shell Side Density	0 lb/ft3	Default Value:	0 gpm
	Tube Side Density	0 lb/ft3	Data Reference:	<none></none>
	Category: Material Properties			Settings
	🕞 Shell Side Material	WX1000		
-	Tube Side Material	HC1500		
	Category: Process Information			
	🗒 Shell Side Flow Rate In	0 gpm		
	Jube Side Flow Rate In	0 gpm	an l	
	Category: Temperatures	\smile		
	🖫 Cold Side Inlet Temperature	0 delta 약		
	Hot Side Inlet Temperature	0 delta ºF		

- f. Notice that the **Properties Viewing** pane is displaying properties common to both Attributes.
- 2. For the next part, select the **Facility1** and **Facility2** Elements and change their template to **New Facility** at the same time.

Step by step:

- a. If you are not in the **Elements** view press the **Ctrl+1** key combination.
- b. Select the **Elements** in the **Browser** pane, and then select the **Facility1** and **Facility2** Elements by holding down the **Ctrl** key and clicking on them in the **Viewing** pane.

ements	Elements
Elements Copied Elements G Moved Elements	Search
Referenced Elements	Copied Elements
由 Exclude 白 Facility	🛛 🗊 Exclude 1
🛱 🔤 Facility1	fill Exclude2
⊞ 🗊 Area1 ⊞ 🗊 Area2	🕀 💷 🗃 Facility1
H → Area2	🕀 🗉 🗇 Facility2
🕀 🗇 Area4	Moved Elements
⊡ 🗊 Facility2 ⊡ 🗊 Area1	🕀 🖻 🗇 Parent1
🗄 🗝 🙀 ParentTemplate	Referenced Ele
🔍 Element Searches	

c. Right click one of the selected Elements and select **Convert>Change Template**

Sea	(क्र						
		Nam	e		۵	Description	ī
		0	Сор	ied E	lements		
	M	0	Exd	lude 1			
		0	Exc	lude 2			
Ŧ	Y	a	Fac		Conver	Convert to Model	
Ð	۲	0	Fac			Gillerterhotelin	
		0	Mov			or Update Data Reference (🕲 Change Template)	
Ð		٥	Par	*		Jate Naming Pattern	
Ŧ	Π	0	Ref	ē,	Catego	ize	
				1	Сору		
					Copy C	eli	
					Copy P	ath	
				Ц,	Export	to File	
				1	Check (Dut	

d. Then select **New Facility** and click **OK**. (**Note:** notice that display next to the **name** field reads **<Multiple>** since more than one Element is selected.)

Name:	<multiple></multiple>	
Element Template:		
☐ ElementTemplate		<u>.</u>
Engine		
Exclude		
Facility		
Furnace		
Generic Pump		
Heat Exchanger	N	
New Facility		
ParentTemplate		
Pump -		-
Rotating Equipmen	t	
Templates of category:	<any></any>	
Warning: Changing the	template of an existing El	ement may
have unintended conse	quences. Use with cautio	n.
	ОК	Cancel

e. Both elements have their templates changed. (Note: multi-select is also useful for many other operations like change/create Categories, configure Attributes, move/reference groups of Elements)

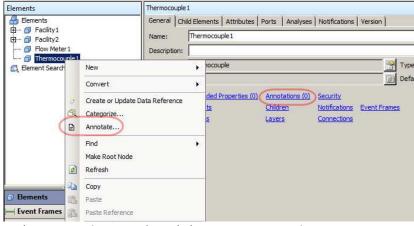
Annotations

This is a new feature of the upcoming release **PI AF 2.8**. You can add annotations to Elements and Event Frames to document something about them and attach certain document types to the annotation.

Approach: Add comment to the **Thermocouple1** Element and attach the **Thermocouple K.pdf** document to the comment.

Step by step:

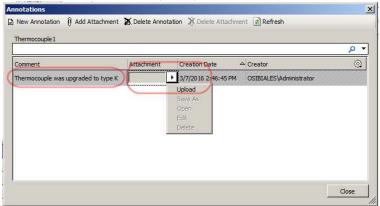
- a. Press the **Ctrl+1** key combination to navigate to the **Elements** view and click on the **Thermocouple1** Element.
- b. You can either right-click the **Thermocouple1** Element or you can select it and then double-click the <u>Annotations (0)</u> in the **Viewing Pane**.



c. In the Annotations window click on New Annotation.

45			Q
Comment	Attachment	Creation Date	0
New Annotation			

d. In the **Comment** field type in, **Thermocouple was upgraded to type K**. Click on the **Attachment** field and then on the Symbol. Select **Upload**, navigate to the Desktop and select the **Thermocouple K.pdf** file. Then click on **Close** to close the window.



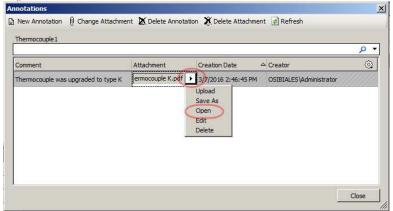
e. Notice that when you select the Element you can see how many annotations that particular Element has in the **General** tab of the **Viewing Pane**. For the **Themocouple1** Element it shows <u>Annotations (1)</u>.

Elements Elements Elements Elements Facility1 Elements Facility2	Thermocouple General Ch Name:	1 Id Elements Attributes 1 Thermocouple 1	Ports Analyse	es Notifications	Vers
Flow Meter 1 Flow Meter 1 Flow Meter 1 Flow Thermocouple 1 Element Searches	Description: Template: Categories:	Thermocouple			
	Find:	Extended Properties (0) Parents Models	Annotations (1 Children Layers	Notifications Connections	Eve

f. Click on **Elements** in the **Browser Pane** and in the **Viewing Pane**, you can see which Elements have annotations by the icon. Hover the mouse cursor over the icon and a tooltip appears with the comment and the name of any attachment.

- D Facility1	Sea	nd -			
- 🗇 Facility2 - 🎒 Flow Meter1			Name	A Description	Template
Thermocouple 1	Œ		Facility1		Facility
Element Searches	Ξ		Facility2		Facility
			Flow Meter 1		Flow Meter
			Thermocouple 1		Thermocouple

g. Double-click the icon that you just hovered over. The **Annotations** window opens, select the **Annotation** field, and click on the symbol. Select the **Open** option. The document is opened in Acrobat Reader. This is a good way to attach important instructions and documentation about the asset so that it is available for all users. Close the Acrobat Reader.



h. Note: The following formats are supported as attachments.

Allowed Files (*.docx;*.xlsx;*.csv 💌]
Allowed Files (*.docx;*.xlsx;*.csv;*.pdf;*.tx	t;*.rtf;*.jpg;*.jpeg;*.png;*.svg;*.tiff;*.gif;*.pdi;)
docx (*.docx;)	
xlsx (*.xlsx;)	
csv (*.csv;)	
pdf (*.pdf;)	
txt (*.txt;)	
rtf (*.rtf;)	
jpg (*.jpg;)	
jpeg (*.jpeg;)	
png (*.png;)	
svg (*.svg;)	
tiff (*.tiff;)	
gif (*.gif;)	
pdi (*.pdi;)	

Analytics - Comments and Breaking up your calculations

Approach: It is not easy to try to read and understand an equation that is very long (those of you who have experience with the PI Performance Equations can attest to this), or when the calculations are not documented. Go to the **Analysis Templates** tab in the **Flow Meter** Template and enter comments for the three expressions. Then make the **Status** expression more readable.

Step by step:

- a. If you are not in the Library view press the Ctrl+3 key combination
- b. Select the **Flow Meter** Template in the **Browser** pane and then click on the **Analysis Templates** tab in the **Attribute Viewing** pane.

Library	F	low Meter						
TechCon 2016		General Attribu	ite Templates	Ports Analy	sis Templates Notific	ation Templates		
Templates Energiates							Name:	Operatio
Gi Area Gi Compressor Gi Compressor Gi Enclute Gi Enclute Gi Flow Meter Gi Flow Meter Gi Flow Meter Gi House Congrege Gi Meter Facility Gi Server		B Name ft⊗ Operati	onal Status nt: <u>Flow M</u>	Schedule Natural	Output(s)		Description: Categories: Analysis Type Start analys	
🖓 Pump ঝ Rotating Equipment ঝ Thermal Equipment ঝ Thermocouple		Name	Expression			Value	Evaluate Now Output Attribute	•
H- Kent Frame Templates	_	UpperLimit	'UCL'				Мар	8
Elements Event Frames		LowerLimit	'LCL'				Мар	8
📙 Library		Status	If 'Flow	>= UpperL	imit Then "High	Alarm" E	Map	⊗ '
🚥 Unit of Measure		-	Add a new	variable				
MyPI								
Notifications								
A Contacts								

c. Click on the field under **Expressions** next to the **UpperLimit**. At the beginning of the line enter **// Upper Control Limit**, then hold down the **Shift** key and press **Enter**. Then press the **Esc** key, this exits you out of the editing mode.

For the LowerLimit, do the same but type // Lower Control Limit, and for Status type // Evaluate if flow rate is within limits.

Name	Expression	Value
UpperLimit	//Upper control Limit	
LowerLimit	//Lower control Limit	
Status 🤇	<pre>//Evaluate if flow rate is within limits If 'Flow' >= UpperLimit Then "High Alarm" H</pre>	

d. To make the **Status** expression more readable click inside the expression. Click in front of the first **then** and then hold the **Shift** key down and press **Enter**. Then click in front of the first **else** and then hold the **Shift** key down and press **Enter**.

Click in front of the next **then** and then hold the **Shift** key down and press **Enter**. Use the space bar to lineup the **then** with the **if** in the line above. Then click in front of the next **else** and then hold the **Shift** key down and press **Enter**. Use the space bar to ling up the **else** with the **then** in the line above. (Much more readable)

Name	Expression	Value	Ou
UpperLimit	//Upper control Limit 'UCL'		Ma
LowerLimit	//Lower control Limit 'LCL'		Ma
Status	<pre>//Evaluate if flow rate is within limits If 'Flow' >= UpperLimit Then "High Alarm" Else (If 'Flow' <= LowerLimit Then "Low Alarm" Else "Normal")</pre>		Ma

e. Bonus round ⁽²⁾ - an extremely useful feature is the **Preview** option. Before you check in and enable the calculation of an expression, it is always useful to validate your logic and see if it is giving the desired results. Right click the **Operational Status** Analysis and select **Preview Results**.

General	Attribute T	emplates	Ports	Analysis T	emplates
A	Name		Sche	dule	Output(s)
		X De			
		Ne Ne			
		Pre			
		Ba	ckfill Sta	tus	
Exampl	le Element:	中国 Go	to Tem	plate	

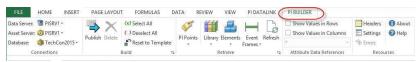
f. In the Preview results for Operational Status window click the Generate Results button. The results for variables in the Analysis and values for all of the Attributes used in the Analysis are displayed in columns. Usually there will be a lot of columns and rows and it will be difficult to check the results in this dialog. So, click the Export Results button and save the file to the Desktop. (This saves a file in the CSV format so you can then use Excel to analyze the results.)

Start Time:	t							Generate Results
End Time:	*		III.					Export Results
Trigger Time	e	UpperLimit	LowerLimit	Status	UCL	LCL	Flow	
3/9/2016 12	:01:42 AM	200	40	Normal	200	40	117.91	
3/9/2016 12	:06:42 AM	200	40	Normal	200	40	113.24	
3/9/2016 12	:09:42 AM	200	40	Normal	200	40	113.59	
3/9/2016 12	:16:42 AM	200	40	Normal	200	40	109.59	
3/9/2016 12	:23:42 AM	200	40	Normal	200	40	103.62	
3/9/2016 12	:34:42 AM	200	40	Normal	200	40	106.39	
3/9/2016 12	:38:12 AM	200	40	Normal	200	40	102.66	
3/9/2016 12	:44:12 AM	200	40	Normal	200	40	95.518	
3/9/2016 12	:48:12 AM	200	40	Normal	200	40	90.035	
3/9/2016 12	:53:12 AM	200	40	Normal	200	40	83.6	
3/9/2016 12			40	Normal	200	40	85.805	
3/9/2016 1:	08:42 AM	200	40	Normal	200	40	83.741	
3/9/2016 1:		200	40	Normal	200	40	75.584	
3/9/2016 1:	21:42 AM	200	40	Normal	200	40	80.139	
3/9/2016 1:	25:12 AM	200	40	Normal	200	40	74.849	-
	10.47 AM	200	40	Mananal	200	10	04 170	
200 180 160 140 420 100 80 60 40 20	M	\sim	\mathcal{N}	N	~	~	~~~	 LowerLimit 40 Status Normal UCL 200 LCL 40 Flow 99,2949
0 3/9/2016 12	2:00:00 AM		6.59 hours	3/9/2	016 6:3	5:10.15	057 AM	
	Gene	e C Multiple					and the second second	Revert

g. After you are happy that the expression is correct, press the **Ctrl+S** key combination to Check In your changes.

Part 2 – PI Builder

Open Microsoft Excel with a blank workbook. Click on **PI Builder** in the menu to display the PI Builder ribbon.



PI Builder is used for bulk editing/creation of either PI Tags or PI AF objects. Select the PI Server and Asset Server, and make sure the Database is set to **TechCon2016.**



PI Point Search

Search for PI Tags whose names contain **Sinu** and have a Point Source of **R** and a Point Class of **Classic**.

Step by step:

- a. In the ribbon click the down arrow under the PI Points and select Find PI Points
- b. Type ***Sinu*** in the **Name** field, type **R** in the **Point Source** field. Click on **Add Criteria** and select **Point Class**.

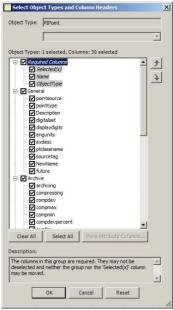


c. Select **Classic** from the **Point class** combo box and click the **Search** button.

Name-*sinu*	pointsource:R.ptclassname	-		× • 🔅	v	Name: "sinu" pointsource:R ptdassnar	ne:classic		x • 🛞	Search
Name: Point Class:	*snu*	Point Source: R	×			Name: *snu* Point Class: classic	× Point Source: R	×		
Name	Alarm base Classic SQC_Alarm Totalizer	Data Server	Description	Point Source	Data 1	Name SINUSOID SINUSOIDU Sinusoid no compression	Data Server OSIBI2 OSIBI2 OSIBI2 OSIBI2	Description 12 Hour Sine Wave UTC 12 Hour Sine 12 Hour Sine Wave		Data Float Float Float

You can select the tags you want or just click the OK button to select all the tags that the search retrieved. (Note – you can also type in the search string directly if you know the syntax)

e. The **Select Object Types and Column Headers** dialog pops up. Here you can make selections on what attributes of the PI tags you would like to retrieve into the workbook. Just accept the default by clicking the **OK** button.



f. The result should look very familiar to users of the old **PI SMT** add-in to Excel with one exception. There is a mandatory additional property called **ObjectType**. For PI Tags the value is **PIPoint**, it is different for different AF objects.

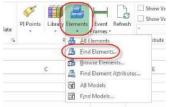
2	A	В	1	C	D	E	F	G	H	I	J	K
1	Selected(x)	Name		ObjectType	pointsource	pointtype	Description	digitalset	displaydigits	engunits	exdesc	ptclassname
2	x	SINUSOI	2	PIPoint	F	Float32	12 Hour Sine Wave		-5			classic
3	x	SINUSOI	U	PIPoint	R	Float32	UTC 12 Hour Sine Wave		-5			classic
1			1									
5												

Element Search and Hierarchy Backup

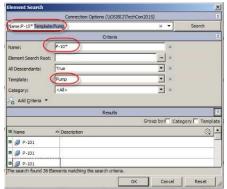
1. Import all Pumps starting with **P-10** and their Attributes from the **TechCon2016** database into the workbook.

Step by step:

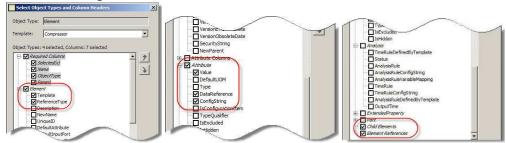
a. Create a new workbook. In the ribbon click the down arrow under the **Elements** and select **Find Elements**.



b. In the **Name** field type **P-10*** and select **Pump** in the **Template** combo box. Click the **Search** button.



c. To select all the pumps you can just click the OK button (Note - no need to select the pumps in the results if you want all of them). The Select Object Types and Column Headers dialog pops up. Deselect all the options, and then select only the options shown in the Figures below.



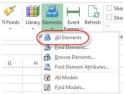
d. The pumps and their Attributes are listed by row.

1	A	в	C	D	E	F	G	н	1
1 Se	lected(x) Nam	ne	ObjectType	Parent	Template	ReferenceType	AttributeValue	AttributeDataReference	AttributeConfigString
X	P-10	91	Element	Facility1\Area4\Rotating Equipment	Pump	Parent-Child			
x 8	Area	a i	Attribute	Facility1\Area4\Rotating Equipment\P-101				String Builder	"%\.\Element%"
×	Flow	wat End	Attribute	Facility1\Area4\Rotating Equipment\P-101				PI Point	Flow Average;UOM=gpm
5 X	Flow	v at Start	Attribute	Facility1\Area4\Rotating Equipment\P-101				PI Point	Flow Average;TimeRangeMethod=StartTime;UOM=gpm
×	Flow	// Average	Attribute	Facility1\Area4\Rotating Equipment\P-101				PI Point	\\osibi2\cdt158;TimeMethod=Interpolated;TimeRangeMethod=Average;UOM=gpr
x	P-10	31	Element	Facility1\Area3\Rotating Equipment	Pump	Parent-Child			
3 x	Area	a	Attribute	Facility1\Area3\Rotating Equipment\P-101				String Builder	"%\.\Element%"
x	Flow	v at End	Attribute	Facility1\Area3\Rotating Equipment\P-101				PI Point	Flow Average;UOM=gpm
x 0	Flow	w at Start	Attribute	Facility1\Area3\Rotating Equipment\P-101				PI Point	Flow Average;TimeRangeMethod=StartTime;UOM=gpm
1 x	Flow	v Average	Attribute	Facility1\Area3\Rotating Equipment\P-101				PI Point	\\osibi2\cdt158;TimeMethod=Interpolated;TimeRangeMethod=Average;UOM=gpr
2 x	P-10	31	Element	Facility1\Area2\Rotating Equipment	Pump	Parent-Child			
3 X	Area	a	Attribute	Facility1\Area2\Rotating Equipment\P-101				String Builder	"%\.\Element%"
4 x	Flow	v at End	Attribute	Facility1\Area2\Rotating Equipment\P-101				PI Point	Flow Average;UDM=gpm
5 x	Flow	u at Start	Attribute	Facility1\Area2\Rotating Equipment\P-101				Pt Point	Flow Average;TimeRangeMethod=StartTime;UOM=gpm
16 x	Flow	/ Average	Attribute	Facility1\Area2\Rotating Equipment\P-101				PI Point	\\osibl2\cdt158;TimeMethod=Interpolated;TimeRangeMethod=Average;UOM=gpn
14	0.10		The second	Taxilia (1) Arrest) Detectors Contemport		Dama at Child			

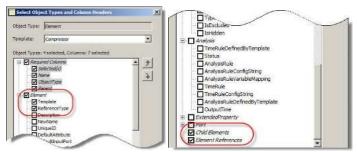
2. Import all the elements and the element hierarchy only. (Note - this is useful for making a backup of the elements and the hierarchy.)

Step by step:

a. Create a new workbook. In the ribbon click the down arrow under the **Elements** and select **All Elements**.



b. The **Select Object Types and Column Headers** dialog pops up. Deselect all the options, and then select only the options shown in the Figures below.



c. The elements and their hierarchy are now listed in the workbook.

	A	B	С	D	E	F	G
1	Selected(x)	Name	ObjectType	Parent	Template	ReferenceType	
2	х	Area1	Element	Facility1	Area	Parent-Child	
3	х	Rotating Equipment	Element	Facility1\Area1	Rotating Equipment	Parent-Child	
4	x	K-101	Element	Facility1\Area1\Rotating Equipment	Compressor	Parent-Child	
5	×	K-102	Element	Facility1\Area1\Rotating Equipment	Compressor	Parent-Child	
6	x	K-103	Element	Facility1\Area1\Rotating Equipment	Compressor	Parent-Child	
7	x	K-104	Element	Facility1\Area1\Rotating Equipment	Compressor	Parent-Child	
8	x	K-105	Element	Facility1\Area1\Rotating Equipment	Compressor	Parent-Child	
9	x	к-106	Element	Facility1\Area1\Rotating Equipment	Compressor	Parent-Child	
10	x	к-107	Element	Facility1\Area1\Rotating Equipment	Compressor	Parent-Child	
11	x	K-108	Element	Facility1\Area1\Rotating Equipment	Compressor	Parent-Child	
12	x	к-109	Element	Facility1\Area1\Rotating Equipment	Compressor	Parent-Child	
13	x	K-110	Element	Facility1\Area1\Rotating Equipment	Compressor	Parent-Child	
14	x	K-111	Element	Facility1\Area1\Rotating Equipment	Compressor	Parent-Child	
15	x	K-112	Element	Facility1\Area1\Rotating Equipment	Compressor	Parent-Child	
16	x	K-113	Element	Facility1\Area1\Rotating Equipment	Compressor	Parent-Child	
17	x	K-114	Element	Facility1\Area1\Rotating Equipment	Compressor	Parent-Child	
18	x	К-115	Element	Facility1\Area1\Rotating Equipment	Compressor	Parent-Child	
19	x	K-116	Element	Facility1\Area1\Rotating Equipment	Compressor	Parent-Child	
20	x	K-117	Element	Facility1\Area1\Rotating Equipment	Compressor	Parent-Child	
21	x	K-118	Element	Facility1\Area1\Rotating Equipment	Compressor	Parent-Child	
22	x	K-119	Element	Facility1\Area1\Rotating Equipment	Compressor	Parent-Child	
23	x	K-120	Element	Facility1\Area1\Rotating Equipment	Compressor	Parent-Child	
24	x	K-121	Element	Facility1\Area1\Rotating Equipment	Compressor	Parent-Child	
25	x	K-122	Element	Facility1\Area1\Rotating Equipment	Compressor	Parent-Child	
26	x	K-123	Element	Facility1\Area1\Rotating Equipment	Compressor	Parent-Child	
27	x	К-124	Element	Facility1\Area1\Rotating Equipment	Compressor	Parent-Child	
28	x	K-125	Element	Facility1\Area1\Rotating Equipment	Compressor	Parent-Child	
29	x	K-126	Element	Facility1\Area1\Rotating Equipment	Compressor	Parent-Child	

Setting PI Tag names in Attributes

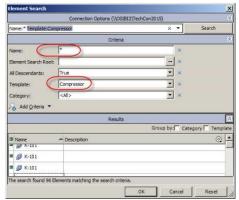
For all the Compressors, set the PI Tag names for all the **Discharge Pressure** Attributes.

Step by step:

a. Create a new workbook. In the ribbon click the down arrow under the **Elements** and select **Find Elements**.



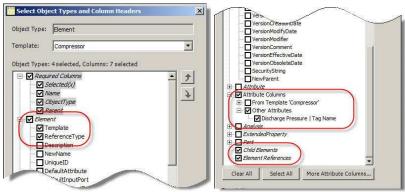
b. In the **Name** field type ***** and select **Compressor** in the **Template** combo box. Click the **Search** button, and then the **OK** button.



c. The Select Object Types and Column Headers dialog pops up. Click the More Attribute Columns button. Select the Add Attributes from Template radio button and then Compressor from the combo box. Select the Tag Name Attribute and click the D button. Then click the OK button.

Add Attributes from Template:	Compressor	
Add Attributes from Element:	🗊 K-101	
Others:	Enter a semicitor separated list of names to use as attribute columns:	bbA 🭳
Attribute Templates:	Attributes:	
Compressor	Group by: Category	e Pressure Tag Name
file	₽ • »	3
Name	Category	3
		5
E Discharge		

d. Now you are back in the **Select Object Types and Column Headers** dialog. Make sure that only the options shown in the Figures below are selected. Then click the **OK** button.



e. You will now have the workbook contain only the **Tag Name** child-Attributes of the **Discharge Pressure** Attributes for all the compressors.

A	1 -	• : 🗙 🗸 fs	Selected	i(x)			
4	Α	В	С	D	Е	F	G
1	Selected(x)	Name	ObjectType	Parent	Template	ReferenceType	Discharge Pressure Tag Name
2	х	Compressor-K-101	Element	Facility1\Area2\Rotating Equipment	Compressor	Parent-Child	cdt158
3	х	Compressor-K-101	Element	Facility1\Area1\Rotating Equipment	Compressor	Parent-Child	0
Į.	x	Compressor-K-101	Element	Facility1\Area3\Rotating Equipment	Compressor	Parent-Child	0
5	x	Compressor-K-101	Element	Facility2\Area1\Rotating Equipment	Compressor	Parent-Child	0
5	x	Compressor-K-101	Element	Facility1\Area4\Rotating Equipment	Compressor	Parent-Child	0
7	x	Compressor-K-102	Element	Facility1\Area2\Rotating Equipment	Compressor	Parent-Child	0
3	х	Compressor-K-102	Element	Facility1\Area1\Rotating Equipment	Compressor	Parent-Child	0
9	х	Compressor-K-102	Element	Facility1\Area3\Rotating Equipment	Compressor	Parent-Child	0
0	x	Compressor-K-102	Element	Facility2\Area1\Rotating Equipment	Compressor	Parent-Child	0
1	x	Compressor-K-102	Element	Facility1\Area4\Rotating Equipment	Compressor	Parent-Child	0
2	x	Compressor-K-103	Element	Facility1\Area2\Rotating Equipment	Compressor	Parent-Child	0
3	x	Compressor-K-103	Element	Facility1\Area1\Rotating Equipment	Compressor	Parent-Child	0
4	x	Compressor-K-103	Element	Facility1\Area3\Rotating Equipment	Compressor	Parent-Child	0
5	x	Compressor-K-103	Element	Facility2\Area1\Rotating Equipment	Compressor	Parent-Child	0
6	х	Compressor-K-103	Element	Facility1\Area4\Rotating Equipment	Compressor	Parent-Child	0
7	x	Compressor-K-104	Element	Facility1\Area2\Rotating Equipment	Compressor	Parent-Child	0
8	x	Compressor-K-104	Element	Facility1\Area1\Rotating Equipment	Compressor	Parent-Child	0
9	x	Compressor-K-104	Element	Facility2\Area1\Rotating Equipment	Compressor	Parent-Child	0

f. Replace the **0**s in the column under the header |Discharge Pressure|Tag Name with

cdt158. Then click the button in the ribbon. Click **OK** and **Close** on the next two dialogs that pop up.

	А	В	С	D	E	F	G
1	Selected(x)	Name	ObjectType	Parent	Template	ReferenceType	Discharge Pressure Tag Name
2	x	Compressor-K-101	Element	Facility1\Area2\Rotating Equipment	Compressor	Parent-Child	cdt158
3	x	Compressor-K-101	Element	Facility1\Area1\Rotating Equipment	Compressor	Parent-Child	cdt158
4	x	Compressor-K-101	Element	Facility1\Area3\Rotating Equipment	Compressor	Parent-Child	cdt158
5	x	Compressor-K-101	Element	Facility2\Area1\Rotating Equipment	Compressor	Parent-Child	cdt158
6	x	Compressor-K-101	Element	Facility1\Area4\Rotating Equipment	Compressor	Parent-Child	cdt158
7	x	Compressor-K-102	Element	Facility1\Area2\Rotating Equipment	Compressor	Parent-Child	cdt158
8	x	Compressor-K-102	Element	Facility1\Area1\Rotating Equipment	Compressor	Parent-Child	cdt158
9	x	Compressor-K-102	Element	Facility1\Area3\Rotating Equipment	Compressor	Parent-Child	cdt158
10	x	Compressor-K-102	Element	Facility2\Area1\Rotating Equipment	Compressor	Parent-Child	cdt158
11	x	Compressor-K-102	Element	Facility1\Area4\Rotating Equipment	Compressor	Parent-Child	cdt158
12	x	Compressor-K-103	Element	Facility1\Area2\Rotating Equipment	Compressor	Parent-Child	cdt158
13	x	Compressor-K-103	Element	Facility1\Area1\Rotating Equipment	Compressor	Parent-Child	cdt158
14	x	Compressor-K-103	Element	Facility1\Area3\Rotating Equipment	Compressor	Parent-Child	cdt158
15	x	Compressor-K-103	Element	Facility2\Area1\Rotating Equipment	Compressor	Parent-Child	cdt158
16	x	Compressor-K-103	Element	Facility1\Area4\Rotating Equipment	Compressor	Parent-Child	cdt158
17	x	Compressor-K-104	Element	Facility1\Area2\Rotating Equipment	Compressor	Parent-Child	cdt158
18	x	Compressor-K-104	Element	Facility1\Area1\Rotating Equipment	Compressor	Parent-Child	cdt158
19	x	Compressor-K-104	Element	Facility2\Area1\Rotating Equipment	Compressor	Parent-Child	cdt158
20	x	Compressor-K-104	Element	Facility1\Area3\Rotating Equipment	Compressor	Parent-Child	cdt158
21	x	Compressor-K-105	Element	Facility1\Area2\Rotating Equipment	Compressor	Parent-Child	cdt158
22	x	Compressor-K-105	Element	Facility1\Area1\Rotating Equipment	Compressor	Parent-Child	cdt158
23	x	Compressor-K-105	Element	Facility2\Area1\Rotating Equipment	Compressor	Parent-Child	cdt158
24	x	Compressor-K-105	Element	Facility1\Area3\Rotating Equipment	Compressor	Parent-Child	cdt158

g. Open the **PI System Explorer**, press the **Ctrl+1** key combination. Navigate to any compressor in the **Browser** pane. Select a compressor and click the **Attributes** tab in the **Viewing** pane.

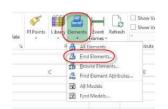
Elements	K-10	7				
Element1 Element2 Facility	Gen	eral Child	Elements Attribute	s Ports	Analyses	Version
Fadity1	- 20	1				P -
- 🗇 Area1		: m + i	Name	4	Value	0
K-101	8	8	🧭 Discharge Pres		164. 190795	898438 psig
🗇 K-102	172		El Tag Name		cdt158	
- K-103						
🗿 K-105						
🗊 K-106						
🗇 K-107						
🗇 K-108						
🗊 K-109						
🗇 K-110						
🗃 K-111						
🔂 K-112						

Attribute Columns

Select all the pumps starting with **P-10** and the pump Attributes and display them with the pumps in rows and the Attributes in columns.

Step by step:

a. Create a new workbook. In the ribbon click the down arrow under the **Elements** and select **Find Elements**.



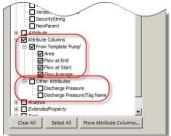
b. In the Name field type P-10* and select Pump in the Template combo box. Click the Search button.

				_		* *
-		Connection Options (\\OSIE	E2\TechCon2015)	-		÷
Name:P-10* Ten	plate:Pur		×	*	Search	
	-	Criteria				*
Name:	(P	10*		×		
Element Search I	Root:			×		
All Descendants:	T	rue -		×		
Template:		amp		×		
Category:	<	Al>	•	× (
Add Griteria	•					
		Results				(()
			Group by:	Cate	egory 🗖 Templ	ate
en Name	4	Description			Q	-
8 Name 8 <i>(</i>) P-101	4	Description			Q	-
	4	Description			Q	-
9 🔊 P-101 9 🔊 P-101 9 🔊 P-101					Q	-
9 🔊 P-101 9 🔊 P-101 9 🔊 P-101		Description	a		Q	-

c. Click the **OK** button. Note, **PI Builder** keeps the last settings that you made. In this case, what we had in the **Setting PI Tag Names**.

B D P	ute Columns om Template 'Pum Area	'qı		
-1	Flow at End Flow at Start			
	Flow Average ther Attributes			
	Discharge Press Discharge Press			
راهديد ال	ois dedProperty		-1	
Let Later				

d. Uncheck the **Other Attributes** check box and check the **From Template 'Pump'** check box. Then click the **OK** button.



e. The pumps are now listed by row and the Attributes by column.

A1 \rightarrow | \times \checkmark $f_{\mathcal{X}}$ | Selected(x)

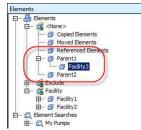
A	B	с	D	ε	P.	g	н	1	
Selected(x)	Name	ObjectType	Parent	Template	ReferenceType	Area	Flow at End	Flow at Start	Flow Average
2 8	P-101	Element	Facility1\Area4\Rotating Equipment	Pump	Parent-Child	=String Builder, S., Litement%	=PI Point, Flow Average;UOM=gpm	=PI Point. How Average; ImeRangeMethod=StartTime; UOM=gpm	=\\USIBIZ\001158
x	P-101	Element	Facility1\Area3\Rotating Equipment	Pump	Parent-Child	=String Builder. "%\.\Element%"	=PI Point, Flow Average;UOM=gpm	=PI Point. Flow Average; TimeRangeMethod=StartTime; UOM=gpm	=\\0SI8I2\cdt158
x	P-101	Element	Facility1\Area2\Rotating Equipment	Pump	Parent-Child	=String Builder. "%\\Element%"	=PI Point. Flow Average;UOM=gpm	=PI Point. Flow Average;TimeRangeMethod=StartTime;UOM=gpm	=\\OSIB12\cdt158
5 x	P-101	Element	Facility1\Area1\Rotating Equipment	Pump	Parent-Child	=String Builder."%\.\Element%"	=PI Point. Flow Average;UOM=gpm	=PI Point. Flow Average; TimeRangeMethod=StartTime; UOM=gpm	=\\OSIB12\cdt158
x	P-102	Element	Facility1\Area4\Rotating Equipment	Pump	Parent-Child	=String Builder."%\\Element%"	=PI Point. Flow Average;UOM=gpm	=PI Point. Flow Average; TimeRangeMethod=StartTime; UOM=gpm	=\\OSIBI2\cdt158
7 x	P-102	Element	Facility1\Area3\Rotating Equipment	Pump	Parent-Child	=String Builder. "%\\Element%"	=PI Point. Flow Average;UOM=gpm	=PI Point. Flow Average; TimeRangeMethod=StartTime; UOM=gpm	=\\OSIBI2\cdt158
x	P-102	Element	Facility1\Area2\Rotating Equipment	Pump	Parent-Child	=String Builder. "%\\Element%"	=PI Point. Flow Average;UOM=gpm	=PI Point, Flow Average; TimeRangeMethod=StartTime; UOM=gpm	=\\OSIBI2\cdt158
e x	P-102	Element	Facility1\Area1\Rotating Equipment	Pump	Parent-Child	=String Builder. "%\\Element%"	=PI Point. Flow Average;UOM=gpm	=PI Point. Flow Average;TimeRangeMethod=StartTime;UOM=gpm	=\\OSIBI2\cdt158
0 x	P-103	Element	Facility1\Area4\Rotating Equipment	Pump	Parent-Child	=String Builder. "%\\Element%"	=PI Point, Flow Average; UOM=gpm	=Pi Point, Flow Average;TimeRangeMethod=StartTime;UOM=gom	=\\OSIBI2\cdt158
1 x	P-103	Element	Facility1\Area3\Rotating Equipment	Pump	Parent-Child	=String Builder."%\\Element%"	-PI Point. Flow Average;UOM-gom	=PI Point. Flow Average; TimeRangeMethod=StartTime; UOM=gom	=\\OSIBI2\cdt158
2 x	P-103	Element	Facility1\Area2\Rotating Equipment	Pump	Parent-Child	«String Builder, %\\Element%"	=PI Point. Flow Average; UOM-gpm	=PI Point. Flow Average;TimeRangeMethod=StartTime;UOM=gpm	=\\OS(812\cdt158
L3 X	P-103	Element	Facility1\Area1\Rotating Equipment	Pump	Parent-Child	«String Builder. "%\\Element%"	=PI Point. Flow Average;UOM=gpm	=PI Point. Flow Average; TimeRangeMethod=StartTime; UOM=gom	=\\OSIBI2\cdt158

Moving elements

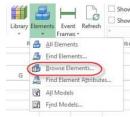
Move the child-Element Facility3 from Parent1 to Parent2.

Step by step:

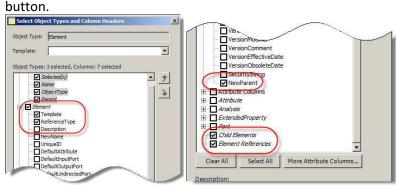
a. Open the **PI System Explorer**, press the **Ctrl+1** key combination. In the **Browser Pane** you can see that **Parent1** element has **Facility3** as a child-Element. **Parent2** has no child-Element.



b. Create a new workbook. In the ribbon click the down arrow under the **Elements** and select **Browse Elements** and select **Parent1**.



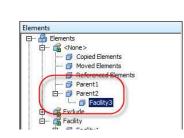
c. Click the **OK** button. In the **Select Object Types and Column Headers** dialog, make sure that only the options shown in the Figures below are selected. Then click the **OK**



d. In the workbook, type in **Parent2** in cell **G3** (or the column where the **NewParent** header is).

4	A	В	С	D	E	F	G
L	Selected(x)	Name	ObjectType	Parent	Template	ReferenceType	NewParent
1	x	Parent1	Element				
6	x	Facility3	Element	Parent1	Facility	Parent-Child	Parent2
E.							

e. Then click the button in the ribbon. Click **OK** and **Close** on the next two dialogs that pop up. Press the **F5** key to refresh the tree view. **Facility3** is now a child of **Parent2**.



Appendix

PI System Explorer (PSE)

Keyboard shortcuts

1. It is a lot faster to use the keyboard shortcuts to move between the ribbons as well as to perform other tasks in PSE. Navigate to the **Library** in the **Navigator Pane** using the keyboard. Then navigate back to the **Elements**.

annnn	
🔁 Elements	
- Event Frames	
library	
🚥 Unit of Measure	
MyPI	
Notifications	
A Contacts	
🗱 Analyses	
the second second	

Step by step:

a. Press the **Ctrl+3** key combination to navigate to the **Library** view. To navigate back to the **Elements** view press the **Ctrl+1** key combination. The **Ctrl+<number>** key combinations to navigate to different views is:

0	Elements	Ctrl+1
-	Event Frames	Ctrl+2
1	Library	Ctrl+3
-	Unit of Measure	Ctrl+4
0	MyPI	Ctrl+5
	Notifications	Ctrl+6
38	Contacts	Ctrl+7
驟	Analyses	Ctrl+0

2. Add an element (choose element template <None>) and check in the changes.

Elements	Elements
Elements	Elements Elements

Step by step:

- a. If you are not in the Elements view press the Ctrl+1 key combination
- b. Right click the Elements (Elements) in the Browser pane and select New Element (choose element template <None>). Alternately, you can also select Elements (
 Elements) and press the Ins key.
- c. Press **Ctrl+S** key combination, this brings up the Check In dialog. Then press the **Check** In key.

iame Z 📶 Element1	Change Edited	This Session True	Path Element1	Type Element	User OSIBI2\Administrator
All Nor		n			
ffective Date: 2/19/ Comment:	2015 8:35:43.468	AM			

3. Search for pump elements under Area1.

Step by step:

- a. If you are not in the Elements view press the Ctrl+1 key combination
- b. To perform a search press the **F3** key
- c. In the Search Dialog select Pump for the Template combo box
- d. Then click the 🔜 next to the Element Search Root and then select Area1 under Facility1

Template:Pump Root	"Facility1\Area1"		× •	Search
	Crite	eria		1
Name:				×
Element Search Roo	t: Facility1\Area1	\rightarrow		×
All Descendants:	True			▼ ×
Template: (Pump			• ×
Category:	<all></all>			▼ ×
🧏 Add <u>C</u> riteria ▪	Resi	1000		
	Resi	lits		
	Kes	1976-975	y: 🗌 Categ	

e. Click the **OK** button. An **Elements Search Results 1** view is created in the Browser pane under **Element Searches**.

The table below shows other very useful keyboard shortcuts.

Key Combination	Action
CTRL+A	Selects all objects in the Viewer.
CTRL+C	Copies the selected object to the clipboard.
CTRL+ALT+C	Copies the path of the selected object to the clipboard.
CTRL+V	Pastes the object on the clipboard to the Viewer.

Key Combination	Action
CTRL+X	Cuts (deletes) the selected object and copies it to the clipboard.
DELETE	Deletes the selected object.
SHIFT+DELETE	Same as CTRL+X
INSERT	Adds a new object to the Viewer or Browser.
НОМЕ	Selects the first row in the Viewer, for example, the first row in a table of attributes.
END	Selects the last row in the Viewer.
CTRL+HOME	Selects the first cell of the current page in the Viewer.
CTRL+END	Selects the last cell of the current page in the Viewer.
ALT+HOME	Selects the first page of objects in the Viewer.
ALT+END	Selects the last page of objects in the Viewer.
CTRL+PAGE UP	Selects the previous page of objects in the Viewer.
CTRL+PAGE DOWN	Selects the next page of objects in the Viewer.
CTRL+ENTER	If the Viewer contains multiple pages of objects, displays the Select Page Number window.
ALT+ENTER	In the Browser, displays the properties of the selected object.
SPACE or ENTER	Presses the currently selected button.
Left, Right, Up, and Down Arrows	Navigate objects in the Viewer or Browser.
F2	Edits the selected object on the Viewer. For complex objects, displays the edit window for the object.
F4 or ALT+Up Arrow or ALT+Down Arrow	Displays the choices in the selected list box. For layered lists, displays the complete hierarchy of choices.

Using Palettes

1. Create a new Heat Exchanger Element by using the **Element Template Palette**.

Step by step:

- a. If you are not in the Elements view press the Ctrl+1 key combination
- b. In the **Menu** bar click on **View** and then select **Palette>Element Templates**. (Note you can also use short cut key combination of **Ctrl+Shift+1**)
 - File Search View Go Tools Help 🔕 Database 🛅 🗹 Toolbar 💐 Check In 🏼 🖓 🖌 👔 Refresh 🛛 📴 New E Status Bar Elements Elements 🔒 Eleme Show Trend Group by: ÷ Palette Ctrl+Shift+P Show Palette E Fac Fac Fac Fac Back Back F5 Refresh Element Templates Ctrl+Shift+1 Alt+Left Ctrl+Shift+3 ÷Ó Data References Ė- <u>€</u> Ele Alt-Right Forward Contacts Ctrl+Shift+5 2 Tag Search Ctrl+Shift+8 E Facility1
- c. The Element Templates palette appears.

lements	Elements	😡 Element Templates 🔹
Ements	Group by: C Gategory C Tempia	e p Marea
El- Exclude	III Name & Description (C	Centrifugal Pump
D- G Truck Ement Searches	Copied Elements	Compressor
B- C My Pumps	🖬 🦪 Element1	Engine
	a 🗇 Element2	Geodity
	🕀 🖻 🧭 Fadity1	Fumace
	🖽 🛎 🗇 Facilty2	Generic Pump
	Moved Elements	Heat Exchanger
	Referenced Ele	Rotating Equipment
	🖽 🖷 🗊 Truck1	🖓 Thermal Equipment

d. Select the **Heat Exchanger** in this pane and drag it to the **Elements** in the **Browser** pane. This creates a new Element called **Heat Exchanger1**.

File Search View Go Tools Help	(Automotication)		
🔕 Database 🛅 Query Date 🔹 🕓 🥪 🕓 Back	🔘 🗟 Check In 🧐 🖌 📝 Refresh 🔡 New Element 🔹	Seath Semination 👂 🔹	
Elements	Elements .	Element Templates	
	Group by: C Gategory C Template		
B- G <none> B- G Exclude</none>	Select P GArea		
B Facility	🗏 Name 🍝 Description 💿	Centrifugal Pump	
D- BHeat Exchanger	G Copied Elements	Compressor	
Heat Exchanger 1	Element1	Engine	
B- 🛃 Element Searches	🗰 👩 Element2	Exclude	
🖮 – 🚉 My Pumps	🗄 🛤 🗊 Facility1	Facility	
	🗄 🗯 🗊 Facility2	Gin Generic Pump	
	Moved Elements	Heat Exchanger	
	Referenced Ele	Rotating Equipment	
	🗄 🖻 🗊 Truck1	Thermal Equipment	
	Heat Exchanger 1	Truck	

2. Add a new Attribute to the **Furnace** Template that has the **PI Point** Data Reference by using the **Element Template Palette**.

Step by step:

- a. If you are not in the Library view press the Ctrl+3 key combination
- b. Then select the **Furnace** Template under **Element Templates**. Click on the **Attribute** tab in the **Attribute Viewing** pane.
- c. In the **Menu** bar click on **View** and then select **Palette>Data References**. (Note you can also use short cut key combination of **Ctrl+Shift+3**). The **Data References** palette appears.

Library	Furnace		Data References	
TechCon2015	General Attribute Templates Ports Analys	s Templates	The .	P
⊕ ⊕ Templates ⊖ ⊕ ⊕ ⊕ ⊕ ⊕ ⊕ ⊕ ⊖ Centrifugal Pump ⊕ ⊕ ⊖ Centrifugal Pump ⊕ ⊕ ⊕ ⊖ Compressor ⊕ <td< th=""><th>P P</th><th>Group by: IP Category Template Description: Description: Categories: Categories: Default UOM: Value Type: Default Value: Data Reference: Categories: C</th><th>1월 Attribute Alias 1월 Promula 1월 Proint 1월 Pr Point 1월 Pr Point Array 1월 Rolley 1월 String Concat 1월 Talie Lookup 1월 Time Parts 1월 Web Reference</th><th></th></td<>	P P	Group by: IP Category Template Description: Description: Categories: Categories: Default UOM: Value Type: Default Value: Data Reference: Categories: C	1월 Attribute Alias 1월 Promula 1월 Proint 1월 Pr Point 1월 Pr Point Array 1월 Rolley 1월 String Concat 1월 Talie Lookup 1월 Time Parts 1월 Web Reference	

d. Select **PI Point** from the palette and drag it onto the white space in the **Attribute Viewing** pane. **Attribute1** is created with the **PI Point** Data Reference.

□ © Group by: ✓ Category: Templates □ ⊕ ⊕ Area □ ⊕ ⊕ Area □ ⊕ ⊕ Centrifical Pump	□ □	Library	Furnace		: Data References • X
B Boder Castring Concet B Bader Castring Concet B Bader B Ba	B - G Purp Default Value: [0 Default Value: [0 Data Reference: PI Point ▼ Data Reference: PI Point ▼	Control 15 C	General Attribute Templates Ports Analysis	Group by: Category Template Name: Attribute 1 Description: Properties: Otone > Categories: Default UOM:	Attribute Alas Chormala

Column visibility

Select a pump element and in the **Attribute Viewing** pane show the time stamp of values in this view.

Step by step:

- a. Click on a pump in the **My Pumps** under **Element Searches** in the **Browser** pane (created in the **Searching and Filters** section above)
- b. Click on the Attribute tab in the Viewing pane

Elements	P-1	P-101					
Facility2 Flement Searches	Ge	ineral C	hild Elements Attribute	Ports Analyses Version			
P-101	E	ter.			• م		
— 🗊 P-101		: = +	R Name	△ Value	0		
- 🗇 P-101 - 🗇 P-101	8	Ga	itegory: <none></none>				
- 🗇 P-102 - 🎯 P-102		в	💷 Area	Area1			
- @ P-102			Ø Flow	81.2822341918945 gpm			
— 🗇 P-103		-	1000000000000000				
- 🗇 P-103 - 🗇 P-103							

c. Right click on the header in the Viewing pane and select Column visibility>Time Stamp

6	R Name	△ Value	62	Categorize	ן ר	
0	🗉 Area	Area1	~	Column Visibility		C
	6 Flow at End	84.137672424		Expand All		Configuration Item Quality
	6 Flow at Start	84.137672424		Hide Excluded Attributes	-	Template
9	Flow Average	84.137672424		Refresh	~	Analysis
		Contraction and	195	Paste	~	Hidden
			×	Delete All	4	Name
		1			-	Value
					5	Time Stamp
						Category
						Configuration Item
						Unit Of Measure
						Value Type

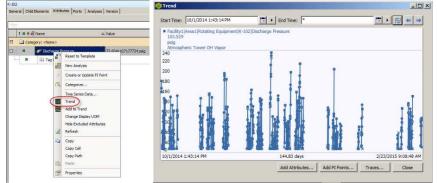
d. Now you have the **Time Stamp** added to the **Viewing** pane. This one is especially useful since the PSE does not show the current time for performance purposes. To update the values for the attributes you need to do a **Refresh**. With the **Time Stamp** being visible you have a time context for the values.

Trending and Archive Data

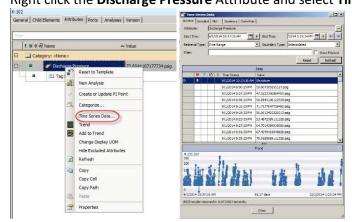
Using the compressor Element from the above example create a trend of the **Discharge Pressure** Attribute and view archive data for the same Attribute.

Step by step:

a. Right click the Discharge Pressure Attribute and select Trend



b. You can modify the Start and End times and click the B button to see the changes
c. Right click the **Discharge Pressure** Attribute and select **Time Series Data**



Event frames capture/recapture, locking

- 1. Change a Data Reference in the Event Frame Template **Operation**, go to the Event Frame view and recapture the event to make the change take effect in the event itself. **Step by step:**
 - a. If you are not in the Library view press Ctrl+3 key combination
 - b. Select on the **Operation** Template under the **Event Frame Templates** and click on the **Attribute** tab in the **Attribute Viewing** pane.

Library	Operation	
TechCon2015	General Attribute Templates	
E Area	Filter	، م
E Compressor	✓ i R Name	🔺 Default Value 🛛 🗔
B- G Exclude	Category: <none></none>	
🖽 🚮 Facility	Flow	0 gpm
🕮 🚰 Furnace 🕀 🚰 Heat Exchanger		
🖽 🚰 Pump		
🖽 – 🚮 Rotating Equipment		
😟 🙀 Thermal Equipment		
Event Frame Templates		
Coperation		
Model Templates		

c. Select the **Flow** Attribute, click the **Settings** button, then in the **Pl Point Data Reference** dialog click the **By Time Range** combo box and select **End Time**. Click the **OK** button.

Point Data Refere	ence	
Data server:	%Server%]
Tag name:		9
Tag Creat	ion	
Attribute:	Elements[.] Flow Average	
Unit of Measure	poneno (1) i on i ne oge	1000
Source Units:		
Value retrieval met	nnds	
By Time:	Interpolated	-
Relative time:		
By Time Range:	Start Time	•
Calculation basi	s: Count	
	Delta	
Min percent goo		
Read only	Maximum Minimum Population Standard Deviation	
Read only	Range	
	Standard Deviation Start Time	

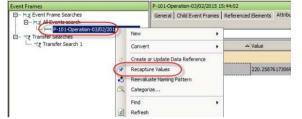
- d. Check in the changes by pressing the Ctrl+S key combination
- e. Press the **Ctrl+2** key combination to navigate to the **Event Frames** view. Select the event under the **All Events search** in the **Brower** pane.

Event Frames	P-101-Operation-03	3/02/2015 15:44:02			
Full Event Frame Searches	General Child Eve	ent Frames Referenced Elements Attr	ributes		
P-101-Operation-03/02/2015 15:44:02	Name:	P-101-Operation-03/02/2015 15:44:02	2		
E	Description:				
	Template:	Operation	3	Categories:	
	Start time:	3/2/2015 3:44:02 PM	1	End time:	3/2/20
	Default Attribute:	<none></none>			
		Extended Properties Security			
	Find:	Parents Children			

f. Click on the **Attribute** tab in the **Attribute Viewing** pane and note the value of the **Flow** Attribute.

	I-Operation-03/02/2015 eral Child Event Frames	Referenced Elements Attribut	tes D
Dici fic	and plane event runnes	Therefore benefit	
File	8		, o
	: B & Name	A Value	0
	Category: <none></none>		
	E Flow	220.25876173069	4 gpm

g. Right-click the event in the Browser pane and select Recapture Values



h. The value for the **Flow** Attribute now reflects the changes you made in the **Operation** Template

File	er '		Q
	: B R Name	△ Value	¢.
	Category: <none< td=""><td>»</td><td>~</td></none<>	»	~
	🖿 🍼 Flow	223.0517578125 g	pm)

2. Lock an event and then try to delete it. (Note: Only administrators of Event Frames can lock and unlock events).

Step by step:

a. Select the **All Events search** in the **Brower** pane and then right-click the event in the **Attribute Viewing** pane. Then select **Lock**.

Event Frames	Al Events sea	rch	
B- Hal Event Brane Searches	1000		
P-101-Operation-03/02/2015 15:44:02	al 1 Name		[00:0]
Transfer Search 1	(Here	01 01 01 01 01 01 01 01 01 01 01 01 01 0	,
		Convert	
	9 * *	Recapture Values Reevaluate Naming Pattern	
		Find Refresh	
	4	Copy Cell Copy Path	
		Export to File	
🗇 Elements		Check Out	
Event Frames	×	Delete	
🔯 Library	- ×	Delete Reference	
Durit of Measure	-	Security	
🚱 MyPI	6		

- b. The event will now have symbol next to it. Try to delete the event. If you right-click it you will see that you can no longer delete, recapture, or rename the event.
- c. Note: In the upcoming release AF 2.8 you can also lock the event frame in the **Viewing Pane** when you select an Event Frame in the **Browser Pane**.

Event Frames	Flow Meter 1-0	Operation-03/07/2016 12:45:00	
How Event Frame Searches	General Ch Name: Description:	ild Event Frames Referenced Elements Attributes Flow Meter 1-Operation-03/07/2016 12:45:00	
Flow Meter 1-Operation-03/07/2016	Template: Start time:	Operation 3/7/2016 12:45:00 PM	
È → Transfer Searches È → Transfer Search 1	Categories:	Extended Properties (0) Annotations (0) Security	6
	Find: Actions:	Parents Children Lock Acknowledge	

Event Frames Severity

Assign a severity of **Critical** to the **Operation** Event Frame Template. For an Event change the severity to **Warning**, then create a new search and find all Events that have the severity of **Warning**.

Step by step:

a. Open the PI System Explorer, press the Ctrl+3 key combination to navigate to the Library. In the Browser Pane select the Operation Event Frame Template. Then in the Viewing Pane select Critical in the Severity combo box.

Library	Operation						
🔂 Area	General Attribut	te Templates					
···· 🔂 Compressor ···· 🚮 ElementTemplate ···· 🚮 Exclude	Name: Description:	Operation					
🚮 Facility 🛃 Flow Meter	Base Template:	<none></none>		1	Severity:	None	-
🔂 Furnace 🔂 Heat Exchanger	Categories:	[<u>a</u>	Default Attribute:	None Information	
🔂 New Facility 🚮 PI Server	Naming Pattern:	%Element%-%Template	%-%StartTime%			Warning Minor Major	
🔂 Pump]		Can Be Acknowledg	ed		Critical	
强 Rotating Equipment 强 Thermal Equipment		Extended Properties (0)					
Event Frame Templates	Find:	Derived Templates	Event Frames Derived Event Frames	Referenced Pare	and the second		

b. Press the **Ctrl-2** key combination to navigate to the **Event Frames**. Select an Event Frame and change the severity to **Warning**.

Event Frames	Flow Meter 1-	Operation-03/07/2016 12:4	15:00			
ng Event Franc Searches EI-rig Al Sevent Search I How Meter LOperation-03/07/2016 12:45 I Recent Event France I — How Neter LOperation-03/07/2016 12:45:00 ng Transfer Searches EI — ng Transfer Search 1		Flow Meter 1-Operation-0		Severity: End time: Default Attribute:	Major None Information Wator Outroor Critical	×
Elements Event Frames						

c. Right-click the **Event Frame Searches** in the **Browser Pane** and select **New Search**. In the **Event Frame Search** window click **Add Criteria** and select **Severity**. Select **Warning** in the **Severity** combo box and click the **Search** button. Then click **OK**.

Event Frame Sea	rch					×
Severity:>=Warnin	ig				× •	Search
		Criteria				8
	rting Before					
Name:	[× Element Name:	[×	
Category:	<all></all>	X Template:	<all></all>		• ×	
Attribute Value:	Altributes >= <null></null>] ×				
Results per Page:	10000	×				
Severity:	>= Warning					
Add Criteria	•	~				
		Results				8
				ОК	Cancel	Reset

- d. The new search now contains all Events with a severity setting of Warning.
- e. Note: There is also an option in the Event Frame Template to allow the Event Frame to be acknowledged. This is used by the upcoming **Coresight** and **Notification** releases. To allow an Event to be acknowledged click the check box in the **Viewing Pane** of the Event Frame Template.

Library	Operation			
Compressor C	General Attribut Name: Description: Base Template: Categories: Naming Pattern: Find:	e Templates Operation Operation %Element%-%Template Allow Extensions Extended Properties (0) Derived Templates	Can Be Acknowledg	ped) Referenc Referenc

- f. Press the Ctrl-2 key combination to navigate to the Event Frames. Right-click the Event Frames Search in the Browser Pane and select New Event Frame. In the Choose Event Frame Template window choose Operation and click OK. Create one more Event Frame in the same manner.
- g. Select one of these new Event Frames and then click <u>Acknowledge</u> in the **Viewing Pane**, and then click **Yes** in the **Acknowledge** window that pops up.

Event Frames	-Operation-03	3/08/2016 13:57:00							
Event Frame Searches	General Child Event Frames Referenced Elements Attributes								
Flow Meter 1-Operation-03/07/2016 12:-	Name:	-Operation-03/08/2016 13:57:00							
Recent Event Frames	Description:								
-Operation-03/08/2016 13:57:00	Template:	Operation				Severity:	None		
→ Transfer Searches	Start time:	3/8/2016 1:57:00 PM				End time:			
	Categories:				6	Default Attribute:	<none></none>		
		Extended Properties (0)	Annotations (0)	Security					
	Find:	Parents	Children						
	Actions:	Capture Values	Lock						
	C	Adknowledge							
	Acknowle	edge				>	al		
()		Are you sure you want to a	knowledge Event	Frame Operation	-03/08				
Elements	<u> </u>	are you sure you want to a	in lovincage Event	rraine operadori	05/05	2010 15:57:00:			
- Event Frames			Ye	s N	D	Help			
Library			_				14		

h. The time and the person who acknowledged the Event is now stored with the Event.

Event Frames	-Operation-03	3/08/2016 13:57:00		
Event Frame Searches Event Frame Searches Event Frame Search Event Frames Recent Event Frames	General Ch Name: Description:	Id Event Frames Referenced Elements Attributes Operation-03/08/2016 13:57:00		
	Template: Start time:	Operation 3/8/2016 1:57:00 PM	Severity:	None
	Categories: Find: Actions:	Extended Properties (0) Annotations (0) Security Parents Children Capture Values Lock	Default Attribu	ite: <none></none>
	(Acknowledged: 3/8/2016 1:58:02 PM	By:	OSIBIALES\Administrator

i. Click on the **Recent Event Frames** in the **Browser Pane** and notice that in the **Viewing Pane** one of the new Event Frames has the **A** in front of it (not acknowledged) and the other has the or symbol (is acknowledged). You can hover over these symbols to get a tooltip text. You can sort on this **Is Not Acknowledged** column and also use this as a filter in Event Frame searches.

Event Frames	Rece	nt Event Frames			
Event Frame Searches	Filter	~			
Recent Event Frames		A Name	Start Time	End Time	
-Operation-03/08/2016 13:56:00		A Operation-03/08/2016 13:56:00	3/8/2016 1:56:00 PM		
		ок — -Operation-03/08/2016 13:57:00	3/8/2016 1:57:00 PM		
⊞– – – – Transfer Search 1					

Pasting Data from Excel into a PI AF Table

Open the **Material.xlsx** file in Excel. Copy the data in the worksheet and paste them into the **Material Table** in PI AF. Then filter the values on all materials where **Property B** is **65**, and then on all materials containing the string **an**.

Step by step:

a. Open Excel and the file **Material.xlsx** located in the C:\ root. Highlight the data in the worksheet and copy.

A	1 ,		× .)	x
4	Α	В	С	D
1	Hydrogen	2	23	
2	Methane	12	44	
3	Methene	11	35	
4	Propane	22	65	
5	Propene	20	57	
6				

b. Navigate to the Library view by using the Ctrl+3 key combination, and select the table Material in the Browser pane.

🔂 Compressor	-
	_
🔂 Engine	
🚮 Exclude	
🚮 Furnace	
🕀 \cdots 🚮 Generic Pump	
🔂 New Facility	
🚮 ParentTemplate	
- 🛃 Pump	
🚮 Rotating Equipment	
🚮 Thermal Equipment	
E Event Frame Templates	
🕀 🗝 强 Model Templates	
🕀 🖷 🚮 Notification Templates	
🗄 🗝 🦌 Transfer Templates	1
Enumeration Sets	
Enumeration Sets Reference Types	
E Tables	
Material Table	
Table Connections	-

c. In the **Viewing** pane select the **Table** tab and click on the left side of the line, as indicated below, to select the empty line.

eneral	Table Define Tab	le Version		
1ateria	l Table			
Filter				P
-	Material		Property B	
) Ø	1)	0	0	

d. Right click on the same area as indicated above, and select Paste from the right click menu.

		ble Version	
Mater	ial Table		Q
	Material	Property A	Property B
	Hydrogen	2	23
	Methane	12	44
	Methene	11	35
	Propane	22	65
	Propene	20	57
ba.		0	0

e. Type **65** in the filter field, the white area above the table, as indicated below. Wait a second or so, and the **Viewing** pane is refreshed automatically and now you only see materials with **65** for **Property B**.

al Table Define Ta al Table	ble Version		
			×
Material	Property A	Property B	
Methene	11	65	
Propane	22	65	

f. Click the [×] to clear the filter and then click the [▼] in the filter field. Then select **Contains**.

Material	Table Define Tab			Ge	Material Table General Table Define Table Version					
Filter				R Ma	iterial Table				Recent Searches	
	Material	Property A	Property B	19	ltor			0	Contains	
	Hydrogen	2	23		Material	Property A	Property 8	~	Exact Match	
	Methane	12	44		Hydrogen	2	23		Starts With	
	Methene	11	65		Methane	12	44		Ends With	
	Propane	22	65		Methene	11	65	~	Name	
Þ	Propene	20	57		Propane	22	65		11 Internet and	
	No. Add Society		1.50		Propene				I Web Reference	

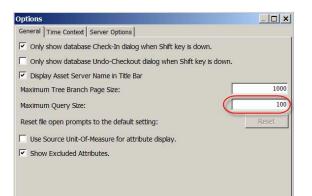
g. Type **an** in the filter field.

Genera	al Table Define Ta	ble Version		
Materi	al Table			
an				×
	Material	Property A	Property B	
1	Methane	12	44	
6				

h. The two materials that have the string an in their name, Methane and Propane.

Options – Maximum Query Size and Time Context

- Select My Pumps under Element Searches in the Browser pane, adjust the query size to show only 100 pumps at a time in the Viewing pane.
 Step by step:
 - a. Click on a pump in the My Pumps under Element Searches in the Browser pane
 - b. Select Tools>Options from the menu. Enter 100 for the Maximum Query Size.



c. The following dialog opens to inform you that you will need to perform a **Refresh** to see the changes. Click the **OK** button or press the **Enter** key.

Collection	n Sort Limit			
Chang	ing the 'Results pe	r Page' requires a n	nanual refresh before chan	iges will appear in the controls.
				OK

d. Press the **F5** key to refresh the **Viewing** pane. The view now shows only 100 pumps, but you can navigate to the next 100 pumps by clicking the number **2** under the header, etc.

er.												
	Name	Description A			Area				_			
Fa	acility1 Elements (1	2	3	4	<u>5</u>	<u>6</u>	Z	<u>8</u>	9	<u>10</u>	11
Ð	🔊 P-101				F	rea4	111	777	7777	77	777	111
•	🔊 P-101				F	rea3						
	🔊 P-101				F	rea2						
	🔊 P-101				F	rea1						
	🔊 P-102				F	rea4						
Ŧ	🗊 P-102				F	rea3						
•	🗊 P-102				F	rea2						
•	🔊 P-102				F	rea1						
Ð	🔊 P-103				F	rea4						
	🔊 P-103				F	rea3						
	🗊 P-103				F	rea2						
	🔊 P-103				1	rea1						
	🔊 P-104				F	rea4						
•	🔊 P-104				F	rea3						

- 2. Select a pump and change the time context settings to show the values for the three Flow Attributes (Flow Average, Flow at Start, and Flow at End) in the Time Range context. Step by step:
 - a. Click on a pump in the My Pumps under Element Searches in the Browser pane
 - b. Click on the **Attribute** tab in the **Attribute Viewing** pane. You will see that the three Attributes **Flow Average**, **Flow at Start**, and **Flow at End** all have the same value.

Fiter					
	: 🛚 🗢 🦧 Name		→ Value	Time Stamp	
	🖻 Ca	itegory: <none></none>			
		💷 Area	Area4	1/1/1970 12:00:00 AM	
	Ð	🞺 Flow at End	56.9729614	2/21/2015 9:05:42 AM	
		🍼 Flow at Start	56.9729614	2/21/2015 9:05:42 AM	
		Flow Average	56.9729614	2/21/2015 9:05:42 AM	

c. Select **Tools>Options** from the menu. Then select the **Time Context** tab. Then click the **Time Range** radio button and enter *-1h for the **Start** and * for the **End** fields. Click the **OK** button.

Options		
General Time Context Se	er Options	
Show attribute values us	g the specified time or time ra	ange.
C Query Date Time:	Currently: Latest Available	<u> </u>
C Alternative Time:	*	<u> </u>
Time Range: Start:	*-1h	
End:	*	<u> </u>
	Se	et as Default Restore Default

d. Note that the Title Bar now shows the time context.

trator)
trator
LIGLUIJ
l

e. The Attribute Viewing pane shows that the three Attributes Flow Average, Flow at Start, and Flow at End now have different values.

Gei	neral C	hild Elements Attributes	Ports Analyses Ve	ersion	
ER	ér				Q
	: 00 0	& Name		Time Stamp	0
	Ca	itegory: <none></none>			
		🗉 Area	Area4	1/1/1970 12:00:00 AM	
		🛷 Flow at End	57.1845474.	2/21/2015 9:15:28.75	AM
	8	ኞ Flow at Start	53.4455757	. 2/21/2015 8:15:28.754	4 AM
	M	Flow Average	59.5294928.	2/21/2015 9:15:28.754	1 AM

Security – Propagating Settings from Parent Elements to Child Elements

Change the security settings for the **World** Identity for the **Facility1** Element and propagate these settings to all the child Elements.

Step by step:

a. If you are not in the **Element** view press **Ctrl+1** key combination. Right click the **Facility1** Element and select **Security** from the right click menu.

	TC Security Co	nfiguration							
Database 🛗 Query Date 👻 🤇	Items to Co	nfigure:							
ements	Item	Item Security String							
Hements Image: Construction of the second	Par 🗇 Far	ality1 Administrators:A(r,w,rd,wd,d,	(,a,s,so) World:A(r,rd) NT AUTHOR	ITY'NETWORK SERVICE:A(r,w,					
		1							
⊡ 🗇 Facility2 ⊡ 😭 ParentTemplate	Lil	1							
Element Searches	Identities:	Add Remove	Permissions for Administra						
	Name Sa Adminis	abratara	Permission	Allow Deny					
	S World	su ators	All						
		HORITY WETWORK SERVICE	Read						
			Write	의 진 					
			Read/Write						
			Read Data						
			Write Data						
			Read/Write Data						
Elements			Delete						
Event Frames			Admin						
Library	Child Perm	nissions							
	- C Do not	modify child permissions)						
Unit of Measure	and a second second second	child permissions for modified identiti	ar						
MyPI	and the second	and the second second second second							
Notifications	Replac	e child permissions for all identities							
Contacts	<u> </u>		ОК	Cancel Apply					
Model Analyses	-								

b. Select the **World** Identity and then click the **Allow** check box for **All** in the **Permissions**. Then click the radio button for **Replace child permissions for all identities** under the **Child Permissions**. Then click the **OK** button.

tem Security String			
Facility1 Administrators:A(r,w,rc	,wd,d,x,a,s,so) World:A(r,rd) NT AUTHOR	ITYWETWORK S	ERVICE:A(r,v
entities: Add Remove	Permissions for World:		
ame Administrators	All	Attow	Deny
World	Read	V	6
SNT AUTHORITY WETWORK SERVICE	Write		
	Read/Write	2	
	Read Data		
	Write Data	1	
	Read/Write Data	V	
	Delete	1	
	Admin		
	9.		
Child Permissions			
Do not modify child permissions			
Update child permissions for modified	identities		
	ties		

c. Select one of the child Elements of **Facility1** and right click it and select **Security**. Select the **World** identity and see that the permissions have been set to the same settings as the **Facility1** Element.

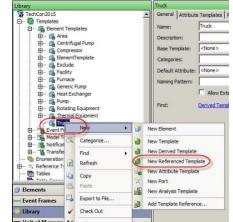
🕽 Database 🛗 Query Date 🔹 🕓 🚱 🔇	Bac Security Configural							
Elements	Items to Configure:							
🖶 Elements	Item	Item Security String						
B - G < <pre>chore></pre> B - G <pre>chore></pre> C <pre>chore></pre> B - G <pre>chore></pre> C <pre></pre> C <pre>chore></pre> C <pre>chore><td>Rotating Ed</td><td>jupment Administrators:A(r</td><td>,w,rd,wd,d,x,a,s,so) World:A(r,w,rd,</td><td>wd,d,x,a,s,so)</td><td>INT AUTHORIT</td></pre>	Rotating Ed	jupment Administrators:A(r	,w,rd,wd,d,x,a,s,so) World:A(r,w,rd,	wd,d,x,a,s,so)	INT AUTHORIT			
	Identities: Add	d Remove	Permissions for World:					
C, Element Searches	Name Administrators		Permission	Allow	Deny			
	World		Read	<u>।</u> ज				
	MT AUTHORITY	WETWORK SERVICE	Write					
			Read/Write	- 				
			Read Data	2				
			Write Data		Ē			
	_		Read/Write Data					
Elements			Delete					
Event Frames			Admin					
Library	Child Permissions		1		1			
	C Do not modify	child parmissians						
Unit of Measure								
		umining for modified identi-	tion					
Unit of Measure MyPI Notifications	C Update child pe	ermissions for modified identi ermissions for all identities	ties					

Template references

Create a Template for a truck, call it **Truck**, and then create a Referenced Template for **Truck** and call it **Engine**. Create a new Element based on the **Truck** Template and a child-Element based on the **Engine** Template.

Step by step:

- a. If you are not in the Library view press Ctrl+3 key combination
- b. Right-click the **Element Templates** and select **New Template**. Press the **F2** key and type **Truck**.
- c. Right-click Truck in the Browser pane and select New>New Referenced Template



d. Type in **Engine** in the Name field. Leave the **Edit reference type** check box unchecked. You can always edit this later. Click the **OK** button.

-			nplate Nai			
Name: E	Engine					1
-	-	1				
Editro	eference t	ype				
			9	OK	Cancel	-1
				UK	Cancel	

Expand the Reference Types in the Browser pane and you will see a new reference type Truck-Engine. To edit the properties just select it and make changes in the Attribute Viewing pane. To see which Templates are referenced right-click the Element Templates in the Browser pane and select Arrange By>Arrange By Template References.

library	100				
Centrifugal Pump G Compressor	A Li	brary			Element Templates
ElementTemplate Generation		TechCon2015		-	
🖽 🚮 Facility	E	🗄 🗤 📅 Templates	Templates		Filter
i⊞ 🚮 Furnace i⊞ 🚮 Generic Pump			New Template		Name
🕀 🖓 Heat Exchanger		⊕- 6 3, ⊕- 6 3,	Categorize		🔂 Area
🖶 🛁 Rotating Equipment			Arrange By	Arran	nge By Name
🖻 🚮 Truck			Refresh	Arra	nge By Category
Event Frame Templates Model Templates			Paste	Arra	nge By Template Inheritance
Notification Templates Transfer Templates		<u><u><u></u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u></u>	Turnet Care Pla	Arrar	nge By Template References
Enumeration Sets			Import from File		LE CADOOC
Reference Types		i i i i i i i i i i i i i i i i i i i	Export to File		🔂 Facility
Composition Parent-Child		i i i i i i i i i i i i i i i i i i i	Delete All		🔂 Furnace
		Ö 🕻 🍙	Security		Generic Pump
	<u> </u>		Security		- Heat Exchanger

f. Press the **Ctrl+1** key combination to go to the **Elements** view. Right-click **Elements** in the **Browser** pane and select **Truck** as the Template.

Elements	11	2
B→ C <none> B→ C <none> B→ C Exclude B→ C Facility</none></none>	Parent: TechCon2015 Add child element using the reference type:	
🚉 Element Searches 🕮 🚉 My Pumps	↔ Parent-Child	
	Element Template:	
	G Engine G Exclude	-
	Geracity Germace	
	Generic Pump	
	Generat Exchanger	
	Rotating Equipment	
	Cathernal Ecupment	-
		Cancel
Elements		Cances

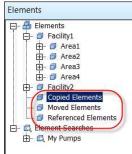
g. Right-click the newly created Element Truck1 and select New>New Child Element. Note that by default the Truck-Engine reference type is selected and only the Engine Template is shown.

Elements Gr 🎒 Elements	Truck1 General Child Elements Attributes Ports Anal	yst
H G Hore> H G Hore> H G Holde H G Holde H G Hore H G HORE	Choose Element Translet Parent: Truckt: Add dial determine therefore type: Choose Element Translet Add dial determine therefore type: Choose Element Translet Choose	H Q
Elements	OK Cancel	

Copying, moving, creating references, and arrange elements

Elements can be referenced, copied, or moved using the mouse by dragging and dropping. By using the **Ctrl** or the **Shift** key you can control the behavior of the drag and drop result.

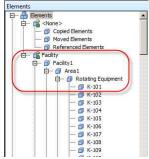
- Add three new Elements and name them Copied Elements, Moved Elements, and Referenced Elements based on no Template. You are going to use these to be parents for copied, moved, and referenced child-Elements, respectively. Arrange the Elements view to be by Template. Copy a furnace Element as a child-Element to Copied Elements, move a furnace Element as a child-Element to Moved Elements, reference a furnace Element as a child-Element to Referenced Elements. Step by step:
 - a. If you are not in the Elements view press Ctrl+1 key combination
 - b. Right click the Fements in the Browser pane and select New Element (select <None> as the Template). Rename the new Element by selecting it, pressing the F2 key, and type Copied Elements. Create two more Elements in the same way and rename them to Moved Elements and Referenced Elements, respectively.



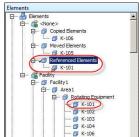
c. Select the **Elements** in the **Browser** then right click it. Select **Arrange By>Arrange By Template**.

Elements		Ele	ments			
	10 10 10 10 10 10 10 10 10 10 10 10 10 1	New Element New Model Add Element Reference				Description
	5 2 A	Create or Update Data Refere Reevaluate Naming Pattern Categorize	nce	pied I sility1 sility2		
	Arrange By Refresh	۱.			ge By Name	
		Refresh				ge By Category
		Paste Paste Reference	(-	Arran	ge By Template

d. Expand the tree in the **Browser** pane to show the Elements under **<None>** and the compressor Elements under **Facility>Facility1>Area1>Rotating Equipment**



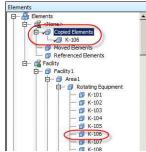
e. Drag a compressor under the **Rotating Equipment** Element to the **Referenced Elements** Element. Select **Weak Reference** in when the **Choose Reference Type** dialog pops up. This now makes a reference to the compressor Element, but the two Elements are



identical. Note that the mouse icon changes to when you hover over the destination Element.

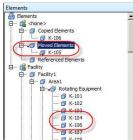
f. Hold down the **Ctrl** key and drag a compressor under the **Rotating Equipment** Element to the **Copied Elements** Element. This now makes a copy of that compressor and the

two Elements are now different. Note that the mouse icon changes to 🗄 when you hover over the destination Element.



g. Hold down the **Shift** key and drag a compressor under the **Rotating Equipment** Element to the **Moved Elements** Element. This now moves that compressor from one location to

the other. Note that the mouse icon changes to be when you hover over the destination Element.



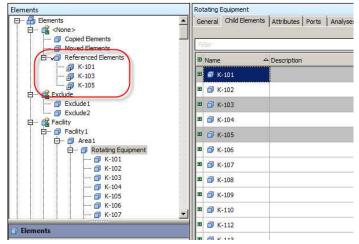
2. A little known feature, you can reference, copy, or move several Elements at one time.

Step by step:

Expand the tree in the Browser pane to show the Elements under <None> and the compressor Elements under Facility>Facility1>Area1>Rotating Equipment . Select Rotating Equipment and then click the Child Elements tab in the Attribute Viewing pane. Select three compressors by holding down the Ctrl key and clicking on them one by one.

Elements	Rotating Equipment
Elements Elements G Chone > G Opied Elements G Moved Elements	General Child Elements Attributes Ports Analyses Version
🔤 🗇 Referenced Elements	Im Name A Description Im Im K-101
Exclude 1 Exclude 2 Facility	a → K-101
id ☐ Facility1 id ☐ Area1 id ☐ Rotating Equipment	■ 🗇 K-103 ■ 🗇 K-104
K-101	
🗊 K-103 🗊 K-104 🗊 K-105	■ 🗇 K-107
- 🗇 K-106 - 🎯 K-107	■ 🗊 K-108
🕤 K-108 🗊 K-109 🗊 K-110	■ 🗊 K-109 ■ 🗊 K-110
Elements	K-112

b. To move the selected Elements click on the **I** symbol next to one of the selected compressors and drag over to the **Referenced Elements.** Select **Weak Reference** in when the **Choose Reference Type** dialog pops up. All the selected Elements are now referenced.



Template inheritance

Approach: Create a Template for a pump (call it **Generic Pump**) and then create another Template for a centrifugal pump call it (**Centrifugal Pump**). Assign the **Centrifugal Pump** Template to inherit from the **Generic Pump** Template. Add Attributes **Suction Pressure** and **Discharge Pressure** to the **Generic Pump** Template, and **Motor Revolutions** to the **Centrifugal Pump** Template.

Step by step:

- a. If you are not in the Library view press the Ctrl+3 key combination
- b. Right-click the **Element Templates** and select **New Template**. Press the **F2** key and type **Generic Pump**.

Library	Generic Pump
TechCon2015 □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □	General Attribute Templates, Ports Analysis Templates Name: Description: Base Template: Categories: Categories: Default Attribute: Output: Naming Pattern:
Carl Pump Carl Rotating Equipment Carl Retaring Equipment Carl Generic Pump Carl Retaring Pump Carl Retaring Pump Carl Retaring Pump	Alow Extensions Extended Propertie Find: Derived Templates Elements Derived Elements Derived Elements

c. Click on the Attribute Templates tab in the Attribute Viewing pane. Click the New Attribute Template and rename (highlight the Attribute and then press the F2 key) it to Discharge Pressure. Right-click anywhere on the white space and select New Attribute Template. Rename the new Attribute to Suction Pressure.

Generic Pr	ump	
General	Attribute Templates Ports	Analysis Templates
Eller	- 9 ₆	
0	i 🕈 🖗 Name	△ Default Valu
12 23	Category: <none></none>	
	Discharge Pressure	0
1	Suction Pressure	0
	C	

d. Right-click the **Element Templates** and select **New Template**. Press the **F2** key and type **Centrifugal Pump**. It the **Attribute Viewing** pane click the **Base Template** combo box and select **Generic Pump**.

ibrary	Centrifugal Pump	
TechCon2015	General Attribute Templates Ports Ana	alysis Templates
E- E- E- E-	Name: Centrifugal Pumo	
🕀 - 🚳 Area 🕀 - 🍓 Compressor	Description: Base Template:) <none></none>	• Ti
B - G ElementTemplate ⊕ - G Exclude ⊕ - G Facility ⊕ - G Funace	Categories: Default Attribute: EmontTemplate	
⊕- ∰ Generic Pump ⊕- ∰ Heat Exchanger ⊕- ∰ Rotating Equipment	Naming Pattern: Exclude Facility	
Themal Externet	Find: Plant Exclosing Pump Rotating Equipment Thermal Equipment	
Model Templates Model Templates		

e. Click on the **Attribute Templates** tab in the **Attribute Viewing** pane. Click the **New Attribute Template** and rename (highlight the Attribute and then press the F2 key) it to **Motor Revolutions**.

General Attribute Templates Ports	Analysis Templates
Film	
1 ♦ R Name	
Category: <tione></tione>	
Motor Revolution	-

f. Arrange the Templates in the **Browser** pane by right clicking on the **Element Templates** and selecting **Arrange By>Arrange By Template Inheritance**. You now see the **Centrifugal Pump** under the **Generic Pump**.

Library	Element Templates
TechCon2015 Templates Grave and a constraint of the second	Riter
G El Arrange By	Arrange By Name Arrange By Category
	Arrange By Template Inheritance
Import from File	Arrange By Template References
Delete All	- G Furnace
- G R Security	Generic Pump
G Centrifugal Pump	Heat Exchanger

g. Press the **Ctrl+1** key combination to go to the **Elements** view. Right-click the **Elements** in the **Browser** pane and select **New Element** and the Element Template as **Centrifugal Pump**.

Choose Element	Template	×
Parent: TechCon20	115	
Add child element usir	ng the reference type:	
→ Parent-Child		
l		
Element Template:		
<none></none>		^
Centrifugal Pump		
Compressor		
ElementTemplate	2	
Exclude		
Facility		

h. Select the **Centrifugal Pump1** Element you just create and click on the **Attribute** tab in the **Attribute Viewing** pane. Click the **Group by Template** check box in the upper right corner. You can see the three Attributes grouped by the Templates they were created in

Elements	Centrifugal Pump 1						
다. 🖶 Bements 마. @ <none></none>	General Child Elements Attributes Ports Analyses Version		Group by: Categor				
Centrifugal Pump	Piter p ·	Name:	Discharge Pressure				
B- & Exclude	1. m. d. Rame O. Value O.	Description:					
Facility Genent Searches	🕞 📑 Template: Generic Pump	Properties:	<none></none>				
😐 🕰 My Pumps	🗐 🖬 Discharge Pressure	Categories:					
	E El Suction Pressure 0	Default UOM:	<none></none>				
	🖯 🔂 Template: Centrifugal Pump	Value Type:	Double				
	B El Motor Revolutions 0	Valuer	0				
		Data Reference:	<none></none>				

PI Builder

Moving Digital States to Enumeration Sets

Create Enumeration Sets in PI AF from the Digital States you have created in the PI Archive.

Step by step:

a. Create a new workbook. In the ribbon click the down arrow under the **PI Points** and select **Find Digital States**.

Data Server: Asset Server: Database:			Publish Del	ete (x) Select () Desel Reset		Pl Points Library Element	Event Refresh
Con	nections	~	1.6	Build	r,	<u>All PI Points</u> <u>Eind PI Points</u>	G
A	В		D D	E	F	All Digital States	1

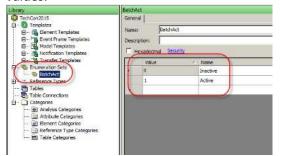
b. Select **BatchAct** and click the **OK** button.

Type:	×	Ass	a Server: 🔞 C et Server: 🧐 C abase: 🙆 T		Publis	sh Delete	(x) Select All () Deselect Reset to	All	PI Points	Library E
Same			Connec	tions		В	uild	5		Re
BatchAct		A	1 *	: X	V.	f _x Sele	ected(x)			
LMF_Status	2	12	A	В	C /	0		E		F
C Modes		1	Selected(x)	Parent	Name	ObjectTy	pe Enu	meration	/alue	
In NEAF_Status		2	x		BatchAct	DigitalSta	teSet			
Dperation Mode		3	x	BatchAct	Inactive	DigitalSta	te		0	
		4	x	BatchAct	Active	DigitalSta	te		1	
OK Cancel		5			1	_				
		6								

c. Under the **ObjectType** property change the **DigitalStateSet** to **EnumerationSet**, and **DigitalState** to **EnumerationValue**.



- d. Click the in the ribbon, then click the **OK** button on the next dialog, and the **Close** button on the last dialog that pops up.
- e. Open the **PI System Explorer** if it is not already open, and press the **Ctrl+3** key combination to navigate to the **Library** view. Expand the **Enumeration Sets** in the **Browser** pane and you will see the **BatchAct** Enumeration Set and the Enumeration values.



Renaming elements

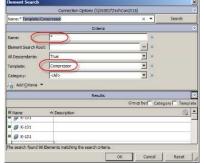
Rename the compressor Elements by appending **Compressor-** in front of the original names.

Step by step:

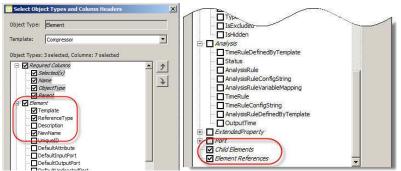
a. Create a new workbook. In the ribbon click the down arrow under the **Elements** and select **Find Elements**.



b. In the **Name** field type ***** and select **Compressor** in the **Template** combo box. Click the **Search** button.



c. Click the **OK** button. In the **Select Object Types and Column Headers** dialog, make sure that only the options shown in the Figures below are selected. Then click the **OK** button.



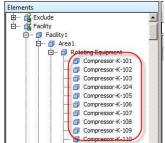
d. All the compressors are listed in the workbook. Go cell J2 and type in =E2&"-"&B2 (You are concatenating the column Template with column Name, so change the column reference in the =E2&"-"&B2 to the one corresponding in your sheet. Then copy this cell in column J for all the compressors.

4	A	B	C	D	E	(F	5	H.	T	1	- K.
1	Selected(x)	Name	ObjectType	Parent	Template	ReferenceType	NewName				
2	x	K-101	Element	Facility2\Area1\Rotating Equipment	Compressor	Parent-Child				Compres	Fr K 101
3	x	K-101	Element	Facility1\Area4\RotatingEquipment	Compressor	Parent-Child				Compres	sor-K-101
4	x	K-101	Element	Facility1\Area3\Rotating Equipment	Compressor	Parent-Child				Compres	sor-K-101
5	x	K-101	Element	Facility1\Area2\Rotating Equipment	Compressor	Parent-Child				Compres	sor-K-101
6	x	K-101	Element	Facility1\Area1\Rotating Equipment	Compressor	Parent-Child				Compres	sor-K-101
7	x	K-102	Element	Facility2\Area1\Rotating Equipment	Compressor	Parent-Child				Compres	sor-K-102
8	x	K-102	Element	Facility1\Area4\Rotating Equipment	Compressor	Parent-Child				Compres	sor-K-102
	x	K-102	Element	Facility1\Area3\Rotating Equipment	Compressor	Parent-Child				Compres	sor-K-102
10	x	K-102	Element	Facility1\Area2\Rotating Equipment	Compressor	Parent-Child				Compres	sor-K-102
11	x	K-102	Element	Facility1\Area1\Rotating Equipment	Compressor	Parent-Child				Compres	SOF K 102
12	x	8-103	Element	Facility2\Area1\Rotating Equipment	Compressor	Parent-Child				Compres	sor-K-103
15	x	K-103	Element	Facility1\Area4\Rotating Equipment	Compressor	Parent-Child				Compres	sor-K-103
14	x	K-103	Element	Facility1\Area3\RotatingEquipment	Compressor	Parent-Child				Compres	sor-K-103
15	×	K-103	Element	Facility1\Area2\Rotating Equipment	Compressor	Parent-Child				Compres	sor-K-103
16	x	K-100	Element	Facility1\Area1\Rotating Equipment	Compressor	Parent-Child				Compres	sor-K-103
17	x	K-104	Element	Facility2\Area1\Rotating Equipment	Compressor	Parent-Child				Compres	sor-K-104

e. Then copy the cells from J2 to the last compressor in column J. Click in cell G2 and Paste Special as Values.

G2	2 2		A Y	fx Compressor-K-101				
4	A	6	c	D	E	Ŧ	G H	Г J К
1	Selected(x)	Name	ObjectType	Parent	Template	ReferenceType	NewName	
2	6	K-101	Element	Facility2\Area1\Rotating Equipment	Compressor	Parent-Child	Compresso - K-101	Compressor K-101
3	¢.	K-101	Element	Facility1\Area4\Rotating Equipment	Compressor	Parent-Child	Compressor-K-101	Compressor-K-101
4	¢	K-101	Element	Facility1\Area3\Rotating Equipment	Compressor	Parent-Child	Compressor-K-101	Compressor-K-101
5 :	x'	K-101	Element	Facility1\Area2\Rotating Equipment	Compressor	Parent-Child	Compressor-K-101	Compressor-K-101
6	¢.	K-101	Element	Facility1\Area1\Rotating Equipment	Compressor	Parent-Child	Compressor-K-101	Compressor-K-101
7 :	¢.	K-102	Element	Facility2\Area1\Rotating Equipment	Compressor	Parent-Child	Compressor-K-102	Compressor-K-102
8	ς	K-102	Element	Facility1\Area4\Rotating Equipment	Compressor	Parent-Child	Compressor-K-102	Compressor-K-102
9	ĸ	K-102	Element	Facility1\Area3\Rotating Equipment	Compressor	Parent-Child	Compressor-K-102	Compressor-K-102
0	κ.	K-102	Element	Facility1\Area2\Rotating Equipment	Compressor	Parent-Child	Compressor-K-102	Compressor-K-102
1	¢	K-102	Element	Facility1\Area1\Rotating Equipment	Compressor	Parent-Child	Compressor-K-102	Compressor-K-102
2	K.	K-103	Element	Facility2\Area1\Rotating Equipment	Compressor	Parent-Child	Compressor-K-103	Compressor-K-103
3	e	K-103	Element	Facility1\Area4\Rotating Equipment	Compressor	Parent-Child	Compressor-K-103	Compressor-K-109
4	¢	K-103	Element	Facility1\Area3\Rotating Equipment	Compressor	Parent-Child	Compressor-K-103	Compressor K-103
5	é .	K-103	Element	Facility2\Area2\Rotating Equipment	Compressor	Parent-Child	Compressor-K-303	Compressor-K-103
6 :	κ.	K-103	Element	Facility1\Area1\Rotating Equipment	Compressor	Parent-Child	Compressor-K-303	Compressor-K-103
7	e i	K-104	Element	Facility2\Area1\Rotating Equipment	Compressor	Parent-Child	Compressor-K-104	Compressor-K-104
8	0	K-104	Element	Facility1\Area3\Rotating Equipment	Compressor	Parent-Child	Compressor-K-104	Compressor-K-104
9	x	K-104	Element	Facility1\Area2\Rotating Equipment	Compressor	Parent-Child	Compressor-K-104	Compressor-K-104
10	6	K-104	Element	Facility1\Area1\Rotating Equipment	Compressor	Parent-Child	Compressor-K-104	Compressor-K-104
1	κ.	K-105	Element	Facility2\Area1\Rotating Equipment	Compressor	Parent-Child	Compressor-K-105	Compressor-K-105
12	¢.	K-105	Element	Facilitv1\Area3\Rotating Equipment	Compressor	Parent-Child	Compressor-K-105	Compressor-K-105

f. Then click the solution in the ribbon. Click **OK** and **Close** on the next two dialogs that pop up. Open the **PI System Explorer**, press the **Ctrl+1** key combination. Navigate to any compressor in the **Browser** pane. All the compressors are now renamed (magic).



Traits

Load the traits for the **Thermocouple** Template into **PI Builder** and modify the names from **Maximum** to **Max** and **Minimum** to **Min**. If these do not exist then perform the **Attribute Traits** exercise earlier in this document to create these traits first.

Step by step:



a. Create a new workbook in Excel. In the ribbon click the down arrow under the Library symbol and select **Find Template**. Select the **Thermocouple** Template and click **OK**.

Riter		Q	•
Name	Category	ту⊚	
Operation		Ev	
🔂 PI Server		Ele	
🔂 Pump		Ele	
Rotating Equipment		Ele	
🕞 Thermal Equipment		Ele	
🛱 Thermocouple		Ele	
			-

b. In the next window, that pops up first click the **Clear All** button. Then click the check boxes for **Trait** and **Default Value** under *Attribute Template*. Then click **OK**.

oject Type:	ElementTemplat	e		
mplate:	Thermocouple			-
	: 2 selected, Colu	many Exclusion		
averal negotieres		nins: o selected	Trees of the	- 1
	ired Columns elected(x)		4.	5
			2	51
	bjectType			*
	arent			
	uteTemplate			
_Πτ				
	efaultValue			
	efaultUOM			
D	ataReference			
	onfigString			
- D T	ypeQualifier			
	ConfigurationIten	1		
🗖 Is	Indexed			
	ewParent			
- 🗖 Is	Hidden			
	Excluded			
	ManualDataEntry			
	entTemplate		3	
	sisTemplate			
	ute Columns			
± Exter	ndedProperty		<u> </u>	
Clear All	Select All	More Attribute	e Columns	
Contracting Contraction	1			
scription:				

c. All Attributes that have Traits and the Trait Attributes are brought into the worksheet.

24	A	В	C	D	E	F
1	Selected(x)	Name	ObjectType	Parent /	AttributeTrait	AttributeDefaultValue
2	x	Thermocouple	ElementTemplate			
3	x	Temperature	AttributeTemplate	Thermocouple		0
4	x	Temperature Maximum	AttributeTemplate	Thermocouple	Maximum	150
5	x	Temperature Minimum	AttributeTemplate	Thermocouple	Minimum	50
6				0.0		

d. Change the names in **Column B** to the ones as shown below.

2	A	B	C	D	E	F
1	Selected(x)	Name	ObjectType	Parent	AttributeTrait	AttributeDefaultValue
2	x	Thermocouple	ElementTemplate			
3	x	Temperature	AttributeTemplate	Thermocouple		0
4	x	Temperature Max	AttributeTemplate	Thermocouple	Maximum	150
5	x	Temperature Min	AttributeTemplate	Thermocouple	Minimum	50
6						
7						

e. Click the **Publish** button in the **Ribbon** and then **OK** in the dialog that pops up. Switch to the **PSE**, navigate to the **Library** and select the **Thermocouple** Element Template. In the **Viewing Pane**, click on the **Attribute Templates** tab. Click on the **Ξ** next to the **Temperature** Attribute to display the Child-Attributes. Notice that we now have four Child-Attributes. **Max** and **Min** are now the **Limits**, and the **Maximum** and **Minimum** are now just Child-Attributes. You can delete the latter two. You can also take existing Child-Attributes and convert them to **Limits** or **Forecasts** using **PI Builder** by just entering one of the following (**Minimum**, **LoLo**, **Lo**, **Target**, **Hi**, **HiHi**, **Maximum**) in the **AttributeTrait** column.

e.						Q
0	i 🗢 🦧 Name			△ Default Value	:	6
0	Category: <	None>				
	1 1	emperature		0 deg F		
		Max		150 deg F	>	
		Maximum		150		
		Min		50 deg F		
		Minimum		2021		
mi		(MICHINGAN)		50		
efre mpe	ts esh erature				12000	
efre mpe	ts esh erature Trait	Attribute	Value	Data Reference	Settings	
efre mpe	ts esh erature		Value 50 deg F		Settings	
efre mpe	ts esh erature Trait	Attribute	and the second s	Data Reference	Settings	
efre mpe	ts esh erature Trait Minimum	Attribute Min	50 deg F	Data Reference	Settings	
efre mpe	ts esh Trait Minimum LoLo	Attribute Min LoLo	50 deg F 10	Data Reference <none></none>	Settings	
efre mpe	ts esh Trait Minimum LoLo Lo	Attribute Min LoLo Low Limit	50 deg F 10 50	Data Reference <none> <none> <none></none></none></none>	Settings	
	ts esh Trait Minimum LoLo Lo Target	Attribute Min LoLo Low Limit Target	50 deg F 10 50 50 50	Data Reference <none> <none> <none> <none></none></none></none></none>	Settings	