VisualKPI

Visual KPI AF Integration Server

Prior to the Visual KPI AF Integration Server all Visual KPI metadata (configuration information) was entered manually via the Visual KPI Designer.   This includes everything from Visual KPI object definitions (groups, KPIs, values, trends, tables and links) to custom attributes to contacts and alert templates.   Until now data from the OSIsoft PI System was only used as source data via a PI interface or via an AF interface.   For example, the actual value for a KPI could come from a PI tag via the Visual KPI PI interface or AF attribute data via the Visual KPI AF interface.

The Visual KPI AF Integration server expands the role of the PI System to include this metadata or Visual KPI object definition data.   As OSIsoft PI AF becomes more pervasive within our customer base it seemed only natural to allow PI AF to be the master source of this type of metadata. In fact, defining hierarchies and modeling physical and logical assets was the primary driving force behind the development of PI AF. Now Visual KPI can leverage your existing AF models, automatically turning AF Elements into Visual KPI groups and AF Attributes into KPIs, values, trends, tables and links.

Since we are committed to the success of our customers who use OSIsoft technology, Transpara will continually enhance the Visual KPI AF Integration Server over time to allow more seamless control of our application from within PI AF.

If you have questions about Visual KPI or the content in this document, please contact us at info@transpara.com or call +1-925-218-6983.

How this all works

The Visual KPI AF Integration Server will iterate your AF database.   Each AF Element will become a Visual KPI Group.   Within each AF Element (Visual KPI Group) each of the AF Attributes will be searched through.   By default your AF Attributes will be mapped to a Visual KPI Value.   However, if the AF Attribute name maps to a keyword within the general properties section of the group section those attributes will become properties of the Visual KPI Group.   If the AF Attribute has child attributes and those attribute names map to key words for a KPI, Trend or table they will become the Visual KPI Objects (KPI's, Trends, Table).   All other attributes will become Visual KPI Values.
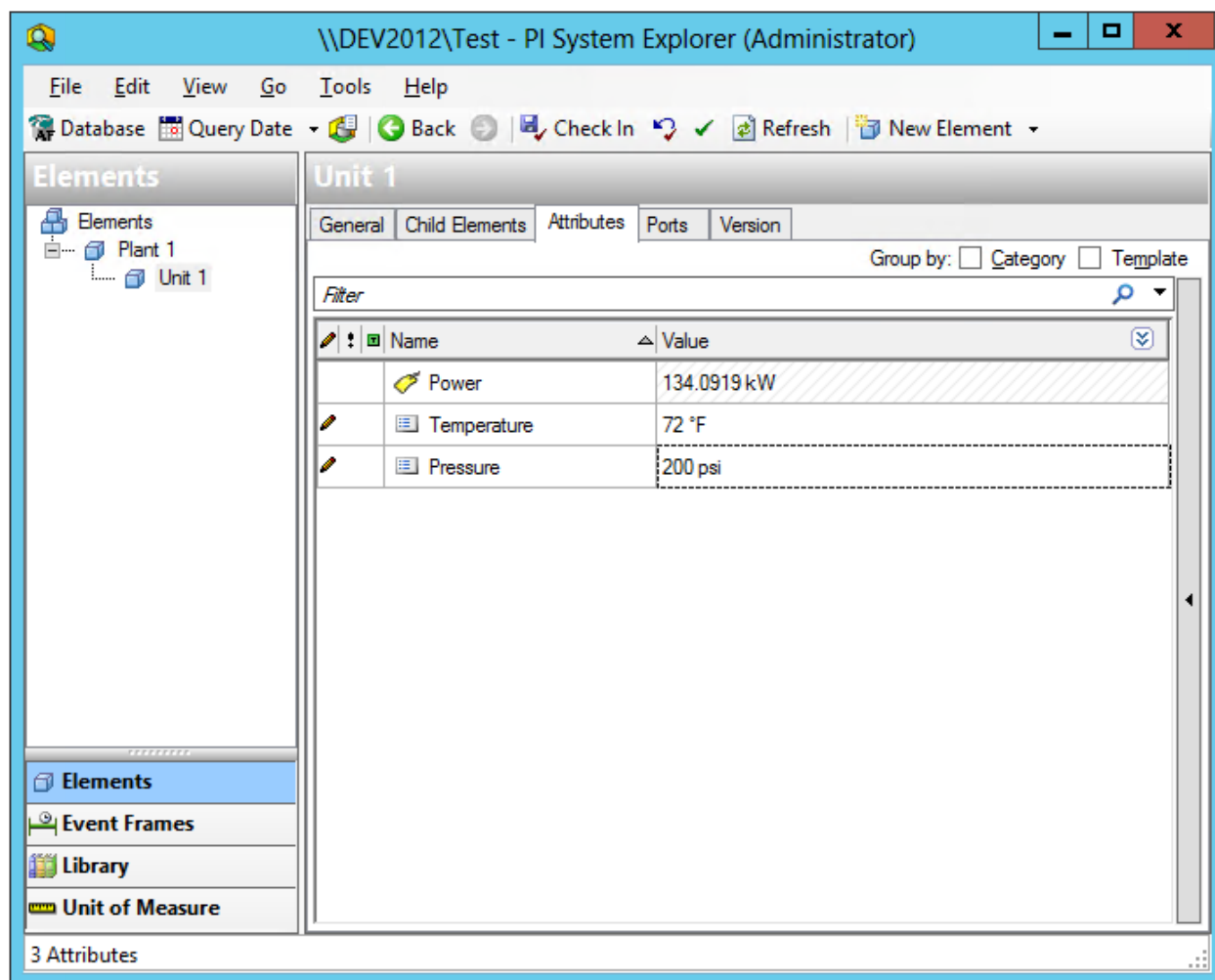
Here is an example showing a very simple AF Model.

Figure 1

By default the AF Integration Server will create 2 Visual KPI Groups (Plant 1 and Unit 1).   The AF Attributes in Unit 1 will become Power, Temperature and Pressure Values in Visual KPI.

If we add specific child attributes to these AF Attributes they will then become KPIs in Visual KPI.
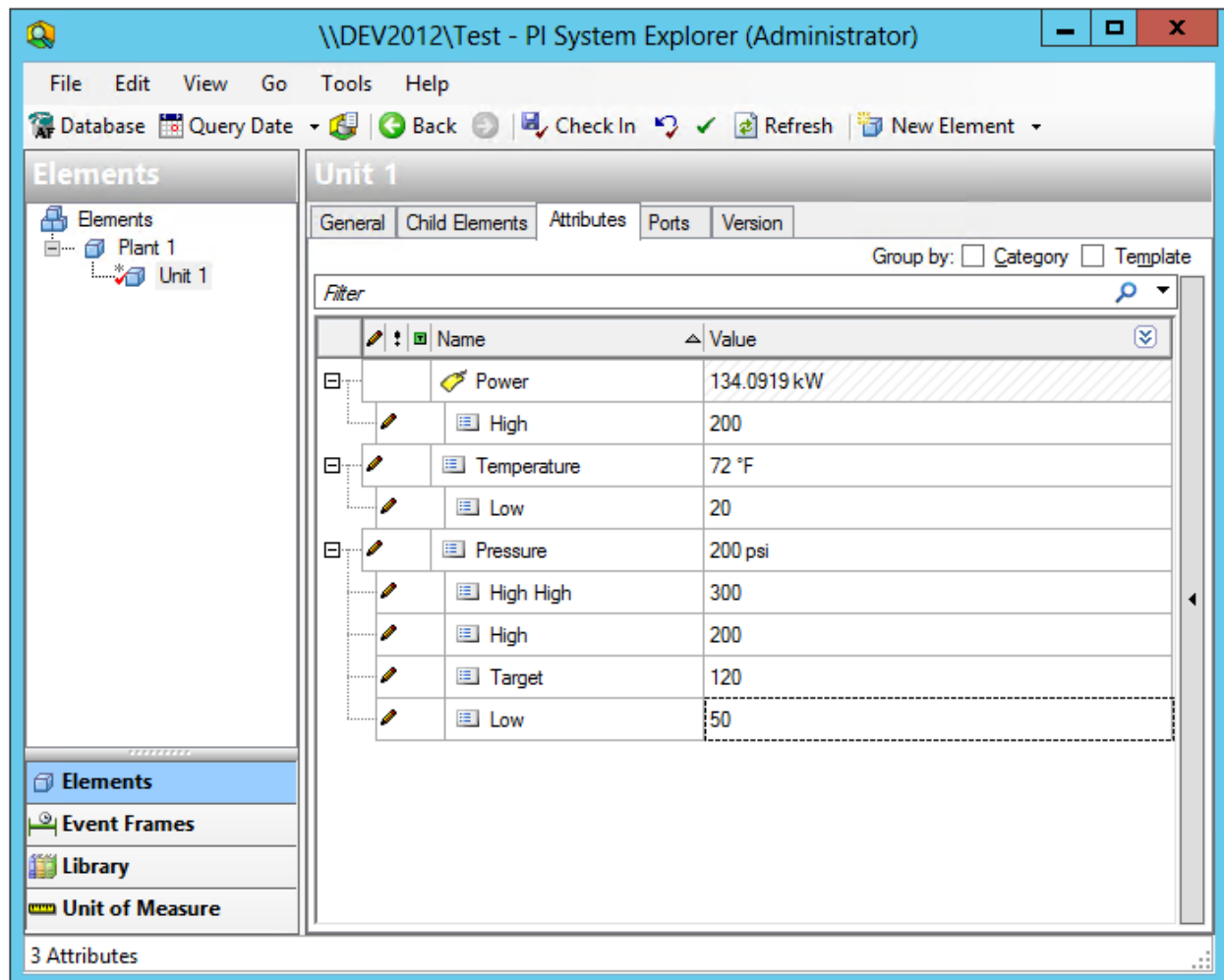Figure 2 illustrates this concept.

Figure 2

Adding Attributes to Unit 1 with names that match key words for Group properties will decorate the Visual KPI Group with more information.   In Figure 3 we have added some Sparkline duration properties.
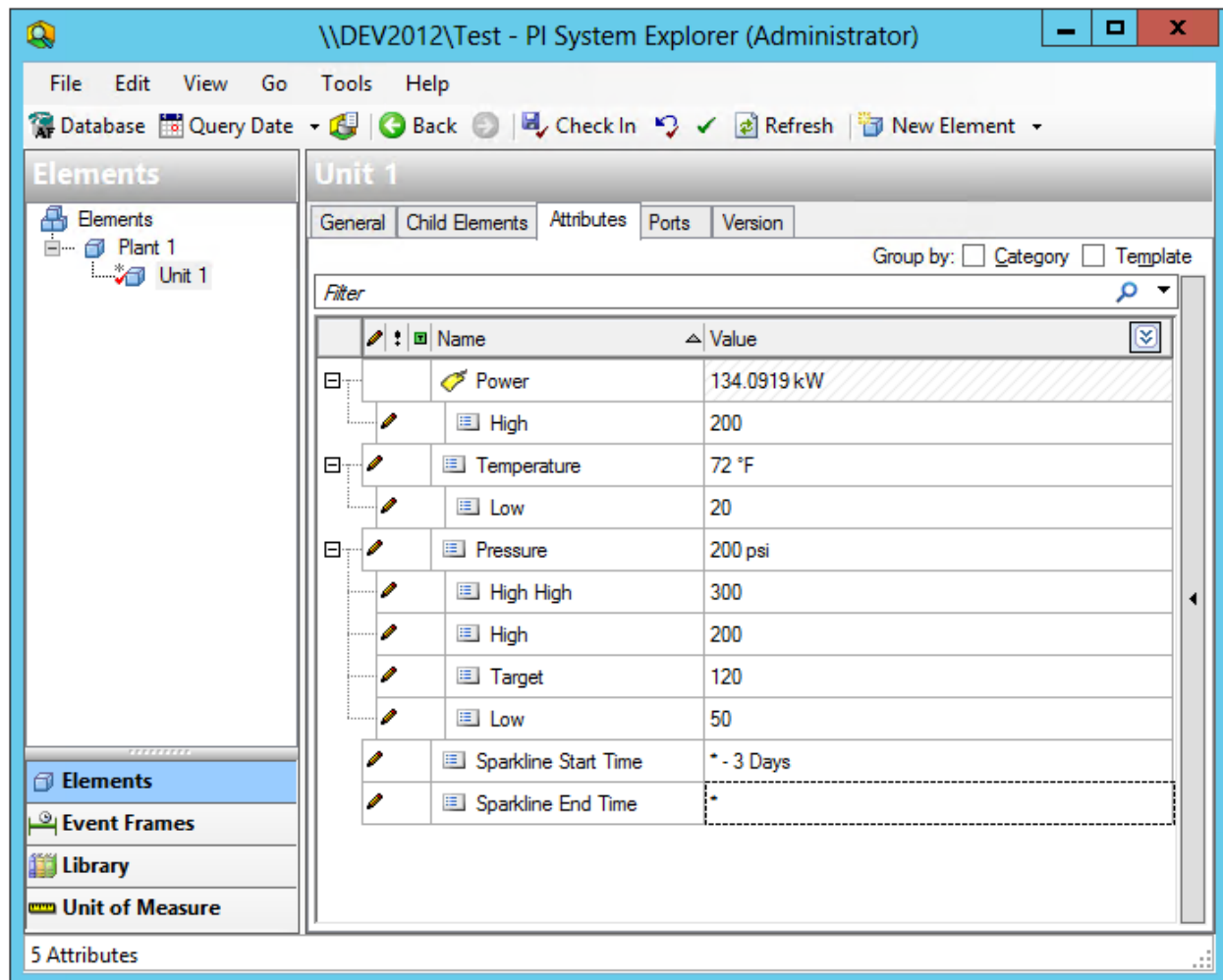

Figure 3

By simply pointing to your existing AF database the Visual KPI AF Integration Server will create Visual KPI Groups and Values with no additional work.   By adding the appropriate attributes and child attributes you can easily create fully decorated Visual KPI Groups, KPIs, Values, Trends, Tables and Links.   Leveraging the power of AF Element Templates can make this very fast and easy.

Visual KPI Properties Attribute

As you build out your AF Model to include Visual KPI keywords you may find that your AF Model becomes quite busy or even cluttered with Attributes that only Visual KPI cares about.   For instance, in the example above it is unlikely that users viewing your AF model will care about attributes such as "Sparkline Start Time".   In order to keep your model as clean as possible you can place all of these keyword attributes under a child attribute with the name "Visual KPI Properties" as seen in figure 4.
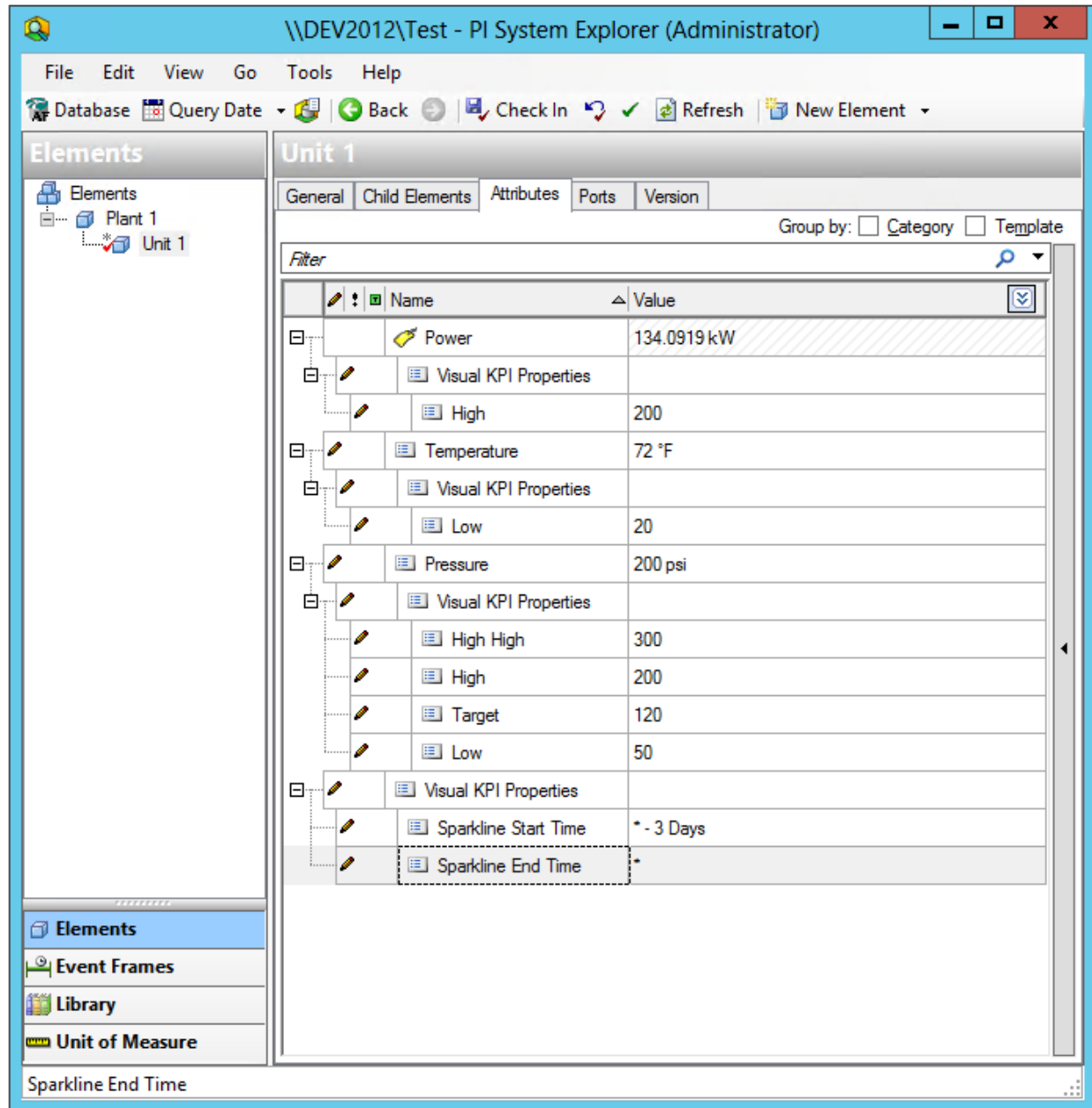

Figure 4

This attribute is not required by default and is meant to be used as a way to tidy up your model.   You can specify just some or all of your attributes as child attributes of the Visual KPI Properties attribute.

The AF Integration Server will first check for this property and read the attributes under it, and secondly check for attributes outside of it.

This attribute can also be used to mark an element or attribute to be ignored by the Visual KPI Integration Server.   In Figure 5 we have added a Level attribute to Unit 1 and set the Visual KPI Properties attribute to False which indicates the AF Integration Server should ignore this attribute and not create it as a Visual KPI Value.

Figure 5

If the Visual KPI Properties attribute is either 0, False, or Omit then the attribute or element will be ignored by Visual KPI.

If the Visual KPI Properties attribute is set to be ignored on an AF Element then the whole group will be ignored along with all the AF Properties and AF Child Elements within it, as shown in Figure 6.
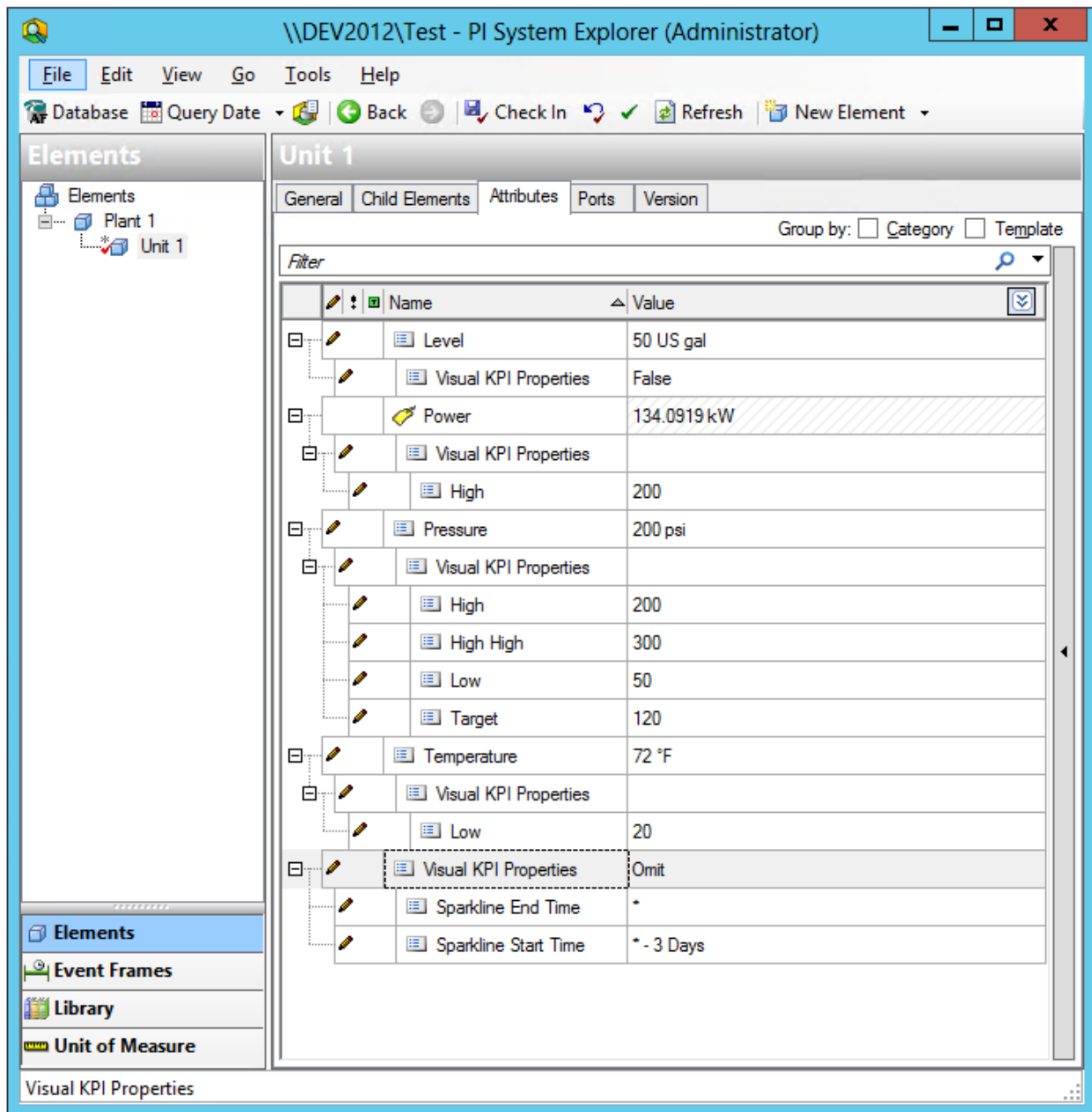
Figure 6

If Unit 1 had child Elements they would also not be processed which allows for entire sections of your AF Model to be ignored.

There is also a setting in the AF Integration Server named 'Require Visual KPI Properties Attributes' shown here in Figure 7.   By default this value is set to false and if set to true will then make this attribute required in order to process the AF Elements and Attributes.   If this value is set to true and the Visual KPI Properties attribute is not found on either an AF Element or an AF Attribute then that AF Element or AF Attribute will not be processed.   This functionality toggles the logic requiring the Visual KPI Properties attribute to act as an "Opt In" rather than the default "Opt Out".
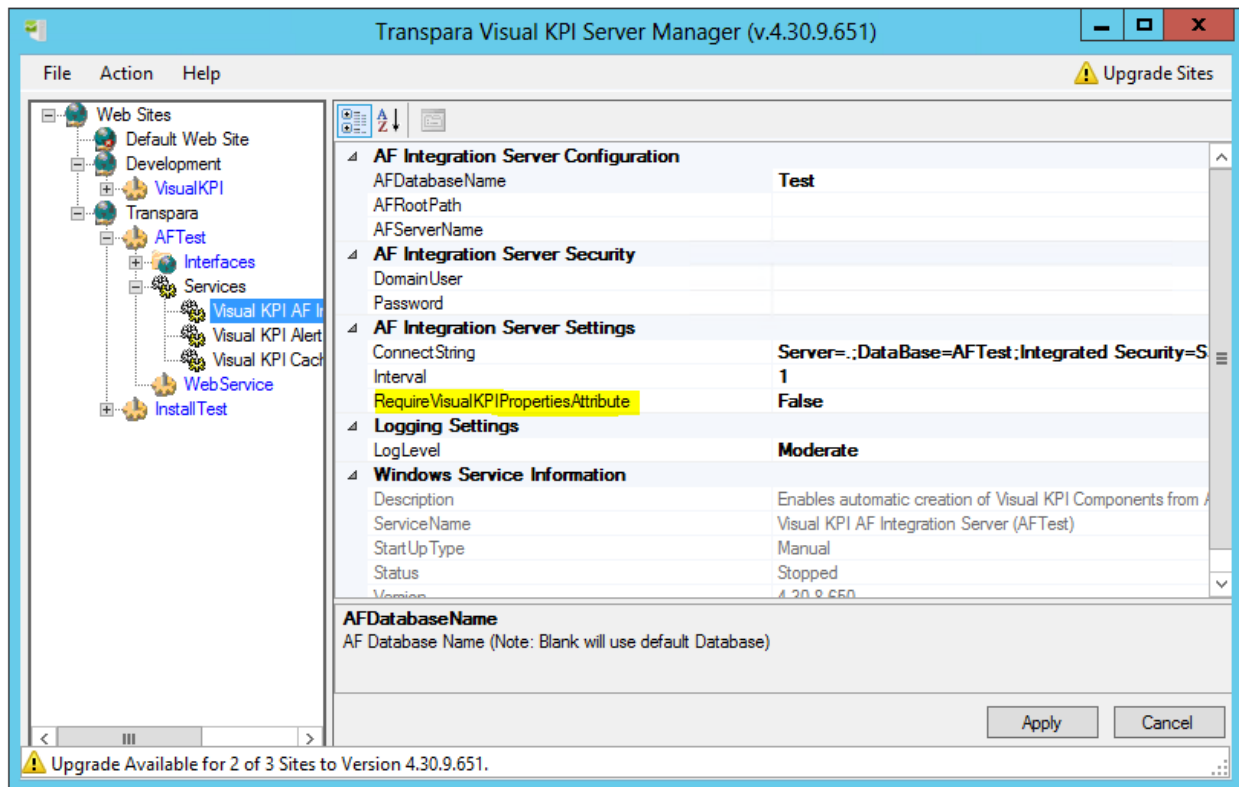
Figure 7

More About Organizing Attributes

One final thing to note on organization is that certain key word attributes can be grouped together for even more readability and flexibility. Certain attributes such as Pen information on trends, Info properties and custom attributes can be grouped together.

For example, the Info settings (which can be on any Visual KPI Object) have the following properties:

- Info
- Info Numeric Format
- Info Display Format
- Info URL

We can either model all of these as a flat list of AF Attributes or we can make them child attributes of Info as shown in Figure 8.
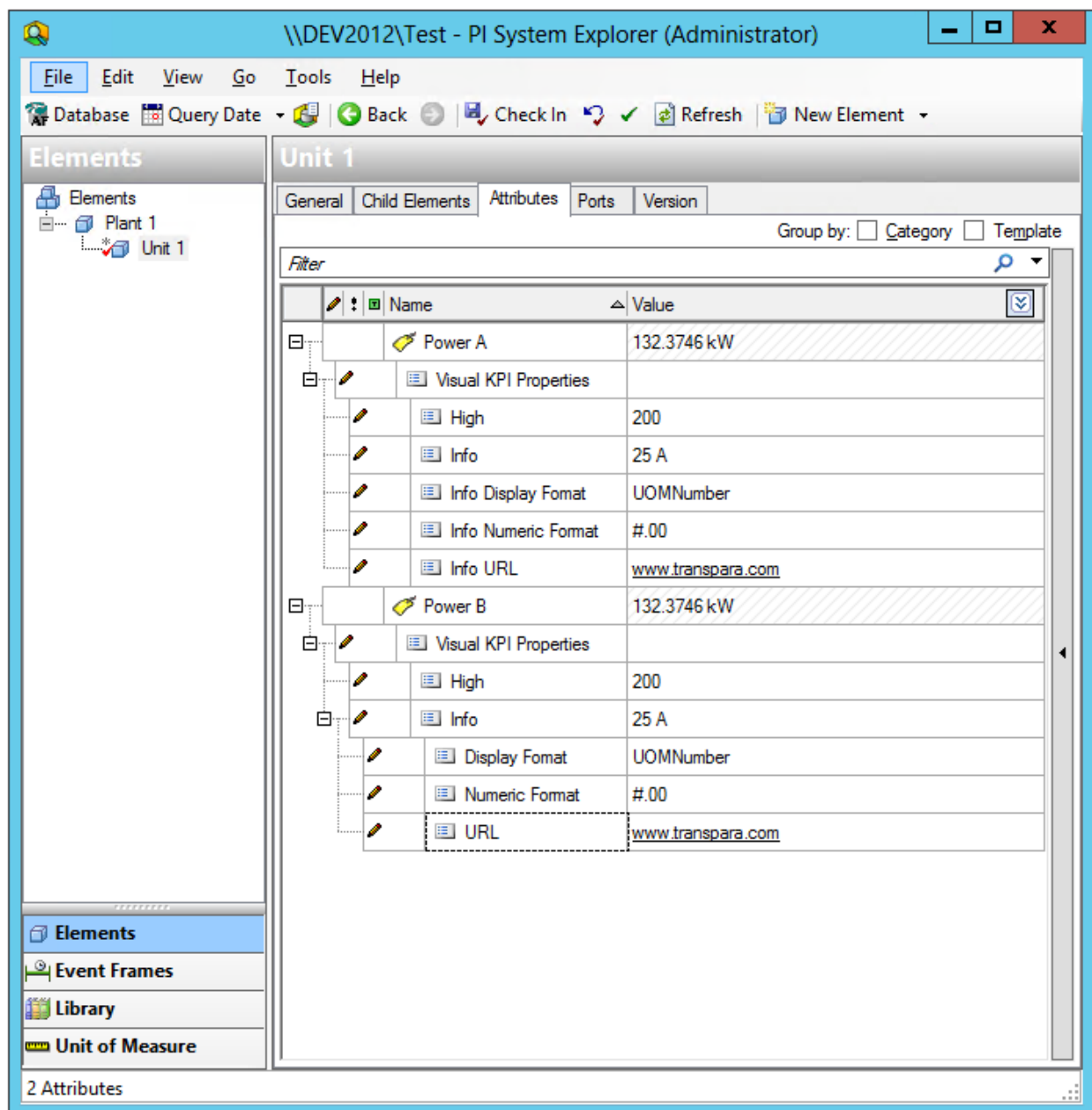
Figure 8

Here you can see that this creates a more readable model. The AF Attribute 'Power A' has the Info Attributes all in a flat list and the 'Power B' AF Attribute has them nested. It is important to note that if you nest these properties, the "Info" portion of the nested keywords is not needed. Here you can see that Info Display Format has become Display Format as a child attribute of Info.

This can be particularly useful when modeling Visual KPI Trends. Each Trend Pen can have many properties and Figure 9 shows the difference between the flat and nested approaches.
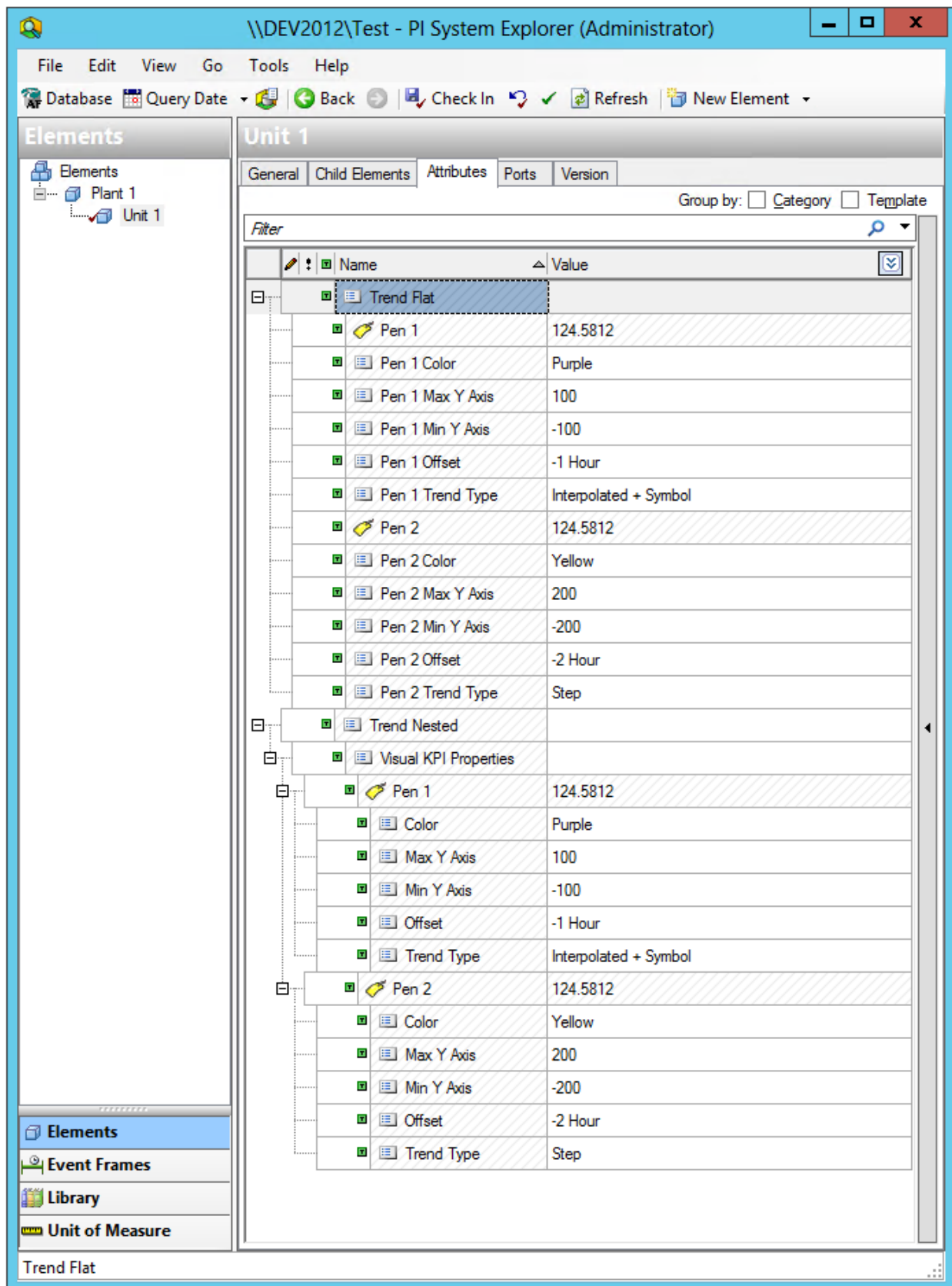
Figure 9

Again you will note the removed start of the key word phrase in the nested example, so 'Pen 1 Color' becomes 'Color' as a child attribute on Pen 1.

The final way this can be applied is on custom Visual KPI Attributes.   You can create up to 20 custom attributes in Visual KPI which can help you group your objects.   For example, you can create custom attributes such as Plant, Unit, Region, Country, Operation Type, Department, Product Line, etc.   If you wish you can place these custom attributes under an 'Attributes' attribute in your model to help keep the model clean and easy to read.   Figure 10 shows how this might look.
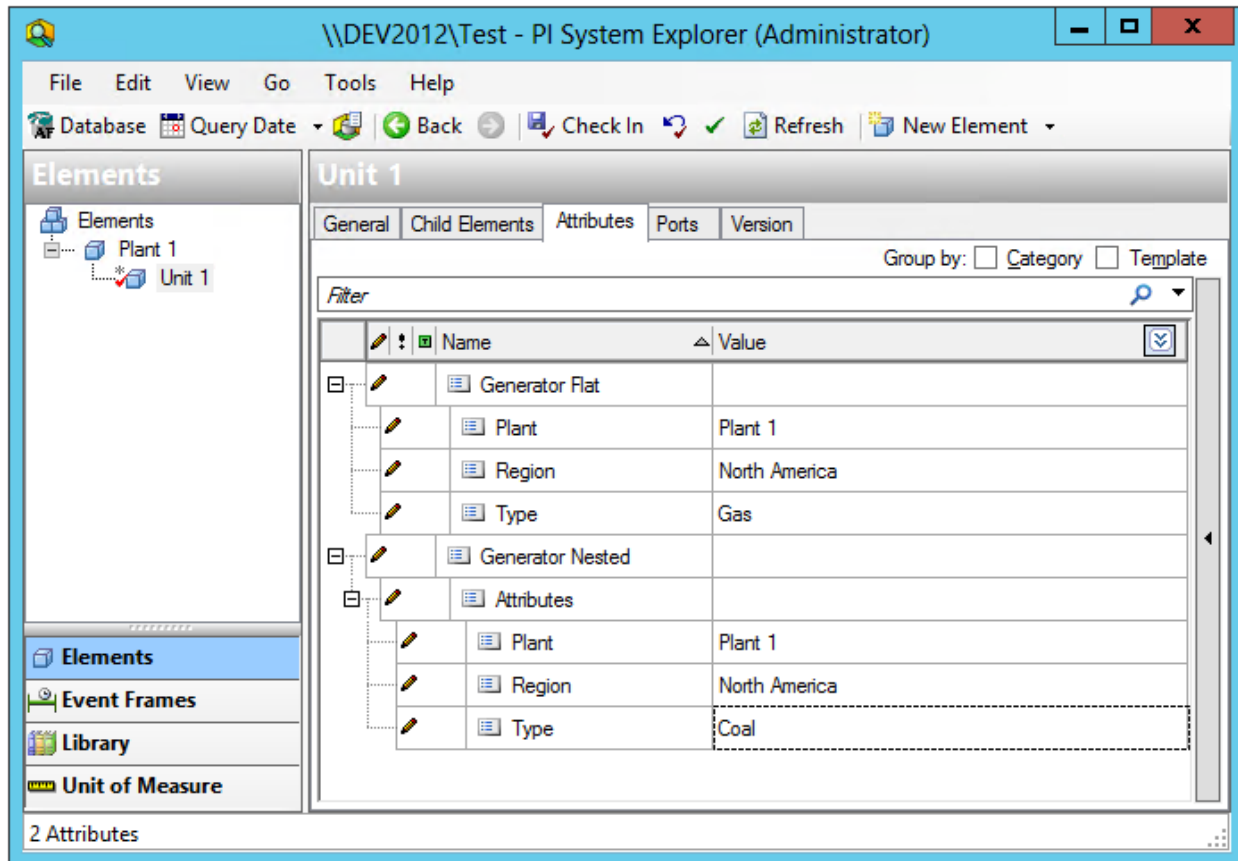
Figure 10

Keyword Reference

Below are instructions on what attribute names Visual KPI AF Integration Server looks for when deciding whether to create either a KPI, Managed Trend, Value, etc. from an AF attribute:

KPIs

The AF Integration Server will automatically create a **KPI** in Visual KPI if it finds one of more of the following sub attributes:

AF Attribute Name	Data Type	Valid Values
Max, Maximum	Any	Any
High High High, HighHighHigh, HHH	Any	Any
High, H	Any	Any
Target, Tgt	Any	Any
Low, L	Any	Any
Low Low, LowLow, LL	Any	Any
Low Low Low, LowLowLow, LLL	Any	Any
Min, Minimum	Any	Any
Top Text, TopText	Any	Any
Bottom Text, BottomText	Any	Any
Alert Silence, AlertSilence	Integer	0 (False), 1 (True)
In Service, InService	Integer	0 (False), 1 (True)
Status, KPI Status, KPIStatus	Integer	3 (HHH), 2 (HH), 1 (H), 0 (Good), -1 (L), -2 (LL), -3 (LLL)

AF Attribute Name	Data Type	Valid Values
Actual Trend Type, ActualTrendType	String / Enum	Interpolated, Step, Symbol, Interpolated + Symbol, Interpolated+Symbol, InterpolatedSymbol, Interpolated Symbol, Step + Symbol, Step+Symbol, StepSymbol, Step Symbol
Target Trend Type, TargetTrendType	String / Enum	Interpolated, Step, Symbol, Interpolated + Symbol, Interpolated+Symbol, InterpolatedSymbol, Interpolated Symbol, Step + Symbol, Step+Symbol, StepSymbol, Step Symbol
Limit Trend Type, LimitTrendType	String / Enum	Interpolated, Step, Symbol, Interpolated + Symbol, Interpolated+Symbol, InterpolatedSymbol, Interpolated Symbol, Step + Symbol, Step+Symbol, StepSymbol, Step Symbol
Trend Limits, TrendLimits	String / Enum	Default, System, False, 0, No, True, 1, Yes
Trend Target, TrendTarget	String / Enum	Default, System, False, 0, No, True, 1, Yes
Bar Chart Type, BarChartType	String / Enum	Actual EU, ActualEU, Deviation EU, DeviationEU, Deviation %, Deviation%, Deviation Percent, DeviationPercent
Group Map Position, GroupMapPosition	String / Enum	0, Omit, None, 1, 2, 3, 4, 5
KPI Name Click Path, Name Click Path	String / Enum	Trend, URL
Notification Type, NotificationType	String / Enum	None, Email, E-Mail

AF Attribute Name	Data Type	Valid Values
Alt Contact 1, Alternate Contact 1, AltContact1, AlternateContact1	String / Reference	Any defined Visual KPI Contact
Alt Contact 2, Alternate Contact 2, AltContact2, AlternateContact2	String / Reference	Any defined Visual KPI Contact
Alert Template, AlertTemplate	String / Reference	Any defined Visual KPI Alert Template

The AF Integration Server will automatically add the following fields as attributes to the **KPI** in Visual KPI if found in AF:

AF Attribute Name	Data Type	Valid Values
Trend Start Time, Trend Start Date, Trend Start, TrendStartTime, TrendStartDate, TrendStart	String / Date	Relative Date (*-n Days) or Actual Date (6/12/2013 1:00:00)
Trend End Time, Trend End Date, Trend End, TrendEndTime, TrendEndDate, TrendEnd	String / Date	Relative Date (*-n Days) or Actual Date (6/12/2013 1:00:00)
Min Y Axis, MinYAxis, Minimum Y Axis, MinimumYAxis	Numeric	Any
Max Y Axis, MaxYAxis, Maximum Y Axis, MaximumYAxis	Numeric	Any
URL	String	Any URL (starts with www, http:// or https://
URL Descriptor, URLDescriptor, URL Description, URLDescription, URL Name, URLName	String	Any * URL and URL Descriptor can be semi-colon (;) delimited lists. It is best if you match these up (i.e. 3 urls and 3 descriptors)
Numeric Format, NumericFormat	String	Valid .Net Numeric Formatting (##.###) http://msdn.microsoft.com/en-us/library/0c899ak8.aspx

AF Attribute Name	Data Type	Valid Values
Geo Label Format, GeoLabelFormat	String / Enum	Default, System, Actual, Name, Name: Actual, Name:Actual, Name Actual, NameActual
Trend Scale, TrendScale	String / Enum	Single, Single-Scale, SingleScale, Single Scale, Multi, Multi-Scale, MultiScale, Multi Scale
Trend Y Axis, TrendYaxis	String / Enum	KPI Min and Max, KPI Min Max, KPIMinMax, Auto-Scale, Auto-Scale, Auto, Multi Scale, Min and Max Y Axis, Min Max Y Axis, MinMaxYAxis
Display Format, DisplayFormat	String / Enum	None, Number, Number+UOM, Number + UOM, NumberUOM, Number UOM, UOM+Number, UOM + Number, UOMNumber, UOM Number

Notes:

- If the parent attribute has a Unit of Measure (UOM), that UOM will be used as the KPI's UOM and by default the Display Format of Number + UOM will be set.
- If the parent attribute has a description, that description will be used as the KPI's description.

Trends

The AF Integration Service will automatically create a **Trend** in Visual KPI if it finds one of more of the following sub-attributes:

AF Attribute Name	Data Type	Valid Values
Pen *n*, Pen*n*, P*n*, Pen 0*n*, Pen0*n*, P0*n* (*n* = 1 to 9) i.e. (Pen 1, Pen 02, Pen3, Pen04, P05)	Any	Any
Pen 10, Pen10, P10	Any	Any
Pen *n*, Pen*n*, P*n*, Pen 0*n*, Pen0*n*, P0*n* + Color I.e. (Pen 1 Color, Pen02Color)	String / Enum	Black, Blue, Brown, Gray, Grey, Green, Orange, Pink, Red, Yellow, Violet, Purple
Pen *n*, Pen*n*, P*n*, Pen 0*n*, Pen0*n*, P0*n* + MinimumYAxis I.e. (Pen 1 MinimumYAxis, Pen02MinimumYAxis)	Numeric	Any
Pen *n*, Pen*n*, P*n*, Pen 0*n*, Pen0*n*, P0*n* + MaximumYAxis I.e. (Pen 1 MaximumYAxis, Pen02MaximumYAxis)	Numeric	Any
Pen *n*, Pen*n*, P*n*, Pen 0*n*, Pen0*n*, P0*n* + Offset I.e. (Pen 1 Offset, Pen02Offset)	String	Any
Pen *n*, Pen*n*, P*n*, Pen 0*n*, Pen0*n*, P0*n* + Trend Type I.e. (Pen 1 Trend Type, Pen02TrendType)	String / Enum	Interpolated, Step, Symbol, Interpolated + Symbol, Interpolated+Symbol, InterpolatedSymbol, Interpolated Symbol, Step + Symbol, Step+Symbol, StepSymbol, Step Symbol

The AF Integration Server will automatically add the following fields to the **Trend** in Visual KPI if found in AF:

AF Attribute Name	Data Type	Valid Values
Trend Start Time, Trend Start Date, Trend Start, TrendStartTime, TrendStartDate, TrendStart, Start Time, Start Date, StartTime, StartDate	String / Date	Relative Date (*-n Days) or Actual Date (6/12/2013 1:00:00)
Trend End Time, Trend End Date, Trend End, TrendEndTime, TrendEndDate, TrendEnd, End Time, End Date, EndTime, EndDate	String / Date	Relative Date (*-n Days) or Actual Date (6/12/2013 1:00:00)
Min Y Axis, MinYAxis, Minimum Y Axis, MinimumYAxis	Numeric	Any
Max Y Axis, MaxYAxis, Maximum Y Axis, MaximumYAxis	Numeric	Any
Trend Scale, TrendScale	String / Enum	Single, Single-Scale, SingleScale, Single Scale, Multi, Multi-Scale, MultiScale, Multi Scale
Trend Y Axis, TrendYAxis	String / Enum	Auto-Scale, Auto-Scale, Auto, Multi Scale, Pen Min and Max Y Axis, Pen Min Max Y Axis, PenMinMaxYAxis, Trend Min and Max Y Axis, Trend Min Max Y Axis, TrendMinMaxYAxis

Notes:

- If the parent attribute in AF has a description, that description will be used as the Trend's description in Visual KPI.
- If a Pen attribute has a description in AF, that description will be used as the Pen's name in Visual KPI.

Tables

The AF Integration Server will automatically create a **Table** in Visual KPI if it finds one of more of the following sub-attributes in AF:

AF Attribute Name	Data Type	Valid Values
ConnectString, Connect String, ConnectionString, Connection String	String	Valid database connection string.
Query, Table Query, TableQuery, SQL Query, SQLQuery	String	Any valid SQL statement
Parameter n, Parameter$n$, Parameter0n, Parameter 0n (n = 1 to 9) i.e. (Parameter 1, Parameter09)	Any	Any
Parameter 10, Parameter10	Any	Any
Query Delimeter, QueryDelimeter	Character / Short String	Any

Notes:

- If the parent attribute has a description in AF, that description will be used as the Table's description in Visual KPI.

Groups

AF Elements will be automatically converted to Visual KPI Groups and the following AF Attributes will be converted to **Group** properties:

AF Attribute Name	Data Type	Valid Values
Sparkline Start Time, Sparkline Start Date, Sparkline Start, SparklineStartTime, SparklineStartDate, SparklineStart	String / Date	Relative Date (*-n Days) or Actual Date (6/12/2013 1:00:00)
Sparkline End Time, Sparkline End Date, Sparkline End, SparklineEndTime, SparklineEndDate, SparklineEnd	String / Date	Relative Date (*-n Days) or Actual Date (6/12/2013 1:00:00)
Zoom Level, ZoomLevel	Interger	0 - 21
KPI Actual Column Display Name, KPI Actual Column Name, KPIActualColumnDisplayName, KPIActualColumnName	String	Any
KPI Target Column Display Name, KPI Target Column Name, KPITargetColumnDisplayName, KPITargetColumnName	String	Any
Value Data Column Display Name, Value Data Column Name, ValueDataColumnDisplayName, ValueDataColumnName	String	Any
Group Info Column Display Name, Group Info Column Name, GroupInfoColumnDisplayName, GroupInfoColumnName	String	Any
KPI Info Column Display Name, KPI Info Column Name, KPIInfoColumnDisplayName, KPIInfoColumnName	String	Any
Value Info Column Display Name, Value Info Column Name, ValueInfoColumnDisplayName, ValueInfoColumnName	String	Any
Trend Info Column Display Name, Trend Info Column Name, TrendInfoColumnDisplayName, TrendInfoColumnName	String	Any
Table Info Column Display Name, Table Info Column Name, TableInfoColumnDisplayName, TableInfoColumnName	String	Any
Link Info Column Display Name, Link Info Column Name, LinkInfoColumnDisplayName, LinkInfoColumnName	String	Any
Default Tab, DefaultTab	String / Enum	Default, Groups, Group, KPIs, KPI, Links, Link, Trends, Trend,

AF Attribute Name	Data Type	Valid Values
		Values, Value, Tables, Table, System
Default Group View, DefaultGroupView	String / Enum	Default, System, List, Geo, Map, Geo Map, GeoMap
Default KPI View, DefaultKPIView	String / Enum	Default, System, List, Bar Chart, BarChart, Bar, Bars, KPI Map, KPIMap, Geo, Map, Geo Map, GeoMap
Default Value View, DefaultValueView	String / Enum	Default, System, List, Geo, Map, Geo Map, GeoMap
Default Trend View, DefaultTrendView	String / Enum	Default, System, List, Geo, Map, Geo Map, GeoMap
Default Table View, DefaultTableView	String / Enum	Default, System, List, Geo, Map, Geo Map, GeoMap
Default Link View, DefaultLinkView	String / Enum	Default, System, List, Geo, Map, Geo Map, GeoMap
Default Group Expand, DefaultGroupExpand	String / Enum	Default, Collapsed, Collapse, Expanded, Expand
Default KPI Expand, DefaultKPIExpand	String / Enum	Default, Collapsed, Collapse, Expanded, Expand
Default Value Expand, DefaultValueExpand	String / Enum	Default, Collapsed, Collapse, Expanded, Expand
Default Trend Expand, DefaultTrendExpand	String / Enum	Default, Collapsed, Collapse, Expanded, Expand
Default Table Expand, DefaultTableExpand	String / Enum	Default, Collapsed, Collapse, Expanded, Expand
Default Link Expand, DefaultLinkExpand	String / Enum	Default, Collapsed, Collapse, Expanded, Expand
Show Group Info Column, Show Group Info, ShowGroupInfoColumn, ShowGroupInfo	Boolean / String / Enum	False, 0, No, True, 1, Yes

AF Attribute Name	Data Type	Valid Values
Show KPI Info Column, Show KPI Info, ShowKPIInfoColumn, ShowKPIInfo	Boolean / String / Enum	False, 0, No, True, 1, Yes
Show Value Info Column, Show Value Info, ShowValueInfoColumn, ShowValueInfo	Boolean / String / Enum	False, 0, No, True, 1, Yes
Show Trend Info Column, Show Trend Info, ShowTrendInfoColumn, ShowTrendInfo	Boolean / String / Enum	False, 0, No, True, 1, Yes
Show Table Info Column, Show Table Info, ShowTableInfoColumn, ShowTableInfo	Boolean / String / Enum	False, 0, No, True, 1, Yes
Show Link Info Column, Show Link Info, ShowLinkInfoColumn, ShowLinkInfo	Boolean / String / Enum	False, 0, No, True, 1, Yes
Attribute Grouping, AttributeGrouping, Group By, GroupBy	String / Reference	Default, None, Status, Group Or any defined Visual KPI Custom Attribute (i.e. Plant, Region, etc)
Map Text, Group Map Text, MapText, GroupMapText	Any	Any
Geo Label Format, GeoLabelFormat	String / Enum	Default, System, Name, Name: Info, Name:Info, Name Info, NameInfo

Notes:

If the AF Element has a description, that description will be used as the Group's description in Visual KPI.

Links

AF Attributes that are valid URL's that start with www, http:// or https:// will automatically be converted to Visual KPI Links.

Notes:

If the AF Attribute has a description, that description will be used as the Link's description in Visual KPI.

Values

Any AF Attribute that is does not match any other Visual KPI Object selection criteria (either object specific or a base property) will be converted to a Visual KPI Value and the following sub-attributes will be converted to Value properties:

AF Attribute Name	Data Type	Valid Values
Trend Start Time, Trend Start Date, Trend Start, TrendStartTime, TrendStartDate, TrendStart	String / Date	Relative Date (*-n Days) or Actual Date (6/12/2013 1:00:00)
Trend End Time, Trend End Date, Trend End, TrendEndTime, TrendEndDate, TrendEnd	String / Date	Relative Date (*-n Days) or Actual Date (6/12/2013 1:00:00)
Min Y Axis, MinYAxis, Minimum Y Axis, MinimumYAxis	Numeric	Any
Max Y Axis, MaxYAxis, Maximum Y Axis, MaximumYAxis	Numeric	Any
URL	String	Any URL (starts with www, http:// or https://
URL Descriptor, URLDescriptor, URL Description, URLDescription, URL Name, URLName	String	Any * URL and URL Descriptor can be semi-colon (;) delimited lists. It is best if you match these up (i.e. 3 urls and 3 descriptors)
Numeric Format, NumericFormat	String	Valid .Net Numeric Formatting (##.###) http://msdn.microsoft.com/en-us/library/0c899ak8.aspx
Geo Label Format, GeoLabelFormat	String / Enum	Default, System, Value, Name, Name: Value, Name:Value, Name Value, NameValue

Notes:

- If the parent attribute has a UOM, that UOM will be used as the Value's UOM in Visual KPI and by default the Display Format of Number + UOM will be set.
- If the parent attribute has a description that description will be used as the Value's description.

General Properties

The following are general properties that apply to all Visual KPI object types (**Groups, KPIs, Values, Trends, Links, and Tables**)

AF Attribute Name	Data Type	Valid Values
Lat, Latitude	String	Any Valid Latitude (note that a corresponding longitude must also be present)
Long, Longitude	String	Any Valid Longitude (note that a corresponding latitude must also be present)
Info	Any	Any
Info URL, InfoURL	String	Any
Info Numeric Format, InfoNumericFormat	String	Valid .Net Numeric Formatting (##.###) http://msdn.microsoft.com/en-us/library/0c899ak8.aspx
Info Display Format, InfoDisplayFormat	String / Enum	None, Number, Number+UOM, Number + UOM, NumberUOM, Number UOM, UOM+Number, UOM + Number, UOMNumber, UOM Number
Display Order, DisplayOrder	Numeric	Any
Show	Integer	0 (False), 1 (True)
Contact	String / Reference	Any defined Visual KPI Contact
Any defined Visual KPI Custom Attribute (i.e. Plant, Region, etc)	String	Any

AF Attribute Name	Data Type	Valid Values
Access Group List, AGL, AccessGroupList	String	Semi-colon (;) delimited list of AD or local group names i.e. (Everyone; MyDomain\MyGroup)