

Migrating Performance Equations to AF Analytics Programmatically

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Agenda

- Introduction
- Requirements
- Solution
- Code Overview
- Demonstration
- Conclusions
- Questions

Introduction



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Requirements



- Build AF Analytics to replace existing Performance Equations
- Use AF Templates where possible
 - Identify “like” equations and make into templates
- Identify the best element to hold the analytic
- Allow override of automatically generated settings
- Add attributes to element that are necessary for the analytic
- Validate Results before disabling PE and enabling analytic
- Store all configuration & status to allow stopping and continuing

Solution



- Wizard style User Interface
 - Get AF Information
 - Get PI & PE information
 - Get translation parameters
 - Read PE and analyze them
 - Allow editing of results
 - Generate AF Analytics (including templates, elements, & attributes)
 - Validate Analytics
 - Disable PE's and enable Analytics
- All code available on OSIssoft's GitHub
 - <https://github.com/osisoft/PE-To-Analytics-Migration-Utility>

PE2AF Code Overview



- WPF Based Solution
- Single Form (MainWindow) with custom controls
 - Each custom control is a different page on the wizard
 - Code then hides/un-hides each control
 - Method “GetCurrentStep()” is used by the next & previous button click handlers to determine what controls to hide and show
- Custom controls include:
 - TopPanel, Welcome, AFInfo, PEInfo, Prefexes, EditTranslations, Migrate, Validate, and Finalize
 - To find custom control references in the code, search for “local:” in MainWindow.xaml

Configuration Persistence



- All configuration data is stored in AF
 - Database: Configuration
 - Root Element: OSIssoft\PE2AF
- Each PI Data Archive will have it's own branch under PE2AF

\\PIPE2017\Configuration - PI System Explorer

File Search View Go Tools Help

Database Query Date Back Check In Refresh New Element

Elements

- Elements
 - OSIssoft
 - PE2AF
 - PIPE2017
 - PI SQL
 - PI Web API
 - PIANO
 - Element Searches

PIPE2017

General Child Elements Attributes Ports Analyses Notification Rules Versio

Filter

Name	Value
AFDatabase	Test1
AllowExtensibility	False
AnalysisNamePrefix	Analysis
BaseTemplate	PE Calcs Template
ConstantNamePrefix	Constant
ElementNamePrefix	%PE%0*
OutputNamePrefix	Output
PEConfig	<?xml version="1.0" enco...<ArrayOfSavedPerfEqCla...
PointSource	C
RootElement	\\PIPE2017\Test1\Big Co...
ScanClasses	
1	00:01:00,00:00:00
2	00:02:00,00:00:00
3	00:00:30,00:00:00
TemplateMode	Create Element Template ...
TemplateNamePrefix	Template
TriggerNamePrefix	Trigger
VariableNamePrefix	Attribute

AF Info Pane



- Asset Server
- AF Database
- Root Element
- Allow enabling “Allow Extensions”
- Handling Similar Pes
- Base Template

PE Info Pane



- PI Data Archive
- Point Source
- Scan Class Definitions

Performance Equation to AF Analytics, Ver. 0.8.0.0 Copyright (c) 2017 OSIsoft LLC

Enter the information about the Performance Equations
This page allows the entry of information about the performance equations to be migrated.

Welcome

AF Information

Source PE Info

Name Prefixes

Edit Translations

Migrate

Validate

Finalize

Data (PI) Server: PIPE2017

Point Source: C

Get Scan Classes from pipesched.bat

3 Scan Classes

Select Scan Class: 1 00:01:00,00:00:00

Delete Scan Class Add Scan Class

Previous Next Cancel

Prefixes Pane



- Input Attribute Prefix
- Output Attribute Prefix
- Constant (Input) Attribute Prefix
- Element Name Convention
- Analysis Name Prefix
- Template Name Prefix

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Enter the Name Prefix for objects created in AF
This page allows the entry of the name prefix for objects to be created in AF.

	Attribute Name Prefixes
Input PI Tag Attribute:	Attribute
Output PI Tag Attribute:	Output
Constant Name Prefix:	Constant

	Other Prefixes
Element Name:	%PE%0*
Analysis Name Prefix:	Analysis
Template Name Prefix:	Template

Previous Next Cancel

Edit Translations Pane



- Edit:
 - Path
 - Base Template
 - Element Name
 - Use Calculation Template
 - Element Template Name
- Filter by tag name
- Group by:
 - Template
 - PointSource

Migrate	Status	PE Tag	Path	Base Template	Element Name	Use Calculation Template	Element Template Name	Analysis Name	Output Attrib	Original Formula	AF Analytic Formula	Scan Freq/Trigger	Detail
☒	Ready to migrate	Test-IdleTime-TagAvg	\\PIPE2017\Test1\Big Company\PECalcs	PE Calcs Template	Test-IdleTi	☒	Template7	Analysis6	Output6	TagAvg('PIPE2017_LogicalDisk(C:)	TagAvg('Analysis6-Attribute1', ''	00:01:00,00:00:00	Edit
☒	Ready to migrate	Test-DiskRead-TimeEq0	\\PIPE2017\Test1\Big Company\PECalcs	PE Calcs Template	Test-DiskF	☒	Template3	Analysis7	Output7	TimeEq('PIPE2017_LogicalDisk(C:)	TimeEq('Analysis7-Attribute1', ''	00:01:00,00:00:00	Edit
☒	Ready to migrate	Test-DiskRead-TagNum	\\PIPE2017\Test1\Big Company\PECalcs	PE Calcs Template	Test-DiskF	☐		Analysis8	Output8	TagNum('PIPE2017_LogicalDisk(C:)	TagNum('PIPE2017_LogicalDisk(C:)	00:01:00,00:00:00	Edit
☒	Ready to migrate	Test-DiskWrite-StDev	\\PIPE2017\Test1\Big Company\PECalcs	PE Calcs Template	Test-DiskV	☒	Template6	Analysis9	Output9	StDev('PIPE2017_LogicalDisk(C:)	StDev('Analysis9-Attribute1', ''	00:01:00,00:00:00	Edit

☒ No Grouping
 ☐ Group by Template
 ☐ Group by PointSource

Edit Selection

Tag Filter:

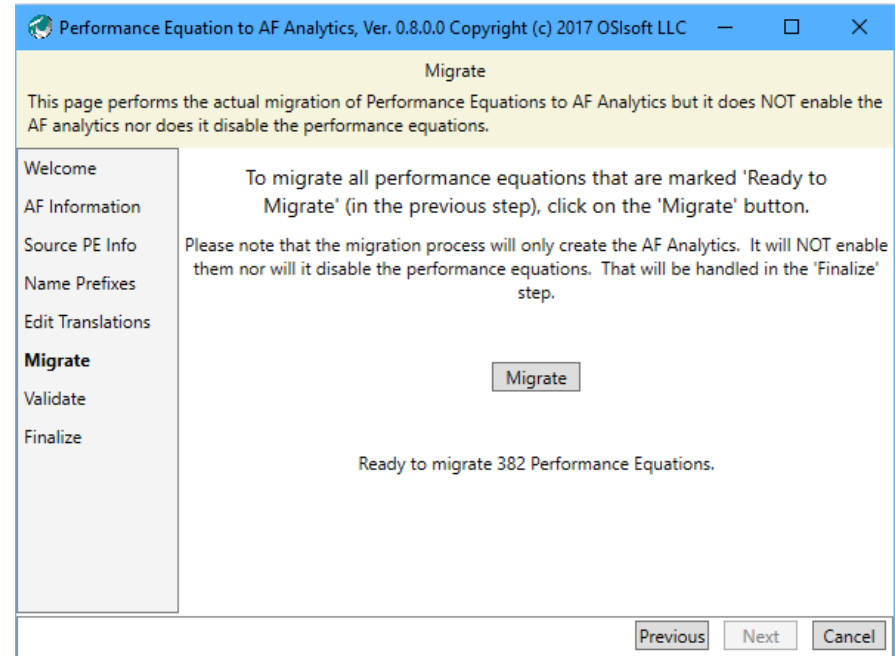
☒ Show already migrated

Save Edits

Migrate Pane



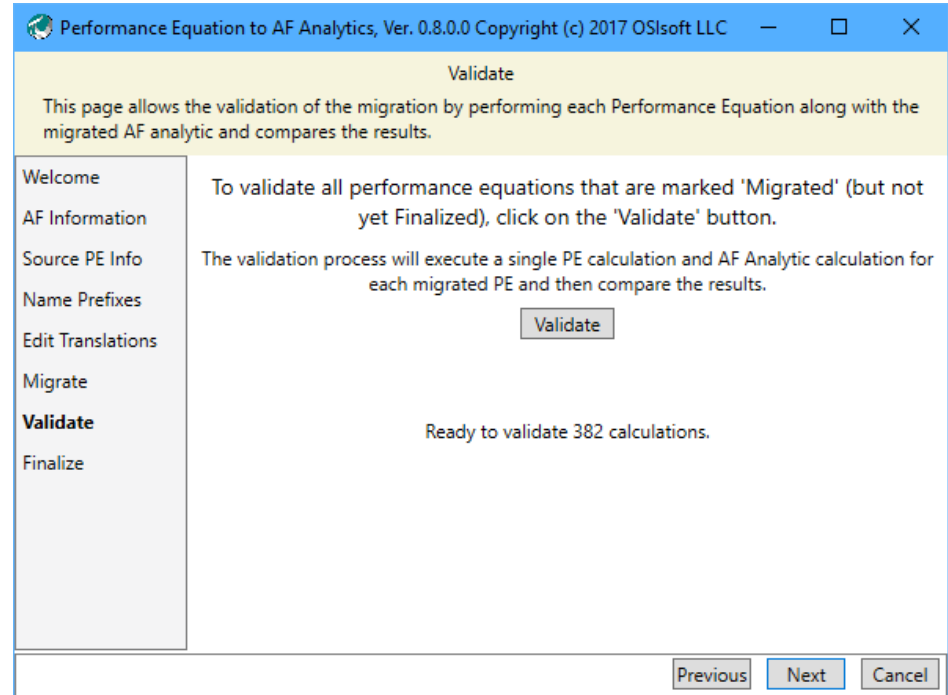
- Cannot advance unless there are migrated PE's
- Migrate will create the AF Analytics
 - All newly created analytics will be disabled
 - No change will be made to the PE's (they will continue to run)



Validate Pane



- Validate is optional
- Validation allows selection of PE's to skip the “Finalize” stage



Validation Results



- Compare PE to AF Analysis
- Slider allows:
 - All results
 - Only mismatches
 - Only mismatches within 0.01%
 - Only mismatches within 0.1%
 - Only mismatches within 1%
- Results can be saved to a .CSV file

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Validate

This page allows the validation of the migration by performing each Performance Equation along with the migrated AF analytic and compares the results.

Welcome

AF Information

Source PE Info

Name Prefixes

Edit Translations

Migrate

Validate

Finalize

Validation Results

Finalize	PE	Timestamp	PE Result	AF Result
☒	Test-DiskWrite-StDev	3/13/2018 1	11380.6594045617	11380.65940
☒	Test-PageFaults-TypVal	3/13/2018 1	50	50
☒	Test-IdleTime-TagMax	3/13/2018 1	97.63948	97.6394805
☒	Test-DiskRead-TimeGE	3/13/2018 1	3600	3600
☒	Test-DiskRead-TagSourc	3/13/2018 1	PM	PM
☒	Test-IdleTime-AvgOfM...	3/13/2018 1	92.419285260872	92.41928526

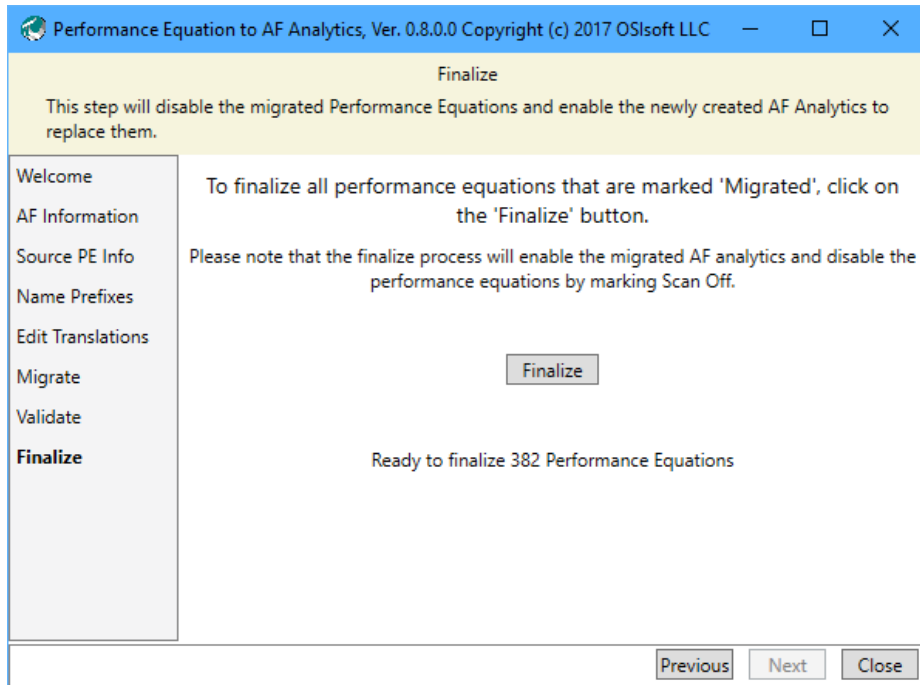
Show all results

Save Results

Previous Next Cancel

Finalize Pane

- Finalize will:
 - Set SCAN OFF for the PE tags
 - Enable the AF Analytics



Config File Settings

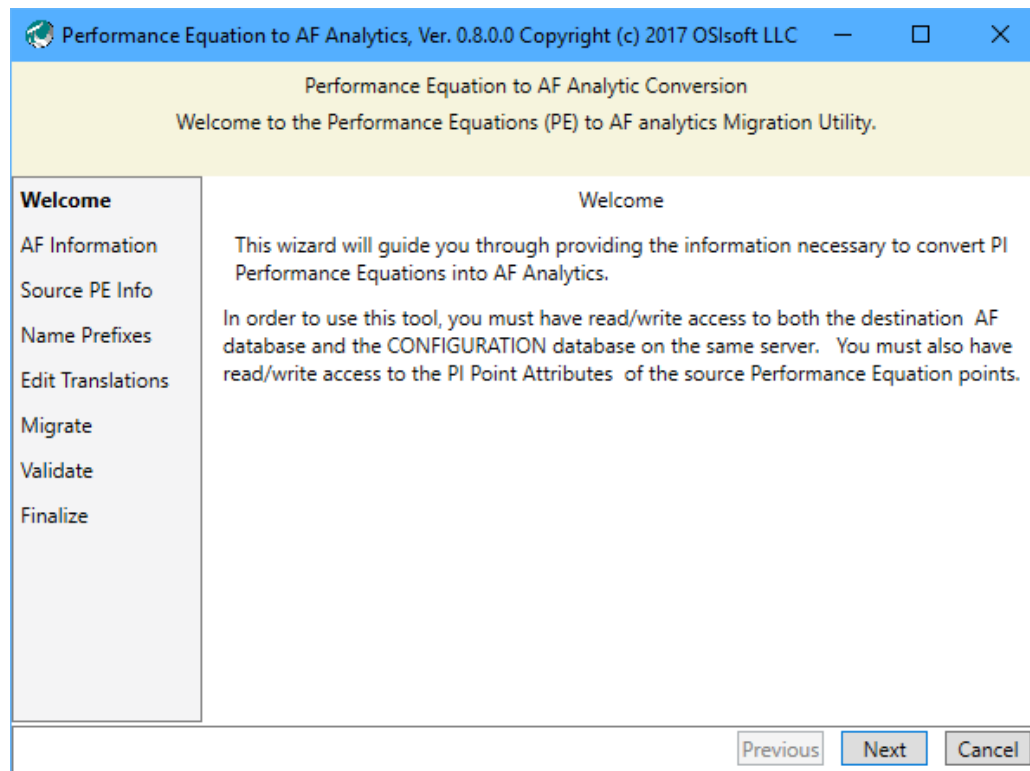


- Application Settings
 - UnsupportedFunctions
- User Settings
 - AFServer
 - DebugMode
 - ShowAnalysisProgressStats

```
<applicationSettings>
  <PE2AF.Properties.Settings>
    <setting name="UnsupportedFunctions" serializeAs="String">

<value>AlmAckStat,AlmCondition,AlmCondText,AlmPriority,Arma,Delay,Impulse,IsDST,Median
Filt</value>
    </setting>
  </PE2AF.Properties.Settings>
</applicationSettings>
<userSettings>
  <PE2AF.Properties.Settings>
    <setting name="AFServer" serializeAs="String">
      <value />
    </setting>
    <setting name="DebugMode" serializeAs="String">
      <value>False</value>
    </setting>
    <setting name="ShowAnalysisProgressStats" serializeAs="String">
      <value>True</value>
    </setting>
  </PE2AF.Properties.Settings>
</userSettings>
```


Solution – Demonstration



Summary

OSIsoft provides an out of the box solution via GitHub, The download includes all source code as well as the fully compiled executable. To use the executable, just put it into a folder in “Program Files” and create a shortcut to it.



CHALLENGE

Migrate Performance Equations to AF Analytics

- Combine similar PE's into AF Templates
- Add necessary input tags to elements as attributes
- Verify analytic before actually replacing PE

SOLUTION

Programmatically analyze the PE's and built the AF analytics

- Use PE2AF as-is
- Or modify it for your own needs

RESULTS

PE's can be reliably migrated to AF analytics using PE2AF

- Provides a more scalable solution for analytics
- Templates provide reduced maintenance

Questions

Please wait for the **microphone** before asking your questions

State your **name & company**



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Merci

谢谢

Спасибо

Danke

Gracias

Thank You

감사합니다

ありがとう

Grazie

Obrigado

Optional: Click to add a takeaway you wish the audience to leave with.