



## PI World 2020 Lab PI Vision –

# **Migrating PI ProcessBook Displays**

#### OSIsoft, LLC 1600 Alvarado Street San Leandro, CA 94577

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, mechanical, photocopying, recording, or otherwise, without the prior written permission of OSIsoft, LLC.

OSIsoft, the OSIsoft logo and logotype, Managed PI, OSIsoft Advanced Services, OSIsoft Cloud Services, OSIsoft Connected Services, OSIsoft EDS, PI ACE, PI Advanced Computing Engine, PI AF SDK, PI API, PI Asset Framework, PI Audit Viewer, PI Builder, PI Cloud Connect, PI Connectors, PI Data Archive, PI DataLink, PI DataLink Server, PI Developers Club, PI Integrator for Business Analytics, PI Interfaces, PI JDBC Driver, PI Manual Logger, PI Notifications, PI ODBC Driver, PI OLEDB Enterprise, PI OLEDB Provider, PI OPC DA Server, PI OPC HDA Server, PI ProcessBook, PI SDK, PI Server, PI Square, PI System, PI System Access, PI Vision, PI Visualization Suite, PI Web API, PI WebParts, PI Web Services, RLINK and RtReports are all trademarks of OSIsoft, LLC.

All other trademarks or trade names used herein are the property of their respective owners.

#### **U.S. GOVERNMENT RIGHTS**

Use, duplication or disclosure by the US Government is subject to restrictions set forth in the OSIsoft, LLC license agreement and/or as provided in DFARS 227.7202, DFARS 252.227-7013, FAR 12-212, FAR 52.227-19, or their successors, as applicable.

No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, mechanical, photocopying, recording or otherwise, without the written permission of OSIsoft, LLC.

## **Table of Contents**

## Contents

Table of Contents	3
Introduction	4
Approach	4
Why Use the PI ProcessBook to PI Vision Migration Utility?	4
Scenario: Flynn River Hydro	5
Exercises	6
Exercise 1: Review Existing PI ProcessBook Displays	6
Exercise 2: Analyze and Migrate PI ProcessBook Displays	8
Exercise 3: Review Migrated PI Vision Displays	10
Exercise 4: Complete the PI Vision Displays	12
Exercise 5: Migrate Another PI ProcessBook Display	16

### Introduction

This lab is designed for people who already have used PI ProcessBook and PI Vision. Students should already be familiar with how to navigate displays in both PI ProcessBook and PI Vision and understand how PI ProcessBook and PI Vision are able to leverage AF Templates.

### Approach

Specific questions or scenarios will be presented to solve primarily using OSIsoft PI ProcessBook or PI Vision as your visualization and analysis tool. In addition, the PI ProcessBook to PI Vision Migration Utility will be used. More advanced features of PI Vision will have a strong reliance on AF so you will also need to use PI System Explorer (PSE). If you are stuck, ask one of the lab monitors for assistance.

### Why Use the PI ProcessBook to PI Vision Migration Utility?

PI ProcessBook is a 25-year-old product that has begun to show its age. PI Vision is our leading visualization tool built to leverage the latest PI System capabilities where PI ProcessBook has fallen behind. We know it takes a lot of hard work to build out PI ProcessBook displays, and we want to help move that work over to our modern visualization tool and take advantage of the benefits of PI Vision. While it may seem like a challenging task, this lab will give you the knowledge and practice to be confident in using the PI ProcessBook to PI Vision Migration Utility.

### Scenario: Flynn River Hydro

You have been hired as a PI Administrator at Flynn River Hydro and you are tasked with migrating their PI ProcessBook displays to PI Vision. Luckily the company has built out AF databases with templatized AF Assets that have been used in the PI ProcessBook displays. The AF structure features three main levels, Hydro Unit, Generation Unit, and Equipment (Generator/Turbine).



Red – Hydro Unit Blue – Generation Unit Green – Equipment

You know that this AF structure has been utilized in the PI ProcessBook displays and you would like to keep that functionality in the migrated PI Vision displays.

Note: The AF database used in these exercises is a slight modification of the Hydro Plant Monitoring Asset Based PI Example Kit available on PI Square:

https://pisquare.osisoft.com/community/all-things-pi/af-library/asset-based-pi-example-kits/hydro-plant-kit

## **Exercises**

## Exercise 1: Review Existing PI ProcessBook Displays

#### Exercise Objectives:

#### Examine PI ProcessBook functionality

#### Scenario:

Your first assignment is to review the existing set of PI ProcessBook displays that the company currently uses to make sure the display content is properly migrated into PI Vision. The company has a set of displays which are used to monitor Flynn River Hydro plant and equipment, located in C:\ProcessBook\Flynn. The company also has a display which IT uses to monitor the health of the PI Data Archive, located in C:\ProcessBook\IT.

## Part 1: PI Data Archive Monitoring Display Approach:

- 1. Open the PI\_Data\_Archive\_Monitoring.pdi display located in C:\ProcessBook\IT
- 2. Select Visual Basic Editor and double click on This Display under the C:\ProcessBook\IT\ PI\_Data\_Archive\_Monitoring.pdi VBAProject to open the VBA code. What does this code do?
- 3. Close the Visual Basic Editor and use the PI\_Data\_Archive\_Monitoring.pdi display to answer the following questions

- 4. How many Unflushed Events are currently in the write cache?
- 5. What is the Point Count in the Base Subsystem?
- 6. What is the approximate peak of the PI Server CPU over the last 20 minutes? Hint: double-click the PI Server CPU trend to maximize it

## Part 2: Flynn River Hydro Displays Approach:

- 1. Open the PG\_Flynn\_Home.pdi display located in C:\ProcessBook\Flynn
- 2. Use the navigation buttons to open the other Flynn PI ProcessBook displays
- 3. Use the Flynn River Hydro displays to answer the following questions

- 4. What is the current Penstock Flow at plant Flynn II?
- 5. Which Generation Unit currently has the highest Power Generated?
- 6. Which Generator currently has the lowest Oil Level?
- 7. What is the approximate peak Water pH Intake at GU3 Turbine in the last 8 hours? Approximately when did this peak occur? Hint: hover over the value to see the summary statistics

## Exercise 2: Analyze and Migrate PI ProcessBook Displays

**Exercise Objectives:** 

Use the PI ProcessBook to PI Vision Migration Utility to migrate PI ProcessBook displays to PI Vision Understand the configuration and reporting options available in the Migration Utility

Scenario:

Now that you have reviewed the PI ProcessBook displays that the client uses, you are ready to use the PI ProcessBook to PI Vision Migration Utility to convert these displays to native PI Vision displays. You would like to preserve the folder and navigation structure of the existing displays.

Note: The PI ProcessBook to PI Vision Migration Utility User Guide is available on Live Library and as a bookmark in Chrome:

https://livelibrary.osisoft.com/LiveLibrary/web/ui.xql?action=html&resource=publist\_home.html&pub\_categ ory=PI-ProcessBook-to-PI-Vision-Migration-Utility

#### Approach:

Part 1: Analyze the PI ProcessBook Displays

- 1. Open the PI ProcessBook to PI Vision Migration Utility
- 2. Click Add Files and select Folders:



- 3. In the Browse for Folder window, select the C:\ProcessBook folder and click OK
- 4. Select the checkbox next to the ProcessBook folder or Select All in the bottom left to select all folders and files
- 5. Click Run Analysis and wait for the Analysis completed message

Part 2: Review the Analysis Results

6. In the Analysis Results pane, expand the categories that appear to view the extent to which the files can be migrated

- 7. Hover over the ① icon next to each category to review each category definition
- 8. Hover over the icons in the Issues column to review each migration limitation
- 9. The PI\_Data\_Archive\_Monitoring display contains VBA <sup>2</sup>, which is not supported in PI Vision. Click Export VBA at the bottom of the Analysis Results pane.
- 10. After the Export completed message is displayed, click View Reports and select Open Reports Folder to view the associated .vba file in notepad.
- 11. In the Reports Folder, open the MigrationAnalysis.csv file to view the migration analysis results in detail.
- 12. Click Select All at the bottom of the Analysis Results pane

Note: In order to preserve links between PI ProcessBook displays, they must be migrated in the same operation

- 13. Click Migrate to open and complete the Migration Settings window:
  - a Connect to the PI Vision Server: enter https://pivision/pivision and

click Connect b Destination PI Vision folder: <Home>

- c Target Display Owner: pischool\student01
- d Display Sharing Access: World
- e Select Persist folder structure from migrated items
- 14. Click OK and wait for the Migration completed message
- 15. Click View Reports and select Migration Report to view the migration results in detail

## **Exercise 3: Review Migrated PI Vision Displays**

**Exercise Objectives:** 

Examine PI Vision functionality Validate migration configuration options in PI Vision

Scenario:

Now that the PI ProcessBook displays have been migrated to PI Vision, you need to examine the migrated PI Vision displays. The users are not very familiar with PI Vision, so you need to be able to demonstrate how the new PI Vision displays work.

#### Part 1: PI Data Archive Monitoring Display

Approach:

- 1. Use the shortcut on the desktop to launch PI Vision using Chrome.
  - a Alternatively, start Chrome and navigate to https://pivision/pivision
- 2. Note the folder structure in the lower left panel. Did the folder structure persist from the PI ProcessBook files? Select the IT folder within ProcessBook on the left side panel
- 3. Click Edit display settings 🍄 in the PI\_Data\_Archive\_Monitoring display to open the Display Settings window. Did the migration settings apply to this display?
- 4. Close the Display Settings window. Click the PI\_Data\_Archive\_Monitoring display to open it and answer the questions below

- 5. How many Unflushed Events are currently in the write cache?
- 6. What is the Point Count in the Base Subsystem?
- 7. What is the approximate peak of the PI Server CPU over the last 20 minutes? Hint: double-click the PI Server CPU trend to maximize it

## Part 2: Flynn River Hydro Displays Approach:

- 1. Back in the PI Vision homepage, select the Flynn folder within ProcessBook on the left side panel
- 2. Click Edit display settings 🍄 in the PG\_Flynn\_Home display to open the Display Settings window. Did the migration settings apply to this display?
- 3. Close the Display Settings window. Click the PG\_Flynn\_Home display to open it
- 4. Use the navigation buttons to open the other Flynn PI Vision displays
- 5. Use these Flynn displays to answer the following questions

- 6. What is the current Penstock Flow at plant Flynn II?
- 7. Which Generation Unit currently has the highest Power Generated?
- 8. Which Generator currently has the lowest Oil Level?
- 9. What is the approximate peak Water pH Intake at GU3 Turbine in the last 8 hours? Approximately when did this peak occur?

## **Exercise 4: Complete the PI Vision Displays**

#### **Exercise Objectives:**

Use AF to create analyses to add to the PI Vision display

Use PI Vision to edit the migrated PI Vision displays

#### Scenario:

After examining the newly migrated PI Vision displays, you see that there is some data missing from the original PI ProcessBook displays. Specifically, in the PG\_Flynn\_Plant PI Vision display, there is some calculation data missing in the upper left corner. You know from the migration results that there are datasets in the original PI ProcessBook display. Since you want to be able to use these calculations in other client tools, you will create AF analyses for these calculations. You also need to update the banner of the PI\_Data\_Archive\_Monitoring display as it utilizes VBA. Since the timebar in PI Vision shows us the time range of the display, you will replace this header with a static header.

#### Approach:

Part 1: Update the PG\_Flynn\_Plant display using AF analysis

- 1. Open PI System Explorer and select the PG\_HydroPlant database
- 2. Navigate to Library and go to Templates > Element Templates > Hydro



3. In the Analysis Templates tab, create two new expression analysis templates is with the following properties:

Analysis 1: % Power Generated

Expression: ('Actual Power Generated'/'Total Installed Capacity')\*100 Output Attribute (Map > New Attribute Template)

- o Save Output History: No
- o Name: % Power Generated

Scheduling: Event-Triggered

Applying Tomologie				
General Attribute remplates Ports Analysis remplate	S Notification R			
	Name:	% Power Generated		^
😘 👩 Name 🔿	Description:			
fix Hydro Attention Percentage	Categories:			~
@t Hydro Condition		Expression      Roll	qu	
\$60 % Power Generated	Analysis Type	<ul> <li>Event Frame Generatio</li> </ul>	n O SOC	
				10 A
xample Element: Flynn River Hydro	I√ Enable an	nalyses when created from ten	nplate	
Example Element: Flynn River Hydro	I√ Enable an	nalyses when created from ten	nplate	
Example Element: Flynn River Hydro           Add a new variable           Name         Expression	Image: Provide an analysis	halyses when created from ten	Output Attribute	
Example Element: Flynn River Hydro          Add a new variable         Name         Expression         Variable1         ('Actual Power Generated'/'To	Image: Contract of the second sec	ed Capacity')*100	Output Attribute	
Example Element: Flynn River Hydro          Add a new variable         Name       Expression         Variable1       ('Actual Power Generated'/'To         Scheduling: <ul> <li>Event-Triggered</li> <li>Periodic</li> </ul>	Tenable an	ed Capacity')*100	Dutput Attribute	

#### Analysis 2: Min/Max Power Generated

Expression 1: TagMin('Actual Power Generated', '\*-1h',

'\*') Output Attribute (Map > New Attribute Template)

- o Save Output History: Yes
- o Name: Min Power Generated

Expression 2: TagMax('Actual Power Generated', '\*-1h', '\*')

Output Attribute (Map > New Attribute Template)

- o Save Output History: Yes
- o Name: Max Power

Generated Scheduling: Periodic

Period: 01h 00m 00s

ner	al Att	ribute Templates	Ports	Analysis Templates	Notification Rule Templates				
					Name:	Min/Max Power Genera	ated		
2		Name Active Power Ge	nerated	<u>^</u>	Description: Categories:			~	
	\$f⊗	Min/Max Power	Generat	ed	Analysis Type:	Expression	Rollup		
	f69	Hydro Attention	Percenta	age		<ul> <li>Event Frame Generation</li> </ul>	ration O SQC		
	at	Hydro Condition	1	~	Enable and	alyses when created from	n template		
am	ple Elei	ment: <u>Flynn Riv</u>	ver Hydro	2			Et El Evalua	te	
am Add	ple Eler	variable	er Hydro	2			Et Evalua	te	
am Ado Na	ple Eler d a new me	variable Expression	er Hydro	2			Output Attribute	te	
Add Nai Var	ple Eler d a new me `iable1	variable Expression	tual Po	2 ower Generated	','*-1h','*	•')	Output Attribute	te	
Ada Na Var Var	ple Eler d a new me iable:	variable Expression TagMin('Act	tual Po	ower Generated	','*-1h','* ','*-1h','*	*')	Output Attribute Min Power Generated Max Power Generated	te	
Add Na Var	ple Eler d a new me hiable:	ment:     Flynn Riv       variable     Expression       L     TagMin('Act       2     TagMax('Act	tual Po	2 ower Generated ower Generated	','*-1h','* ','*-1h','*	·') ·')	Etalua       Output Attribute       Min Power Generated       Max Power Generated	te	
Add Na Var Var	ple Eler d a new me riable2 riable2	ment:     Flynn Riv       variable     Expression       L     TagMin('Act       2     TagMax('Act       O     Event-Trigge	tual Po tual Po	2 ower Generated ower Generated ● Periodic	','*-1h','* ','*-1h','* Advanced	*')	Et     Evalua       Output Attribute       Min Power Generated       Max Power Generated	te	

- 4. Check In your changes deck In
- 5. Go to Elements > Flynn River Hydro



6. In the Attributes tab, if you see "PI Point not found" errors for the Min Power Generated and/or Max Power Generated attributes, right-click each attribute and select Create or Update PI Point



7. In the Analyses tab, right click the Min/Max Power Generated analysis and backfill the analysis from the beginning of today until now

Flynn	Riv	er Hy	dro	D					
General Ch		Child	d Ele	ements	Attributes	Ports	Analyses	Notification Rules	Version
	Þ								
0		1	3		Name		1	Backfilling	
0		1		f⊗	Hydro Atter	ntion Pe	rcentage	0	
0		1		Ø	Hydro Cond	dition		0	
0	a			f(x)	Min/Max Po	ower Ge	nerated	_	
Add	d a	ne	×	New Dele Prev	te iew Results			-	
Na		A Backfill/Recalculate							

8. In PI Vision, open the PG\_Flynn\_Plant display and add value symbols of the newly created % Power Generated, Min Power Generated, and Max Power Generated attributes to replace the missing datasets and save your display

Part 2: Update the PI\_Data\_Archive\_Monitoring display

- 9. In PI Vision, open the PI\_Data\_Archive\_Monitoring display
- 10. Update the non-working date and time header with a header of your choice (ex. PISRV01 PI Data Archive Monitoring) and save your display

#### Bonus: Edit the remaining PI Vision displays

As a bonus exercise, edit the other migrated PI Vision displays to better format the displays in PI Vision. Some suggestions are below, but feel free to make any other adjustments! Be sure to save the displays when finished.

#### PG\_Flynn\_Home

Adjust the 4 links and 3 arrows to be evenly spaced by selecting the symbols and

going to Arrange > Align Middle

#### PG\_Flynn\_Plant

Add the Generating Capacity attribute for the displayed Flynn I or Flynn II plant to the display as a Value symbol under the trend

Format the boxes surrounding Flynn River Hydro Power and Features to have different Border colors

Adjust the Penstock Opening and Penstock Flow value and text symbols so they are not overlapping

#### PG\_Flynn\_GenerationUnit

Increase the Font Size of the Generator Analysis and Turbine Analysis text symbols to 24 Add the Generation Unit Number of Attention Systems attribute for the displayed generation unit to the display as a Value symbol

PG\_Flynn\_Generator and PG\_Flynn\_Turbine



Format the Oil Level gauge symbol to show the scale in Format Gauge > Visibility > Scale Change the text color of the Last Maintenance and Time Since Maintenance value symbols

## Exercise 5: Migrate Another PI ProcessBook Display

#### **Exercise Objectives:**

Complete another migration using the PI ProcessBook to PI Vision Migration Utility

#### Scenario:

You have presented the migrated PI Vision displays to the other PI users at Flynn River Hydro, and they are excited to see the new visualization tool and its new capabilities. An engineer has created a ProcessBook display recently and would like to see how it works in PI Vision.

#### Approach:

- 1. Open the PowerGeneration.pdi file located on the Desktop. Examine this display in PI ProcessBook
- 2. Use the PI ProcessBook to PI Vision Migration Utility to analyze and migrate the display. This display should be located in the Flynn folder in PI Vision.
- 3. Review the migrated PowerGeneration display in PI Vision and verify the migration settings and symbols have been preserved
- 4. Make any adjustments to the display in PI Vision, some suggestions are as follows:

Edit the background and font colors of the display to match the other Flynn displays

Increase the font size of the Flynn I, Flynn II, and Total text and value symbols

Add a Home text symbol to the display. Add a navigation link to this symbol to link to the PG\_Flynn\_Home display





# Have an idea how to improve our products? OSIsoft wants to hear from you!

https://feedback.osisoft.com/



# PI SYSTEM LEARNING MADE EASY!

Accelerate success with the new OSIsoft Learning platform.

VISIT LEARNING.OSISOFT.COM



© Copyright 2020 OSIsoft, LLC