

OSIsoft.

PI SYSTEM ROADSHOW 2014

The **Power** of **Data**

DECISION READY IN REAL-TIME

O C E A N I A



What is new with the PI System?

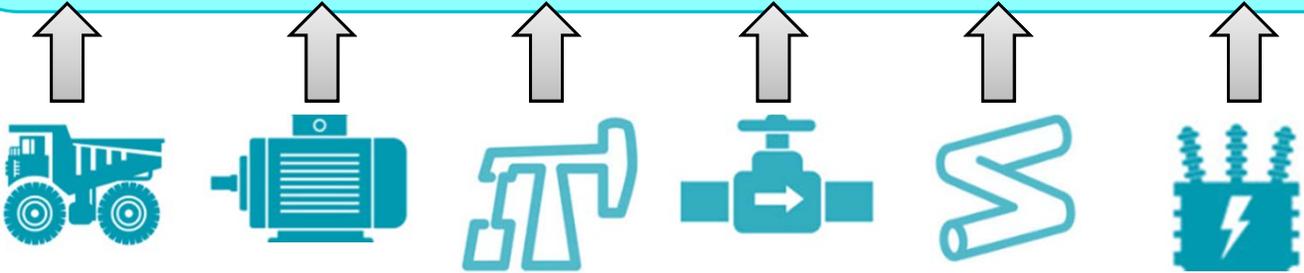
Presented by **Michael Luo**, Technical Consultant, OSIsoft

An Enterprise Infrastructure

Data Driven Insights

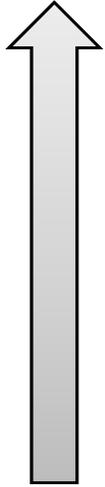


to Wherever your data needs to go

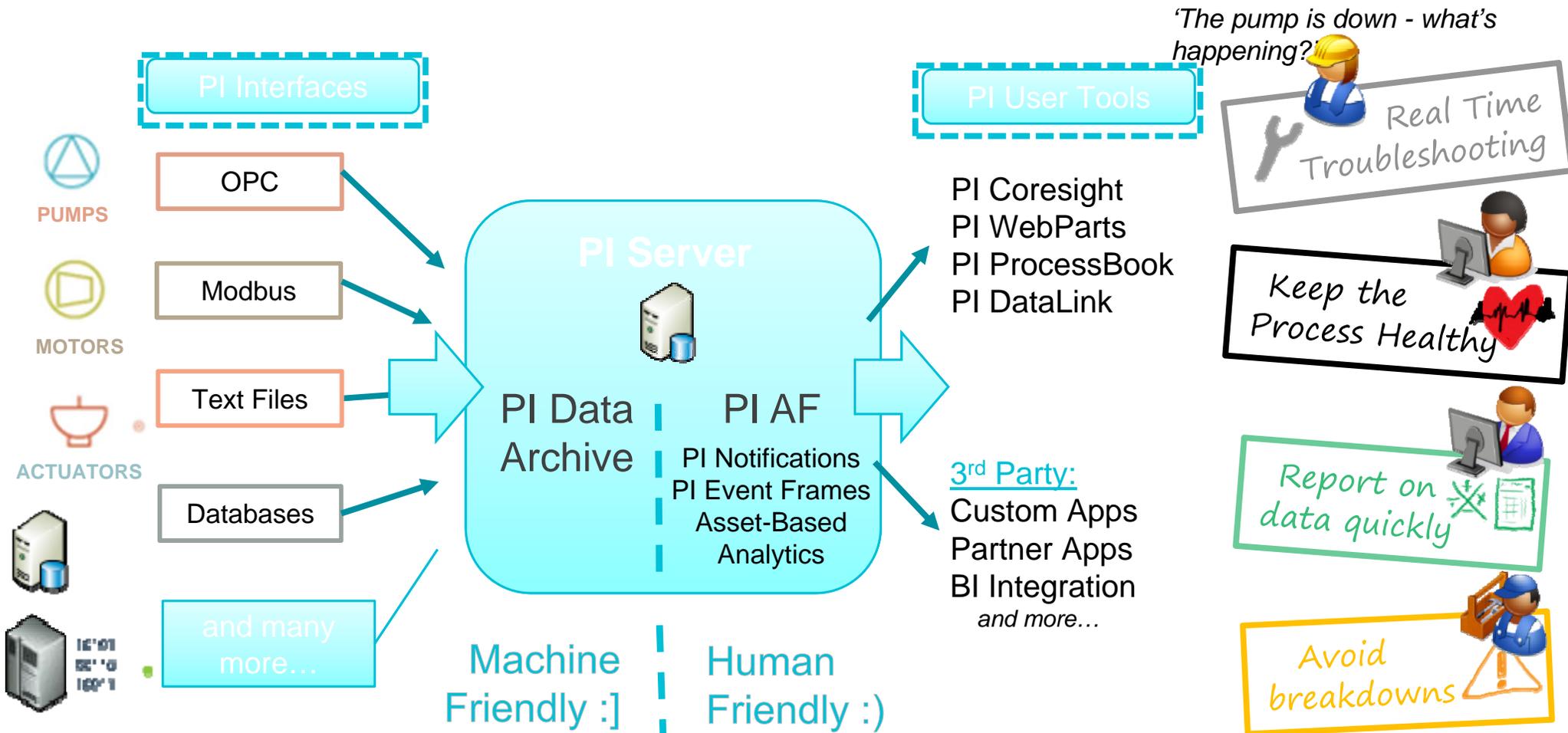


Assets Assets Assets Assets Assets Assets

Wherever your data starts



What is part of our Infrastructure...



What is included in PI Server 2014

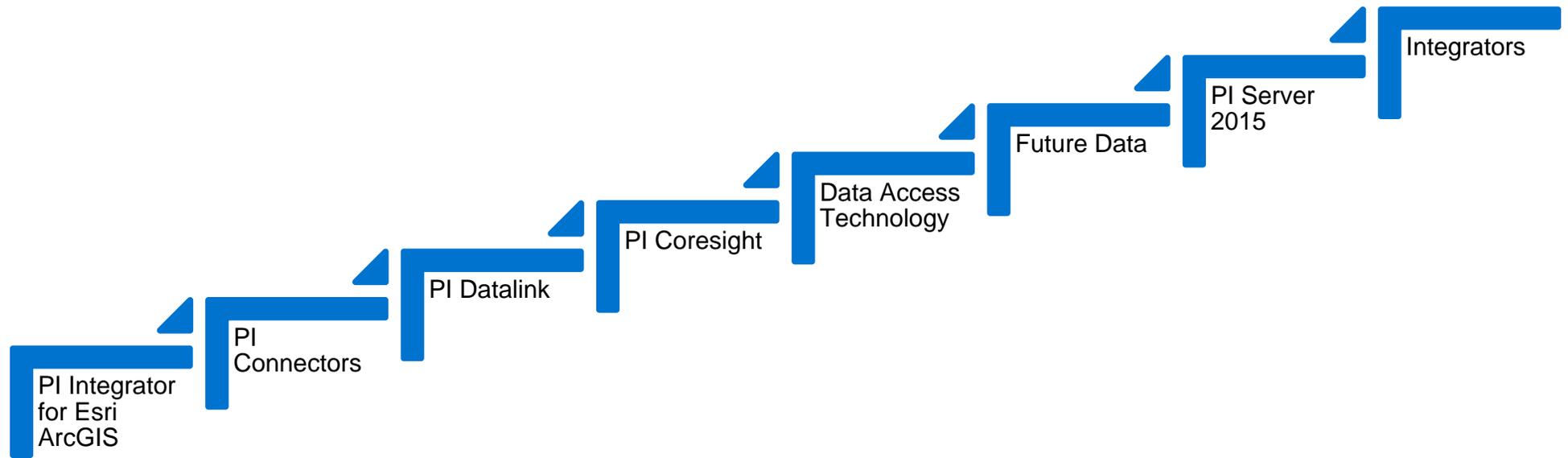
- **Time Series Data Storage**
 - PI Data Archive
- **Contextual, Organize and Find**
 - PI Asset Framework (PI AF)

- **Mark Important Events**
 - PI Event Frames
- **Notify Based on Conditions**
 - PI Notifications

- **Analytics and Event Generation**
 - Asset-Based Analytics
 - PI ACE (Advanced Computing Engine)
 - PI Performance Equations
 - PI Totalizers

- **System Management**
 - PI System Management Tool
 - PI Interfaces for System Management

Future OSIssoft technologies are based on assets



PI System Roadmap

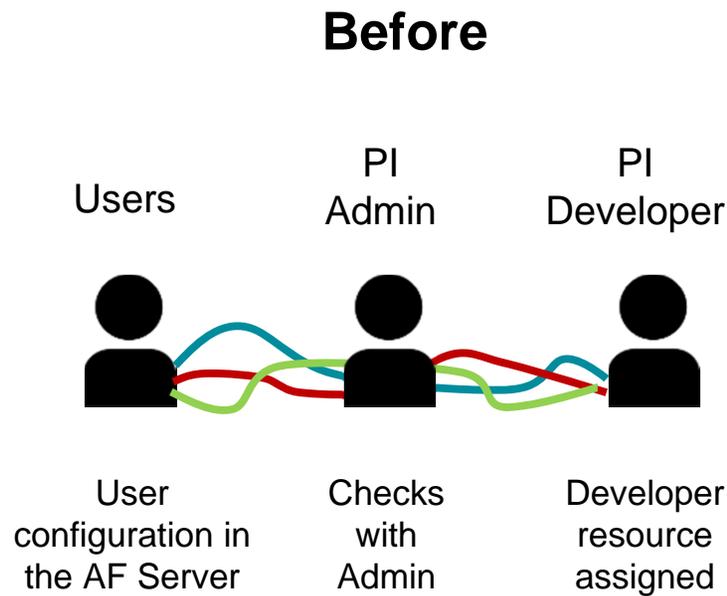
<https://techsupport.osisoft.com/Products/Product-Roadmap>

Asset-Based Analytics

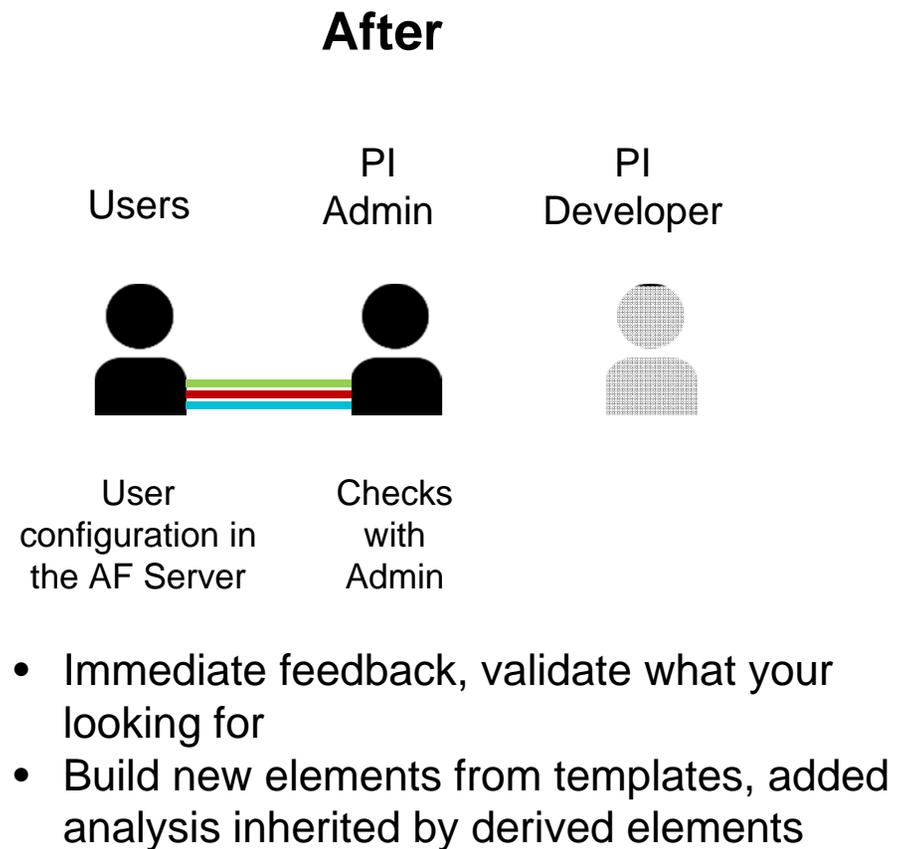
- Easy – empower users to build their own calculations
- Reuse and standardize
 - Clarity and correctness
- KPIs and Rollups
- Automatic Event marking
- And of course, *Performance and scalability*



Asset-Based Analytics: Self-Service Analytics



- Slows down time to value
- Creates complexities (interactions are numerous)



\\Kaboom\NuGreen - PI System Explorer (Administrator)

File View Go Tools Help

Database Query Date Back Check In Refresh New Template Search Element Templates

Library

- NuGreen
 - Categories
 - Analysis Categories
 - Attribute Categories
 - Element Categories
 - Reference Type Categories
 - Table Categories
 - Templates
 - Element Templates
 - Boiler
 - Combined Cycle Power Plan
 - Compressor
 - Condenser
 - Cooling Fan
 - Enterprise
 - Gas Turbine
 - Heater
 - HRSG
 - Monitored Site
 - Plant
 - Process
 - Pump
 - Steam Turbine
 - Unit
 - Event Frame Templates
 - Model Templates
 - Transfer Templates

Gas Turbine

General Attribute Templates Ports Analysis Templates

Name	Expression	Value	Output Attribute
G			

Example Element: [NuGreen\Houston\Power and Steam Generation\Gas Turbine 1](#)

Name	Expression	Value	Output Attribute
Variable1	Type an expression		Click to map

[Add a new expression](#)

Name: G

Description:

Categories:

Analysis Type: Expression Rollup Event Frame Generation

Functions

Insert functions into the expression

All

- Abs
- Acos
- And
- Ascii
- Asin
- Atn

Abs(number x)
Return the absolute value of an integer or real number.
Example: Abs(1)

Attributes

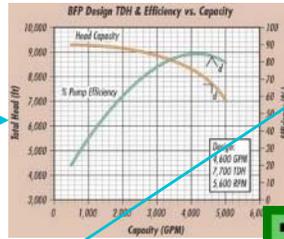
Scheduling: Event-Triggered Periodic

Period: 00h 05m 00s [Configure](#)

Usage Scenarios



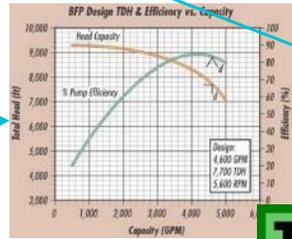
Test



Calculations



Test



Calculations

Annual Sales Report

Item	Unit	Price	Quantity	Total
Item 1	100	100	100	10,000
Item 2	200	50	200	10,000
Item 3	300	33	300	10,000
Item 4	400	25	400	10,000
Item 5	500	20	500	10,000

Backfill



PI Event Frames

Events Shorten the Time to Insight



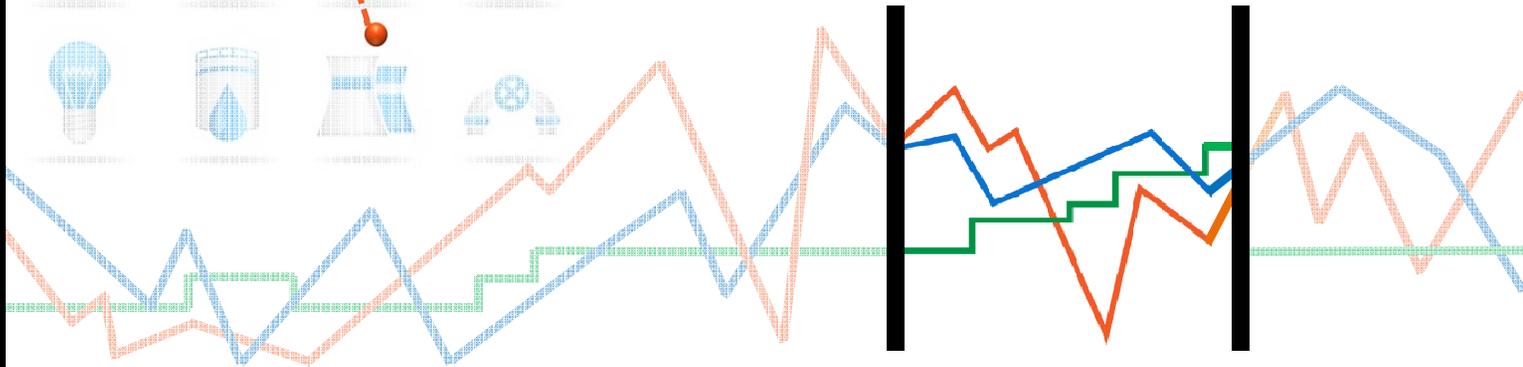
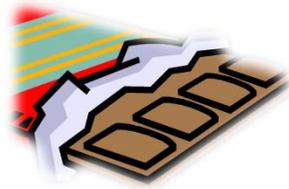
Too High!



Downtime



Batches



Information Challenges



EF Customer Survey: Most Important EF Visualization

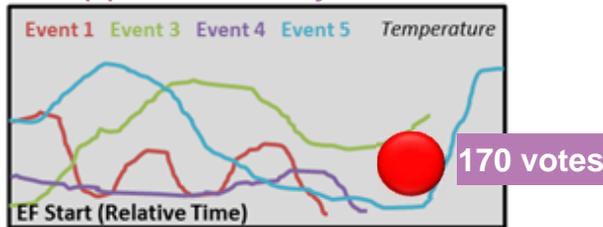
(1) Trend: Time Leading up to EF Start



(2) Trend: EF Start to EF End



(3) Event Overlay Trend

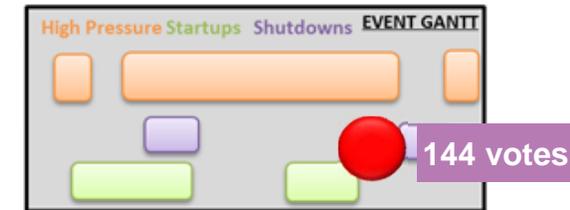


(4) View Event Attributes in Table

Event Name	Duration	Start Time	End Time	Template
EF Demo Event Process	1	2013		
07/20/13 09:09 13:00	01:00:00	5/9/2013 3:00:00 PM	5/9/2013 4:00:00 PM	Downtime
07/20/13 09:09 13:06	00:04:00	5/9/2013 3:06:00 PM	5/9/2013 4:00:00 PM	Downtime
07/20/13 09:09 13:14	00:04:00	5/9/2013 4:14:00 PM	5/9/2013 4:14:00 PM	Downtime
07/20/13 09:09 13:26	00:03:00	5/9/2013 4:26:00 PM	5/9/2013 4:26:00 PM	Downtime
07/20/13 09:09 13:36	00:04:00	5/9/2013 4:36:00 PM	5/9/2013 4:36:00 PM	Downtime
07/20/13 09:09 13:34	00:04:00	5/9/2013 3:34:00 PM	5/9/2013 3:34:00 PM	Downtime

154 votes

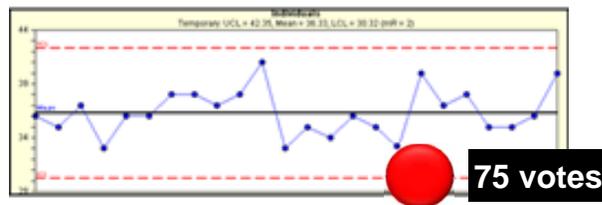
(5) Gantt Chart (aligned w/trend)



(6) Manual Creation of Events



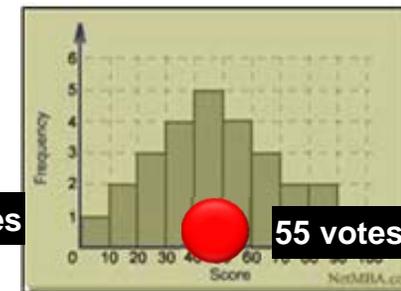
(7) SQC Chart



(8) Line / Column Chart (Event x-axis)



(9) Histogram



PI AF Asset Based Analytics – Event Detection

Library

Power Generation

- Analysis Categories
- Attribute Categories
- Element Categories
- Reference Type Categories
- Table Categories
- Templates
 - Element Templates
 - Air Heater
 - Base Equipment
 - Battery Template
 - Boiler Feed Pump Turbine
 - Circuit Breaker
 - Coal Plant
 - Combined Cycle Power Plant Template
 - Condenser Template
 - Feeder
 - Gas Turbine Template
 - Generator
 - HRSG Template
 - Load Tap Changer
 - Pole Transformer
 - Steam Turbine Template
 - Substation
 - TR Template
 - Turbine
 - Unit
 - Wind Farm Fleet
 - Wind Farm Template
 - Wind Turbine
 - Event Frame Templates
 - 2014_01_Template
 - Boiler Feed Pump Bearing Temp
 - Boiler Feed Pump Cavitation Anomaly
 - Boiler Feed Pump Control Oil Pressure Anomaly
 - Boiler Feed Pump Low Discharge Flow
 - Boiler Feed Pump Low Pump Speed
 - Boiler Feed Pump Suction Pressure Anomaly
 - Domestic Anomaly
 - Circuit Breaker Operation Anomaly
 - GT Exhaust Gas Temperature Anomaly
 - High Vibration
 - MI Low Feeder Speed
 - Operation
 - Phase

Boiler Feed Pump Turbine

General | Attribute Templates | Ports | Analysis Templates

Name: Boiler Feed Pump Vibration Anomaly

Description: Boiler Feed Pump Vibration Anomaly

Categories: [Dropdown]

Analysis Type: Expression Rollup Event Frame Generation

Example Element: Generation\OSIsoft Power\San Leandro Power Plant\Unit 1\Balance of Plant\Feedwater System\Boiler Feed Pump #1

Event Frame Template: Boiler Feed Pump Vibration Anomaly

Name	Expression	Value
StartTrigger	if ('Inboard Bearing Vibration X' > 'Bearing Vibration High Limit') Then true else if ('Inboard Bearing Vibration Y' > 'Bearing Vibration High Limit') Then true else if ('Outboard Bearing Vibration X' > 'Bearing Vibration High Limit') Then true else if ('Outboard Bearing Vibration Y' > 'Bearing Vibration High Limit') then true else false	True
EndTrigger	Type an expression (optional)	

Functions

Insert functions into the expression

All

- Abs
- Acos
- And
- Ascii
- Asin
- Atn
- Atn2
- Avg
- BadVal
- Bod
- Bom
- Bonm
- Ceiling
- Char
- Compare
- Concat
- Convert
- Cos
- Cosh
- Cot
- Coth
- Cor

Abs(number x)
Return the absolute value of an integer or real number.
Example: Abs(1)

Attributes

Evaluated at 4/1/2014 7:35:22 AM

StartTrigger true for: 30 Seconds

Generate child root cause event frame before parent event frame starts

Duration: 1 Days

Name: Root Cause

Category: [Dropdown]

Scheduling: Event-Triggered Periodic

Trigger on: Any Input

Boiler Feed Pump Turbine Modified:3/27/2014 12:29:21 AM.

7:35 AM 4/1/2014

Element Template

EF Start Trigger

Time True

Root Cause Child Events

Type = EF Generation

PE Functions

PI AF Asset Based Analytics – Event Preview

The screenshot displays the PI System Explorer interface. The main window is titled 'Boiler Feed Pump #1' and shows the configuration for an 'Event Frame Template'. The configuration includes a name, description, categories, and analysis type (set to 'Event Frame Generation'). A 'Preview results' dialog box is open, showing a table of event results for the 'Boiler Feed Pump Vibration Anomaly'.

Name	Duration	Start time	End time
- Boiler Feed Pump Vibration Anomaly - 2014.03.28.15	01:57:30	3/28/2014 3:57:11 PM	3/28/2014 5:54:41 PM
- Boiler Feed Pump Vibration Anomaly - 2014.03.29.15	01:57:30	3/29/2014 3:57:11 PM	3/29/2014 5:54:41 PM
- Boiler Feed Pump Vibration Anomaly - 2014.04.01.00	06:58:18.0144869	4/1/2014 12:43:11 AM	

The interface also shows a tree view of elements on the left, including 'Generation', 'Unit 1', and 'Boiler Feed Pump #1'. The bottom status bar indicates the system is connected to the PI Analysis Service and shows the current date and time as 7:42 AM on 4/1/2014.

Results Preview

PI AF Asset Based Analytics – Backfilling Events

The screenshot shows the PI System Explorer application window. The main area displays a table of 8 checked analyses. The table has columns for Status, Element, Name, Template, and Backfilling. The 'Backfilling' column contains green checkmarks for all entries. A callout bubble points to this column with the text 'Backfill Events into History'.

Status	Element	Name	Template	Backfilling
✓	Generation\OSISoft Power\Cleveland Power Plant\Unit 1\Balance of Plant\Feedwater System\Boiler Feed Pump #1	Boiler Feed Pur	Boiler Feed Pump Vibration	✓
✓	Generation\OSISoft Power\Cleveland Power Plant\Unit 1\Balance of Plant\Feedwater System\Boiler Feed Pump #2	Boiler Feed Pur	Boiler Feed Pump Vibration	✓
✓	Generation\OSISoft Power\Philadelphia Power Plant\Unit 1\Balance of Plant\Feedwater System\Boiler Feed Pump #1	Boiler Feed Pur	Boiler Feed Pump Vibration	✓
✓	Generation\OSISoft Power\Philadelphia Power Plant\Unit 1\Balance of Plant\Feedwater System\Boiler Feed Pump #2	Boiler Feed Pur	Boiler Feed Pump Vibration	✓
✓	Generation\OSISoft Power\San Leandro Power Plant\Unit 1\Balance of Plant\Feedwater System\Boiler Feed Pump #1	Boiler Feed Pur	Boiler Feed Pump Vibration	✓
✓	Generation\OSISoft Power\San Leandro Power Plant\Unit 1\Balance of Plant\Feedwater System\Boiler Feed Pump #2	Boiler Feed Pur	Boiler Feed Pump Vibration	✓
✓	Generation\OSISoft Power\Houston Power Plant\Unit 1\Balance of Plant\Feedwater System\Boiler Feed Pump #1	Boiler Feed Pur	Boiler Feed Pump Vibration	✓
✓	Generation\OSISoft Power\Houston Power Plant\Unit 1\Balance of Plant\Feedwater System\Boiler Feed Pump #2	Boiler Feed Pur	Boiler Feed Pump Vibration	✓

Operations
[Start checked analyses](#)
[Stop checked analyses](#)
[Backfill checked analyses](#)

Pending Operations
 No pending operations

Analysis details

Overview | Errors And Warnings

Boiler Feed Pump Vibration Anomaly configuration

Analysis type: Event Frame Generation

Description: Boiler Feed Pump Vibration Anomaly

Element path: Generation\OSISoft Power\Cleveland Power Plant\Unit 1\Balance of Plant\Feedwater System\Boiler Feed Pump #1

Template: Boiler Feed Pump Vibration Anomaly

Schedule: Natural

Status: ✓
 In AF: Enabled
 In PI Analysis Service: Running

Backfill Events into History

PI DataLink 2014 – Pump Relative Report

Copy of Copy of UC2014 Power Gen Reports - Excel

FILE HOME INSERT PAGE LAYOUT FORMULAS DATA REVIEW VIEW ADD-INS PI DATALINK PI BUILDER Team

H20

Site Name **San Leandro Power Plant**
 Unit Name **Unit 1**
 Pump Name **Boiler Feed Pump #1**

Search Start **1/10/2014 0:00** 10-Jan-14 00:00:00
 Search End ***** 24-Mar-14 14:17:41

AF DL Queries

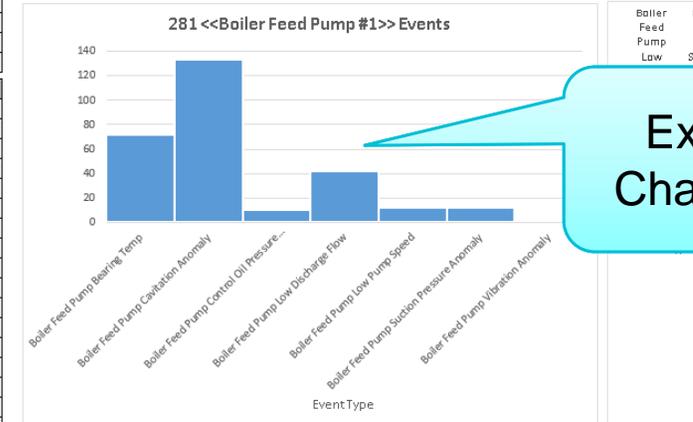
UOM	VIBRATION DATA				PRESSURES				BEARING TEMPERATURES		UOM
	Inboard Bearing Vibration X	Inboard Bearing Vibration Y	Outboard Bearing Vibration X	Outboard Bearing Vibration Y	Bearing Oil Pressure	Control Oil Pressure	Discharge Pressure	Suction Pressure	Inboard Bearing Temperature	Outboard Bearing Temperature	
Value at Start: 10-Jan-14 00:00:00	1.56	1.39	1.50	1.55	15.04	32.33	3675.56	116.17	135.82	122.56	Value at Start: 1
Value at End: 24-Mar-14 14:17:41	0.09	0.13	0.09	0.05	8.40	34.19	28.38	62.59	80.64	81.67	Value at End: 24
Minimum	0.05	0.05	0.04	0.04	2.11	29.82	-76.94	-4.00	71.84	73.44	Minimum
Average	1.05	1.45	1.21	1.26	14.14	32.87	2796.92	123.04	121.42	110.60	Average
Maximum	2.36	21.00	2.11	1.88	19.12	39.91	4081.23	207.12	142.32	127.20	Maximum
StdDev	0.59	2.22	0.68	0.62	3.69	0.96	1687.24	46.10	23.46	16.71	StdDev

Events

EF NAME ***** EVENT CATEGORY ***** EVENT TEMPLATE *****

Minimum **0 0:05:00** Minimum **#VALUE!**
 Average **0 12:15:22** Average **#VALUE!**
 StdDev **1 6:01:40** StdDev **#VALUE!**
 Maximum **8 7:40:00** Maximum **#VALUE!**

Event	Start time	End time	Duration	Event template	Duration Minutes
Boiler Feed Pump #1 - Boiler Feed Pump	10-Jan-14 00:00:00	11-Jan-14 06:40:00	1 6:40:00	Boiler Feed Pump Low Discharge Flow	1840.0
Boiler Feed Pump #1 - Boiler Feed Pump	10-Jan-14 00:00:00	11-Jan-14 06:40:00	1 6:40:00	Boiler Feed Pump Low Discharge Flow	1840.0
Boiler Feed Pump #1 - Boiler Feed Pump	10-Jan-14 00:00:00	10-Jan-14 00:55:00	0 0:55:00	Boiler Feed Pump Cavitation Anomaly	55.0
Boiler Feed Pump #1 - Boiler Feed Pump	10-Jan-14 00:00:00	10-Jan-14 00:55:00	0 0:55:00	Boiler Feed Pump Cavitation Anomaly	55.0
Boiler Feed Pump #1 - Boiler Feed Pump	10-Jan-14 06:35:00	10-Jan-14 07:00:00	0 0:25:00	Boiler Feed Pump Bearing Temp	25.0
Boiler Feed Pump #1 - Boiler Feed Pump	10-Jan-14 06:35:00	10-Jan-14 07:00:00	0 0:25:00	Boiler Feed Pump Bearing Temp	25.0
Boiler Feed Pump #1 - Boiler Feed Pump	10-Jan-14 09:35:00	11-Jan-14 11:30:00	1 1:55:00	Boiler Feed Pump Cavitation Anomaly	1555.0
Boiler Feed Pump #1 - Boiler Feed Pump	10-Jan-14 09:35:00	11-Jan-14 11:30:00	1 1:55:00	Boiler Feed Pump Cavitation Anomaly	1555.0
Boiler Feed Pump #1 - Boiler Feed Pump	10-Jan-14 11:45:00	10-Jan-14 12:05:00	0 0:20:00	Boiler Feed Pump Bearing Temp	20.0
Boiler Feed Pump #1 - Boiler Feed Pump	10-Jan-14 11:45:00	10-Jan-14 12:05:00	0 0:20:00	Boiler Feed Pump Bearing Temp	20.0
Boiler Feed Pump #1 - Boiler Feed Pump	11-Jan-14 01:30:00	11-Jan-14 01:50:00	0 0:20:00	Boiler Feed Pump Bearing Temp	20.0
Boiler Feed Pump #1 - Boiler Feed Pump	11-Jan-14 01:30:00	11-Jan-14 01:50:00	0 0:20:00	Boiler Feed Pump Bearing Temp	20.0
Boiler Feed Pump #1 - Boiler Feed Pump	11-Jan-14 07:35:00	11-Jan-14 07:50:00	0 0:15:00	Boiler Feed Pump Cavitation Anomaly	15.0
Boiler Feed Pump #1 - Boiler Feed Pump	11-Jan-14 07:35:00	11-Jan-14 07:50:00	0 0:15:00	Boiler Feed Pump Cavitation Anomaly	15.0
Boiler Feed Pump #1 - Boiler Feed Pump	11-Jan-14 08:20:00	11-Jan-14 08:30:00	0 0:10:00	Boiler Feed Pump Cavitation Anomaly	10.0
Boiler Feed Pump #1 - Boiler Feed Pump	11-Jan-14 08:20:00	11-Jan-14 08:30:00	0 0:10:00	Boiler Feed Pump Cavitation Anomaly	10.0
Boiler Feed Pump #1 - Boiler Feed Pump	11-Jan-14 08:25:00	11-Jan-14 08:50:00	0 0:25:00	Boiler Feed Pump Bearing Temp	25.0
Boiler Feed Pump #1 - Boiler Feed Pump	11-Jan-14 08:25:00	11-Jan-14 08:50:00	0 0:25:00	Boiler Feed Pump Bearing Temp	25.0
Boiler Feed Pump #1 - Boiler Feed Pump	11-Jan-14 12:35:00	12-Jan-14 18:35:00	1 6:00:00	Boiler Feed Pump Cavitation Anomaly	1800.0
Boiler Feed Pump #1 - Boiler Feed Pump	11-Jan-14 12:35:00	12-Jan-14 18:35:00	1 6:00:00	Boiler Feed Pump Cavitation Anomaly	1800.0



Excel Charting

LIVE LIVE Root Cause Compare **Boiler Feed Pump Relative** Production Summary Report Hourly Report Daily Anomaly Investigation GLOBAL DAY Data

READY 7:23 AM 4/1/2014

PI DataLink 2014 – Daily Events Production Report

Copy of Copy of UC2014 Power Gen Reports - Excel
 FILE HOME INSERT PAGE LAYOUT FORMULAS DATA REVIEW VIEW ADD-INS PI DATALINK PI BUILDER Team

B21 : (=PIEFdat(GLOBAL!\$B\$2,'Production Summary Report'!\$C\$3,'Production Summary Report'!\$C\$4,0,'Production Summary Report'!\$F\$4,'Unit TIME.Day'),'Production Summary Report'!\$F\$3,"","", "", "", "active in range", "start time

EF Template	Unit Time.Day	Site Name	San Leandro Power Plant	Day of Week	
Search Start	1/10/2014 0:00	Unit Name	Unit 1	*	
Search End	*	EF Name	*		

Daily Events

Unit Trip!

Start time	End time	Duration	Site Name	Primary element	Day of Week	Day Type	AMBIENT TEMPERATURE			GROSS MW				
							Ambient Temperature.Min	Ambient Temperature.Avg	Ambient Temperature.Max	Gross MW.Start	Gross MW.End	Gross MW.Min	Gross MW.Avg	Gross MW.Max
10-Jan-14 00:00:00	11-Jan-14 00:00:00	1 0:00:00	San Leandro Power Plant	Unit 1	FRIDAY	WEEKDAY	39.38	53.15	62.12	389.42	383.05	371.63	382.90	405.87
11-Jan-14 00:00:00	12-Jan-14 00:00:00	1 0:00:00	San Leandro Power Plant	Unit 1	SATURDAY	WEEKEND	42.95	51.00	58.65	383.05	548.17	377.83	513.15	583.74
12-Jan-14 00:00:00	13-Jan-14 00:00:00	1 0:00:00	San Leandro Power Plant	Unit 1	SUNDAY	WEEKEND	36.49	39.77	42.97	548.17	557.14	532.21		
13-Jan-14 00:00:00	14-Jan-14 00:00:00	1 0:00:00	San Leandro Power Plant	Unit 1	MONDAY	WEEKDAY	31.43	34.38	37.44	557.14	557.33	445.87		
14-Jan-14 00:00:00	15-Jan-14 00:00:00	1 0:00:00	San Leandro Power Plant	Unit 1	TUESDAY	WEEKDAY	29.40	36.46	44.59	557.33	561.43	513.01		
15-Jan-14 00:00:00	16-Jan-14 00:00:00	1 0:00:00	San Leandro Power Plant	Unit 1	WEDNESDAY	WEEKDAY	36.39	39.39	45.72	561.43	483.70	443.01		
16-Jan-14 00:00:00	17-Jan-14 00:00:00	1 0:00:00	San Leandro Power Plant	Unit 1	THURSDAY	WEEKDAY	31.79	33.96	38.39	483.70	559.58	472.09		
17-Jan-14 00:00:00	18-Jan-14 00:00:00	1 0:00:00	San Leandro Power Plant	Unit 1	FRIDAY	WEEKDAY	27.75	31.90	36.31	559.58	584.55	556.32		
18-Jan-14 00:00:00	19-Jan-14 00:00:00	1 0:00:00	San Leandro Power Plant	Unit 1	SATURDAY	WEEKEND	32.18	36.37	41.00	584.55	580.75	556.34		
19-Jan-14 00:00:00	20-Jan-14 00:00:00	1 0:00:00	San Leandro Power Plant	Unit 1	SUNDAY	WEEKEND	28.63	33.16	40.24	580.75	581.87	574.66		
20-Jan-14 00:00:00	21-Jan-14 00:00:00	1 0:00:00	San Leandro Power Plant	Unit 1	MONDAY	WEEKDAY	25.36	30.89	33.64	581.87	585.70	517.12		
21-Jan-14 00:00:00	22-Jan-14 00:00:00	1 0:00:00	San Leandro Power Plant	Unit 1	TUESDAY	WEEKDAY	21.31	29.28	36.49	585.70	586.95	578.56		
22-Jan-14 00:00:00	23-Jan-14 00:00:00	1 0:00:00	San Leandro Power Plant	Unit 1	WEDNESDAY	WEEKDAY	31.02	36.55	43.74	586.95	582.22	543.00		
23-Jan-14 00:00:00	24-Jan-14 00:00:00	1 0:00:00	San Leandro Power Plant	Unit 1	THURSDAY	WEEKDAY	30.67	35.83	39.71	582.22	584.35	550.65		
24-Jan-14 00:00:00	25-Jan-14 00:00:00	1 0:00:00	San Leandro Power Plant	Unit 1	FRIDAY	WEEKDAY	34.48	36.28	38.73	584.35	1.57	1.57	497.81	631.43
25-Jan-14 00:00:00	26-Jan-14 00:00:00	1 0:00:00	San Leandro Power Plant	Unit 1	SATURDAY	WEEKEND	33.30	36.73	40.87	1.57	1.41	1.35	1.52	1.50
26-Jan-14 00:00:00	27-Jan-14 00:00:00	1 0:00:00	San Leandro Power Plant	Unit 1	SUNDAY	WEEKEND	37.34	41.12	46.49	1.41	1.57	1.35	1.48	1.50
27-Jan-14 00:00:00	28-Jan-14 00:00:00	1 0:00:00	San Leandro Power Plant	Unit 1	MONDAY	WEEKDAY	35.64	42.73	50.00	1.57	1.51	1.51	1.57	1.50
28-Jan-14 00:00:00	29-Jan-14 00:00:00	1 0:00:00	San Leandro Power Plant	Unit 1	TUESDAY	WEEKDAY	35.96	42.99	50.79	1.51	1.51	1.35	1.50	1.50
29-Jan-14 00:00:00	30-Jan-14 00:00:00	1 0:00:00	San Leandro Power Plant	Unit 1	WEDNESDAY	WEEKDAY	37.32	45.35	51.52	1.51	1.57	1.35	1.43	1.50
30-Jan-14 00:00:00	31-Jan-14 00:00:00	1 0:00:00	San Leandro Power Plant	Unit 1	THURSDAY	WEEKDAY	38.37	45.66	53.09	1.57	1.57	1.35	1.50	1.50
31-Jan-14 00:00:00	01-Feb-14 00:00:00	1 0:00:00	San Leandro Power Plant	Unit 1	FRIDAY	WEEKDAY	45.71	52.39	61.25	1.57	564.46	1.57	329.83	583.74
01-Feb-14 00:00:00	02-Feb-14 00:00:00	1 0:00:00	San Leandro Power Plant	Unit 1	SATURDAY	WEEKEND	34.55	41.15	52.62	564.46	584.37	499.94	575.82	591.43
02-Feb-14 00:00:00	03-Feb-14 00:00:00	1 0:00:00	San Leandro Power Plant	Unit 1	SUNDAY	WEEKEND	29.58	37.42	45.33	584.37	502.19	502.19	581.74	581.74
03-Feb-14 00:00:00	04-Feb-14 00:00:00	1 0:00:00	San Leandro Power Plant	Unit 1	MONDAY	WEEKDAY	31.52	38.18	47.16	502.19	581.26	502.19	580.03	581.74
04-Feb-14 00:00:00	05-Feb-14 00:00:00	1 0:00:00	San Leandro Power Plant	Unit 1	TUESDAY	WEEKDAY	41.13	41.29	41.45	581.26	582.85	581.26	582.05	582.05
05-Feb-14 00:00:00	06-Feb-14 00:00:00	1 0:00:00	San Leandro Power Plant	Unit 1	WEDNESDAY	WEEKDAY	40.82	40.97	41.13	582.85	584.43	582.85	583.64	584.43
06-Feb-14 00:00:00	07-Feb-14 00:00:00	1 0:00:00	San Leandro Power Plant	Unit 1	THURSDAY	WEEKDAY	40.68	43.56	53.49	584.43	584.13	496.15	575.45	591.43
07-Feb-14 00:00:00	08-Feb-14 00:00:00	1 0:00:00	San Leandro Power Plant	Unit 1	FRIDAY	WEEKDAY	48.62	57.47	60.77	584.13	585.30	405.41	473.67	581.74
08-Feb-14 00:00:00	09-Feb-14 00:00:00	1 0:00:00	San Leandro Power Plant	Unit 1	SATURDAY	WEEKEND	43.24	51.08	67.00	585.30	581.77	557.08	583.15	591.43
09-Feb-14 00:00:00	10-Feb-14 00:00:00	1 0:00:00	San Leandro Power Plant	Unit 1	SUNDAY	WEEKEND	43.60	47.53	54.25	581.77	581.77	572.93	583.79	581.74
10-Feb-14 00:00:00	11-Feb-14 00:00:00	1 0:00:00	San Leandro Power Plant	Unit 1	MONDAY	WEEKDAY	42.88	46.16	50.80	581.77	583.44	472.99	578.89	581.74

LIVE LIVE Root Cause Compare Boiler Feed Pump Relative Production Summary Report Hourly Report Daily Anomaly Investigation GLOBAL DAY Data

READY 100% 7:25 AM 4/1/2014

PI DataLink 2014 – Daily Anomaly Report

Copy of Copy of UC2014 Power Gen Reports - Excel

FILE HOME INSERT PAGE LAYOUT FORMULAS DATA REVIEW VIEW ADD-INS PI DATALINK PI BUILDER Team

F26 : X ✓ f

Select a DAY: 2014_01_25

Search Start: 1/10/2014 10-Jan-14 00:00:00

Search End: * 24-Mar-14 14:20:12

Unit Name: Unit 1

Daily Data

Excursion Events

Excel Charting

GENERAL INFORMATION

DAY NAME: 2014_01_25
 Site: San Leandro Power Plant
 Unit: Unit 1
 Start Time: 25-Jan-14 00:00:00
 End Time: 26-Jan-14 00:00:00
 Duration: 1 0:00:00
 Duration (min): 1440.0
 Day of Week: SATURDAY
 Day Type: WEEKEND
 Element Path: \UCAFSVR\Power Generation\Generation\OSISoft Power\San Leandro Power Plant\Unit 1

AMBIENT TEMPERATURE

Ambient Temperature.Min: 33.30
 Ambient Temperature.Avg: 36.73
 Ambient Temperature.Max: 40.87

TURBINE OVERVIEW

HP Overall Efficiency.Avg: 0.00
 IP Overall Efficiency.Avg: 0.00

GENERATOR OVERVIEW

Gross MW.Start: 1.57
 Gross MW.End: 1.41
 Gross MW.Min: 1.35
 Gross MW.Avg: 1.52

(76) Events during DAY ---2014_01_25--- on <<Unit 1>>

76 ---2014_01_25--- Events

76 ---2014_01_25--- Events

EF Name: *

Event Category: *

Event Template: *

Events Active In Range

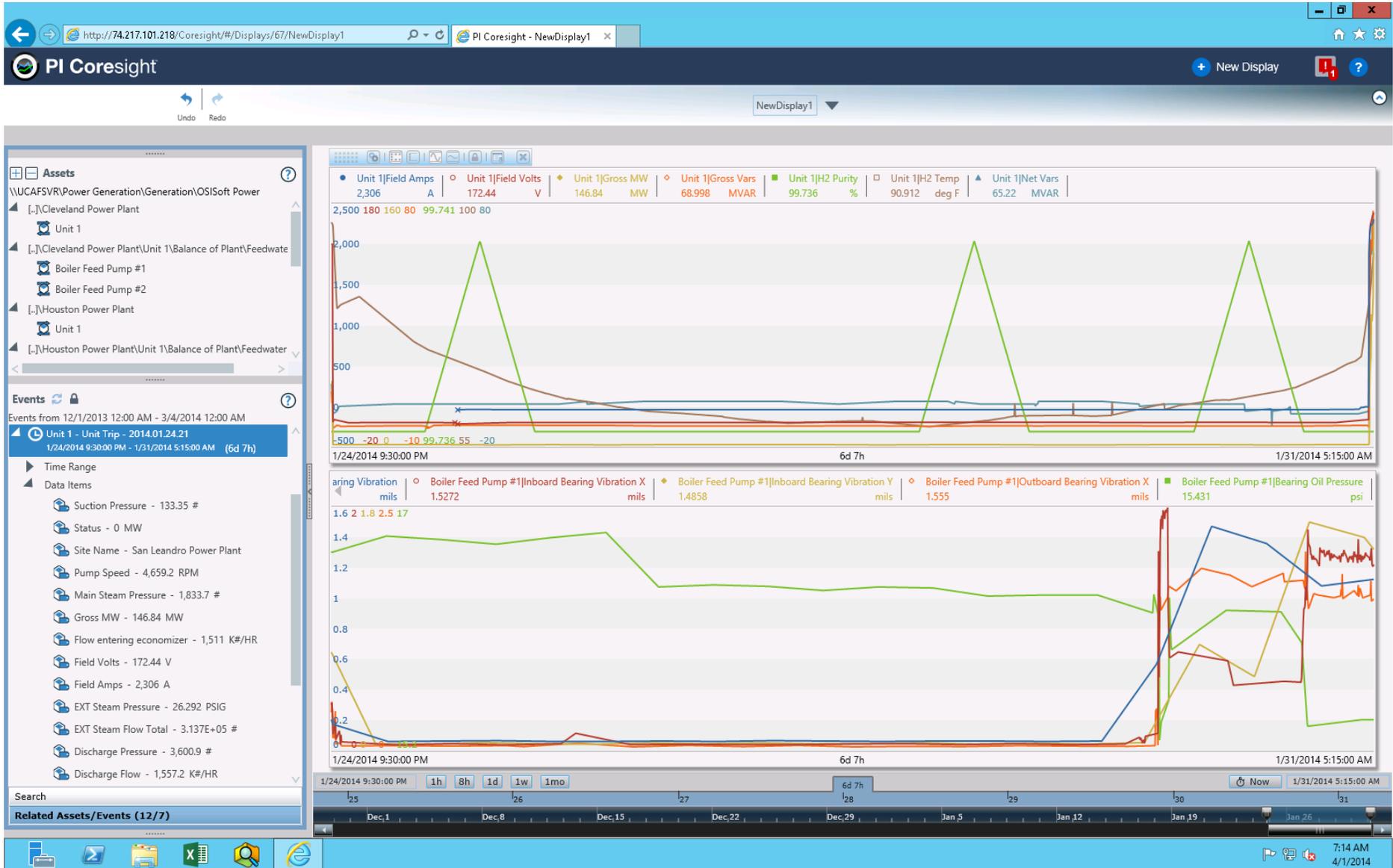
Relative Time	Event name	Start tir	End tir	Durati	Event template
00 -- 05:05:00	Boiler Feed Pump #1 - Boiler Feed Pump Low Discharge Flo	24-Jan-14 18:55:00	29-Jan-14 21:55:00	5 3:00:00	Boiler Feed Pump Low Discharge Flow
00 -- 04:05:00	Boiler Feed Pump #1 - Boiler Feed Pump Low Pump Speed -	24-Jan-14 19:55:00	29-Jan-14 21:55:00	5 2:00:00	Boiler Feed Pump Low Pump Speed
00 -- 03:05:00	Boiler Feed Pump #2 - Boiler Feed Pump Low Discharge Flo	24-Jan-14 20:55:00	26-Jan-14 08:50:00	1 11:55:00	Boiler Feed Pump Low Discharge Flow
00 -- 02:45:00	Boiler Feed Pump #1 - Boiler Feed Pump Control Oil Pressu	24-Jan-14 21:15:00	25-Jan-14 01:55:00	0 4:40:00	Boiler Feed Pump Control Oil Pressure Anoma
00 -- 02:30:00	Unit 1 - Unit Trip - 2014.01.24.21	24-Jan-14 21:30:00	31-Jan-14 05:15:00	6 7:45:00	Unit Trip
00 -- 01:15:00	Boiler Feed Pump #2 - Boiler Feed Pump Low Pump Speed -	24-Jan-14 22:45:00	26-Jan-14 09:15:00	1 10:30:00	Boiler Feed Pump Low Pump Speed
00 -- 00:06:40	Mill 2 - Mill Low Feeder Speed - 2014.01.24.23	24-Jan-14 23:53:20	25-Jan-14 00:01:00	0 0:07:40	Mill Low Feeder Speed
00 -- 00:00:00	2014_01_25	25-Jan-14 00:00:00	26-Jan-14 00:00:00	1 0:00:00	Unit TIME.Day
00 -- 00:32:30	Mill 4 - Mill Low Feeder Speed - 2014.01.25.00	25-Jan-14 00:32:30	25-Jan-14 00:42:00	0 0:09:30	Mill Low Feeder Speed
00 -- 00:32:50	Mill 1 - Mill Low Feeder Speed - 2014.01.25.00	25-Jan-14 00:32:50	25-Jan-14 01:36:30	0 1:03:40	Mill Low Feeder Speed
00 -- 00:34:00	Mill 2 - Mill Low Feeder Speed - 2014.01.25.00	25-Jan-14 00:34:00	25-Jan-14 01:41:20	0 1:07:20	Mill Low Feeder Speed
00 -- 01:40:20	Mill 1 - Mill Low Feeder Speed - 2014.01.25.01	25-Jan-14 01:40:20	25-Jan-14 02:22:00	0 0:41:40	Mill Low Feeder Speed
00 -- 04:20:20	Mill 1 - Mill Low Feeder Speed - 2014.01.25.04	25-Jan-14 04:20:20	25-Jan-14 04:32:30	0 0:12:10	Mill Low Feeder Speed
00 -- 04:34:00	Mill 1 - Mill Low Feeder Speed - 2014.01.25.04	25-Jan-14 04:34:00	25-Jan-14 04:38:30	0 0:04:30	Mill Low Feeder Speed
00 -- 04:40:50	Mill 1 - Mill Low Feeder Speed - 2014.01.25.04	25-Jan-14 04:40:50	25-Jan-14 08:08:30	0 3:27:40	Mill Low Feeder Speed
00 -- 08:14:00	Mill 1 - Mill Low Feeder Speed - 2014.01.25.08	25-Jan-14 08:14:00	25-Jan-14 08:40:00	0 0:26:00	Mill Low Feeder Speed
00 -- 08:46:40	Mill 1 - Mill Low Feeder Speed - 2014.01.25.08	25-Jan-14 08:46:40	25-Jan-14 08:53:50	0 0:07:10	Mill Low Feeder Speed
00 -- 09:09:00	Mill 1 - Mill Low Feeder Speed - 2014.01.25.09	25-Jan-14 09:09:00	25-Jan-14 09:14:20	0 0:05:20	Mill Low Feeder Speed

READY 20 OF 77 RECORDS FOUND

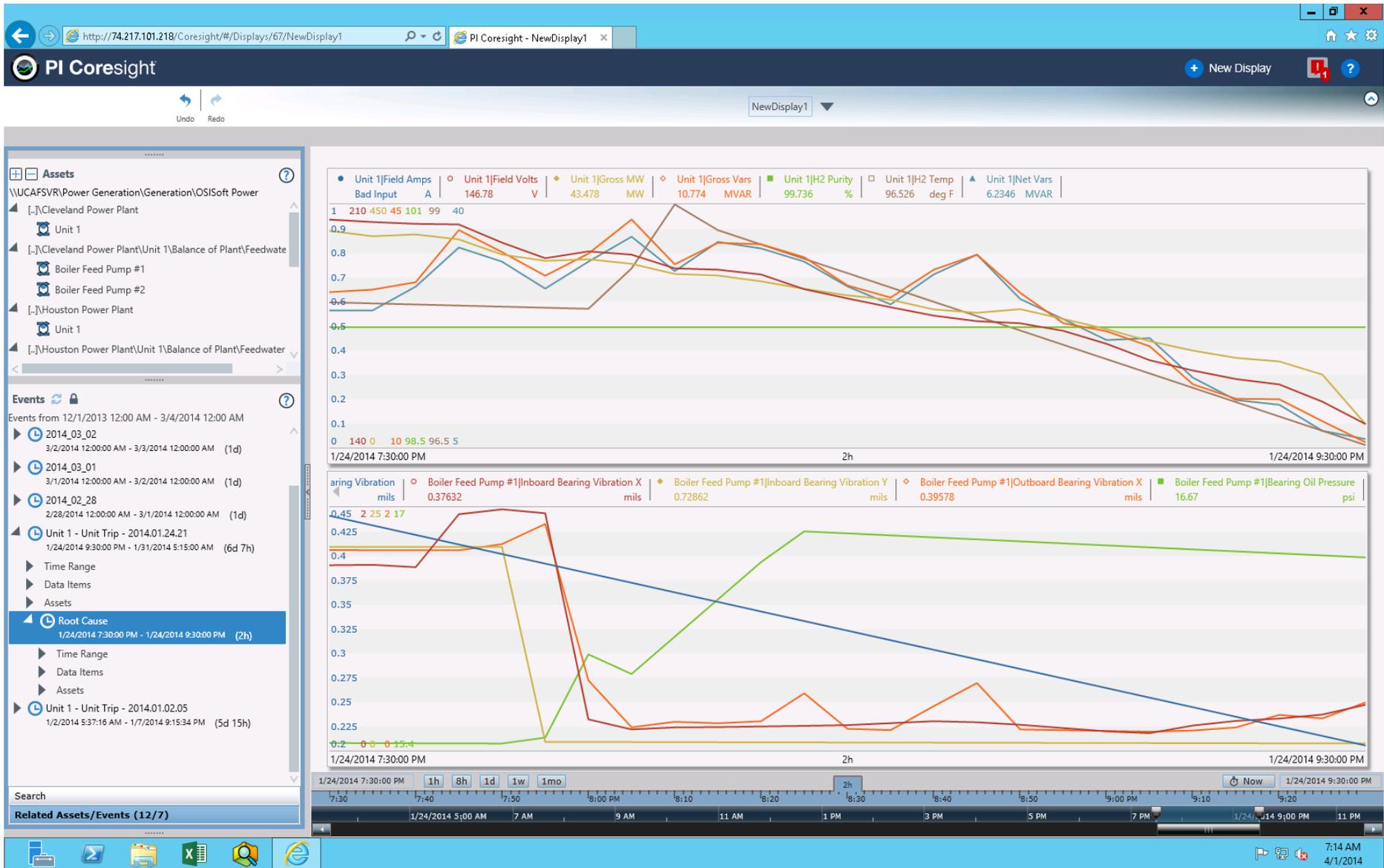
LIVE LIVE Root Cause Compare Boiler Feed Pump Relative Production Summary Report Hourly Report Daily Anomaly Investigation GLOBAL DAY Data

7:28 AM 4/1/2014

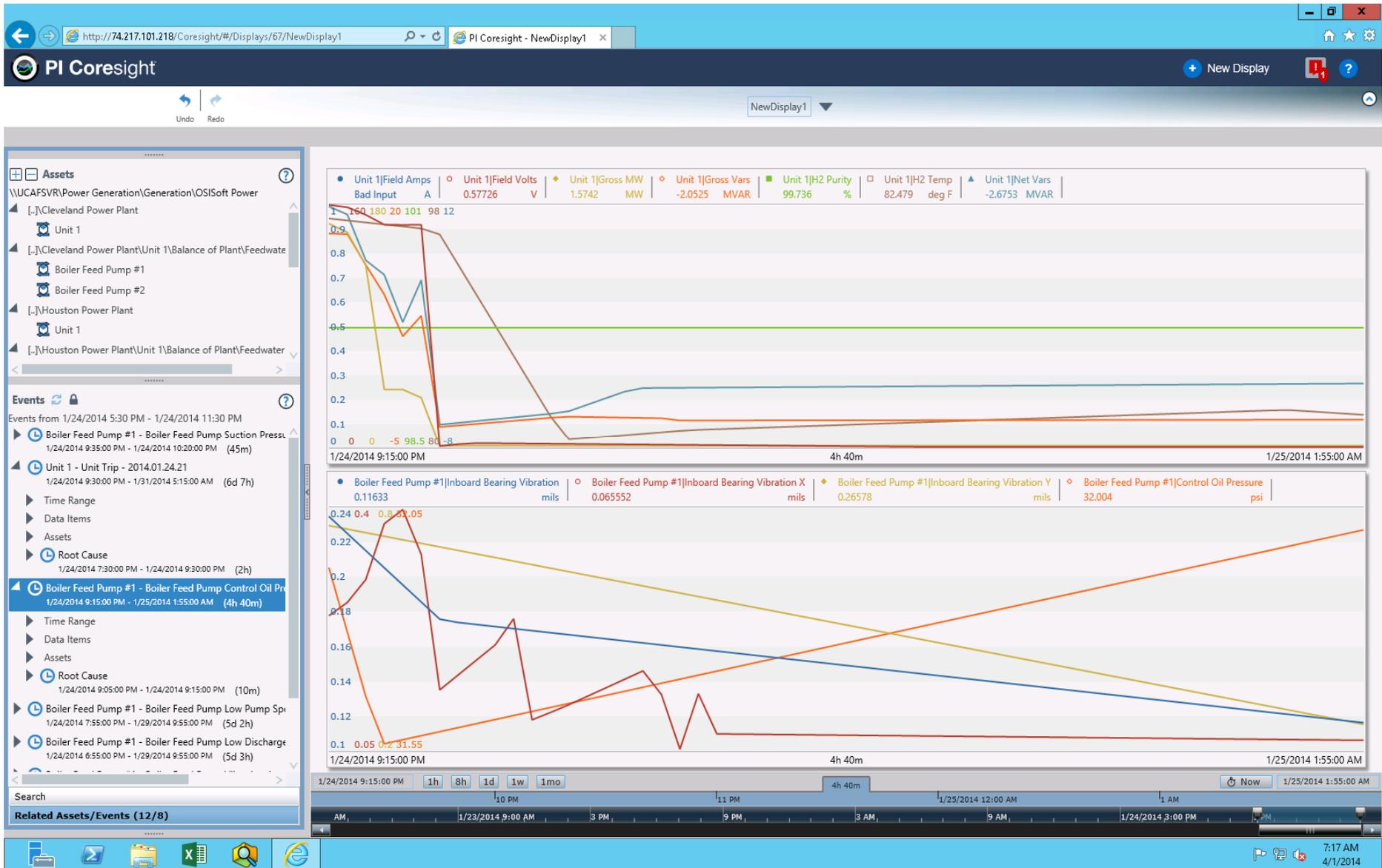
PI Coresight – Event Trending & Related Data



PI Coresight – Root Cause Event Trending



PI Coresight – Anomaly Events



PI Event Frames



2014

 PI Web API – Initial EF Support

 **PI AF Asset Based Analytics – Event Detection**

 **PI DataLink 2014 – Events in Excel**

 PI AF 2014 – EF Value Capture, Locked EFs

 PI AF 2014 – Audit Trail Viewer

 **PI Coresight – Hierarchical Events**

 **PI Coresight – Related Events**

 **PI System Access – PI OLEDB
Enterprise, PI Web Services, PI JDBC**

2013

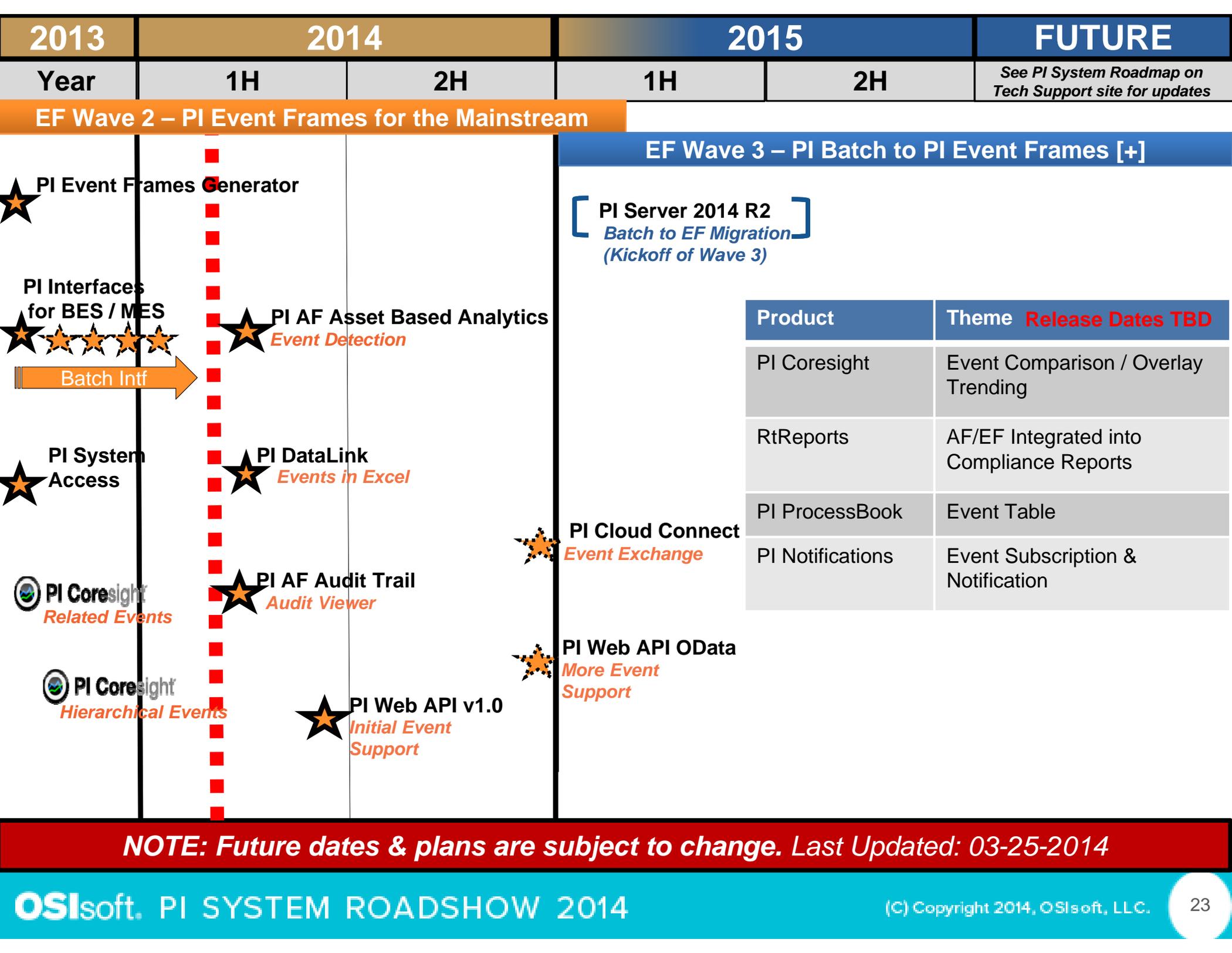
 **PI Event Frames Generator**

 PI AF SDK – Programmatic Access

 PI AF – PI Event Frames Database



2012



2013

2014

2015

FUTURE

Year

1H

2H

1H

2H

See PI System Roadmap on Tech Support site for updates

EF Wave 2 – PI Event Frames for the Mainstream

EF Wave 3 – PI Batch to PI Event Frames [+]

PI Event Frames Generator

PI Interfaces for BES / MES

Batch Intf

PI System Access

PI AF Asset Based Analytics
Event Detection

PI DataLink
Events in Excel

PI AF Audit Trail
Audit Viewer

PI CoreSight
Related Events

PI CoreSight
Hierarchical Events

PI Web API v1.0
Initial Event Support

PI Server 2014 R2
Batch to EF Migration
(Kickoff of Wave 3)

Product	Theme	Release Dates TBD
PI Coresight	Event Comparison / Overlay Trending	
RtReports	AF/EF Integrated into Compliance Reports	
PI ProcessBook	Event Table	
PI Notifications	Event Subscription & Notification	

PI Cloud Connect
Event Exchange

PI Web API OData
More Event Support

NOTE: Future dates & plans are subject to change. Last Updated: 03-25-2014

PI Coresight 2014

Transitional release with Big New Features

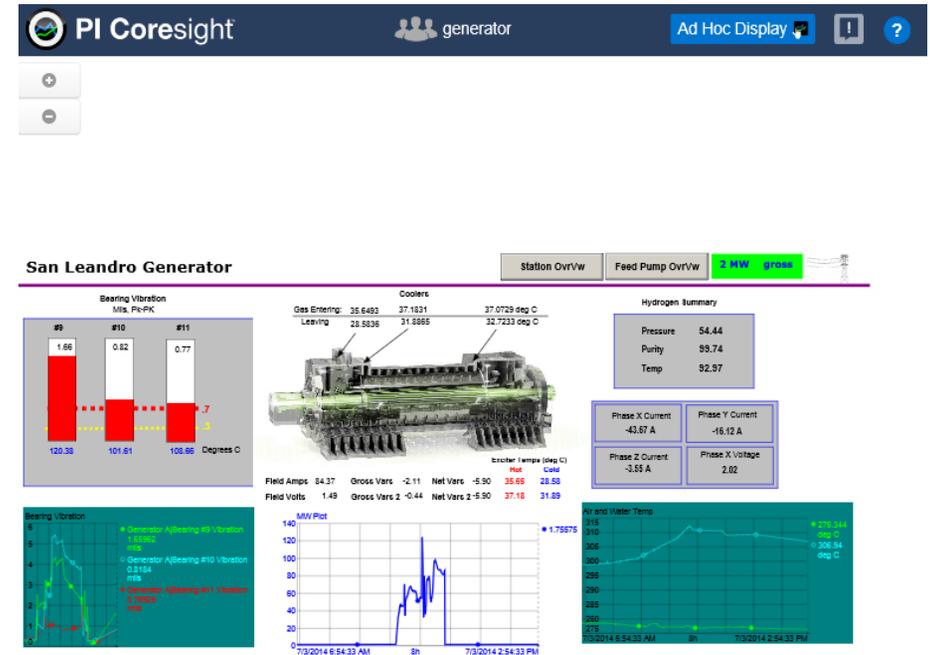
- Moving from desktop browser only to phone, tablet, and desktop
- Making PB displays available on new devices and combine them with new visualization tools
- Improving performance and scalability
- On the path to fully integrated visualization toolset
 - High fidelity display editor
 - Ad-hoc investigation
 - Analytics and Notifications
 - Any device anywhere

PI Coresight 2014

I need to access my graphic displays and real-time data using any modern browser so that I can trouble shoot problems without special software installed.

PI ProcessBook Display Viewing

- Viewable on any modern browser
- Displays organized by import folder
- No special software needed on the client machine

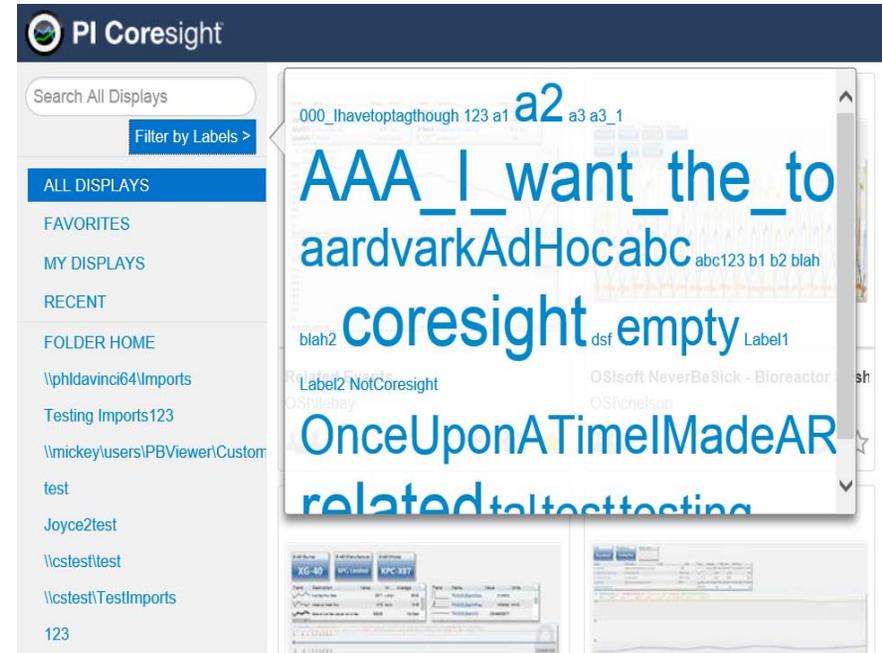


PI Coresight 2014

I need to quickly filter the list of displays to see only the ones I am interested in so I don't waste time hunting for what I want.

New Home Page

- Available using any modern browser
- Find and open native Coresight or PB displays
- Organize displays with folders or labels
- Administrator can manage any display



PI Coresight 2014

I need access to my data and displays from anywhere and with any device, so I can solve problems even before I get there.

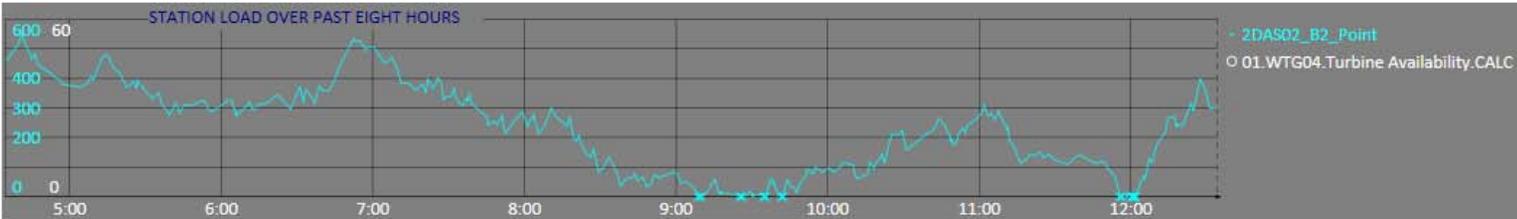
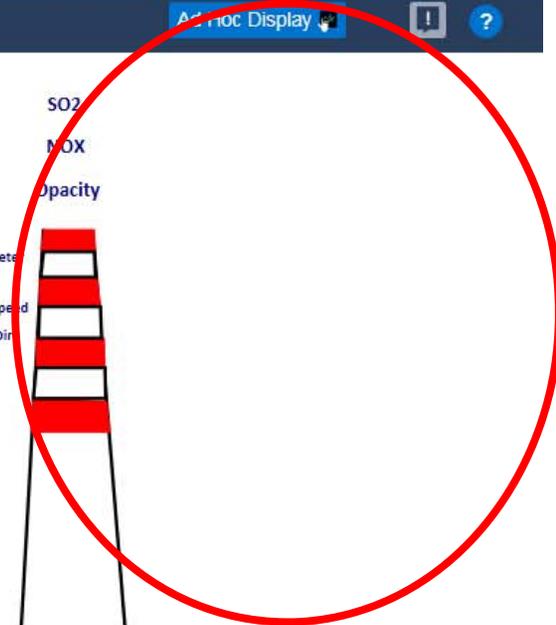
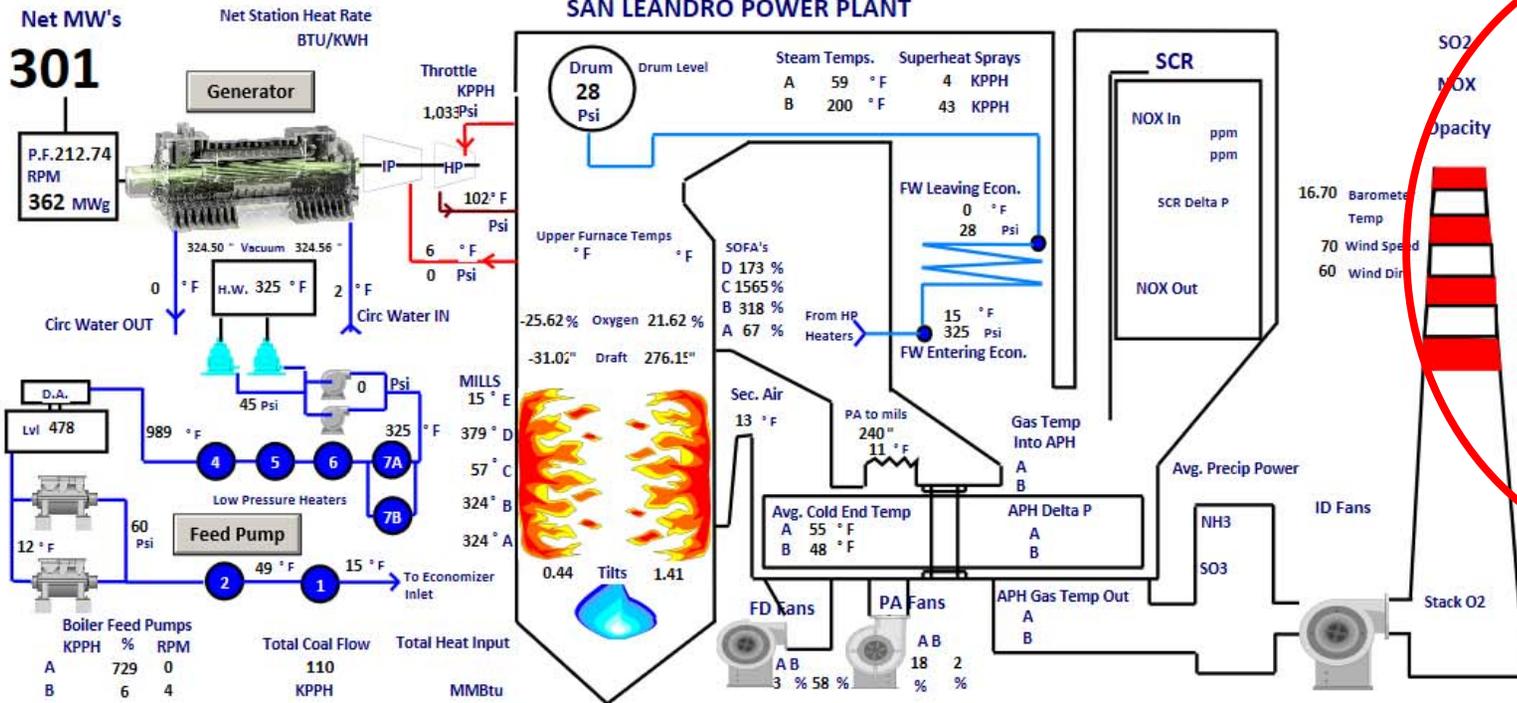
Mobile site

- Automatically displayed on small screen devices
- Find and display native Coresight and PB displays
- Full display, data item, and asset search



TOTAL STATION OVERVIEW

SAN LEANDRO POWER PLANT



< 8h >

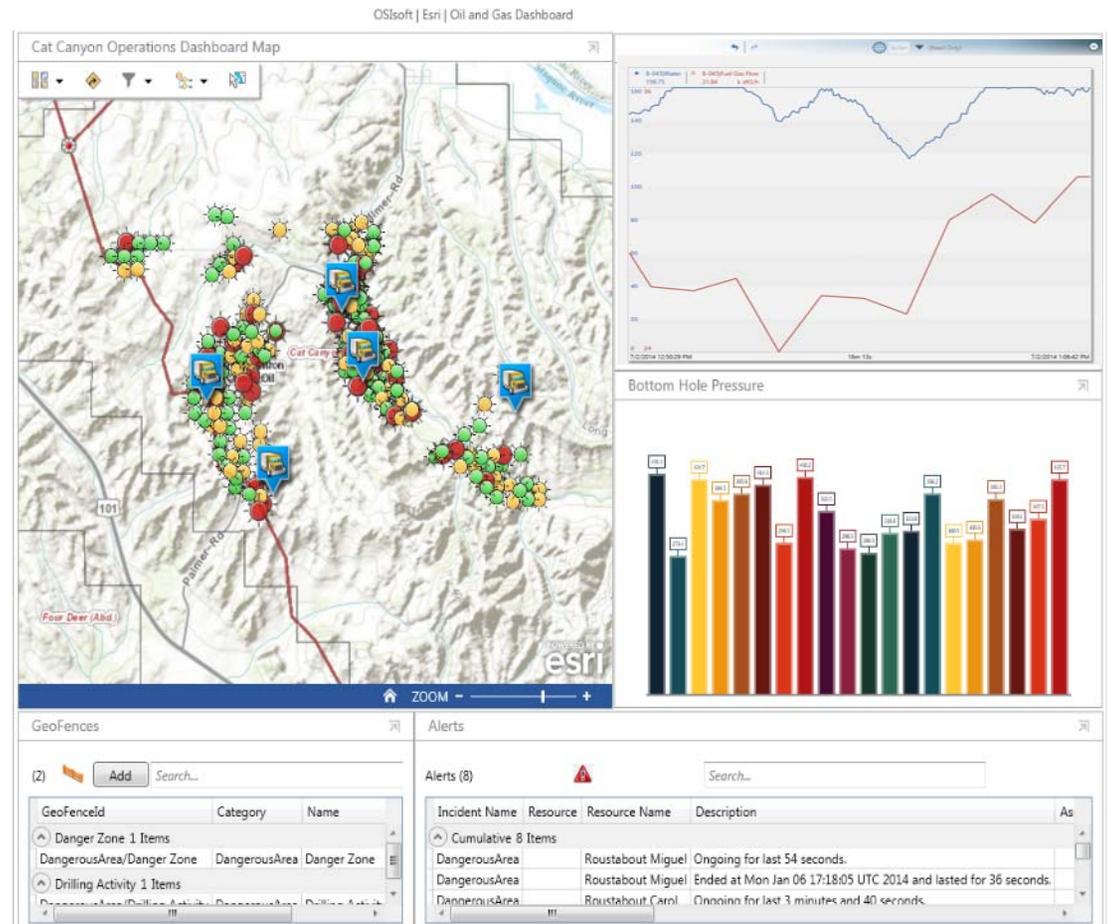
Now 25/08/2014 12:34:27 PM

PI Coresight 2014

I need to integrating PI Coresight with business applications and portal sites to get a complete view of operations.

New URI parameters

- Hide Toolbar, Timebar
- Set element of interest for PB displays
- Set time zone for the current display



What works where?

Desktop
browser only



Displays built
in PI
Coresight

Any modern browser



Homepage



Mobile site



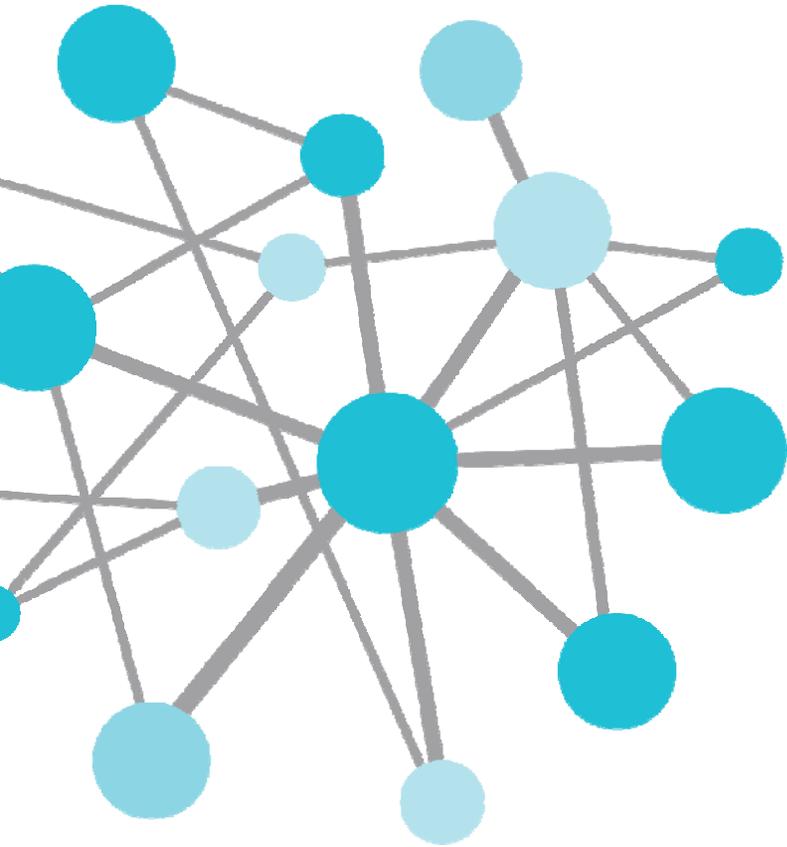
PB Displays



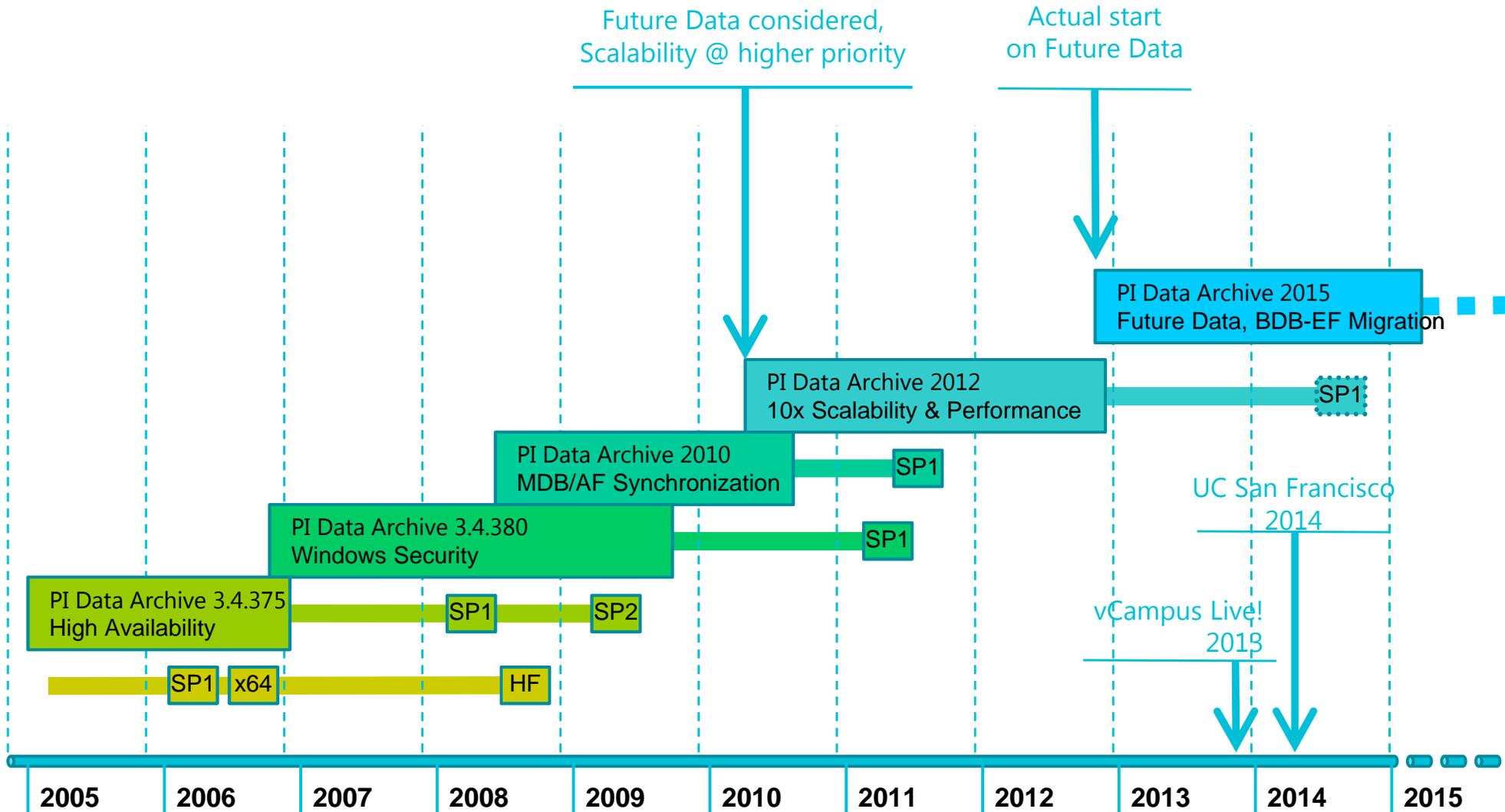
Native Apps



iPad
iPhone



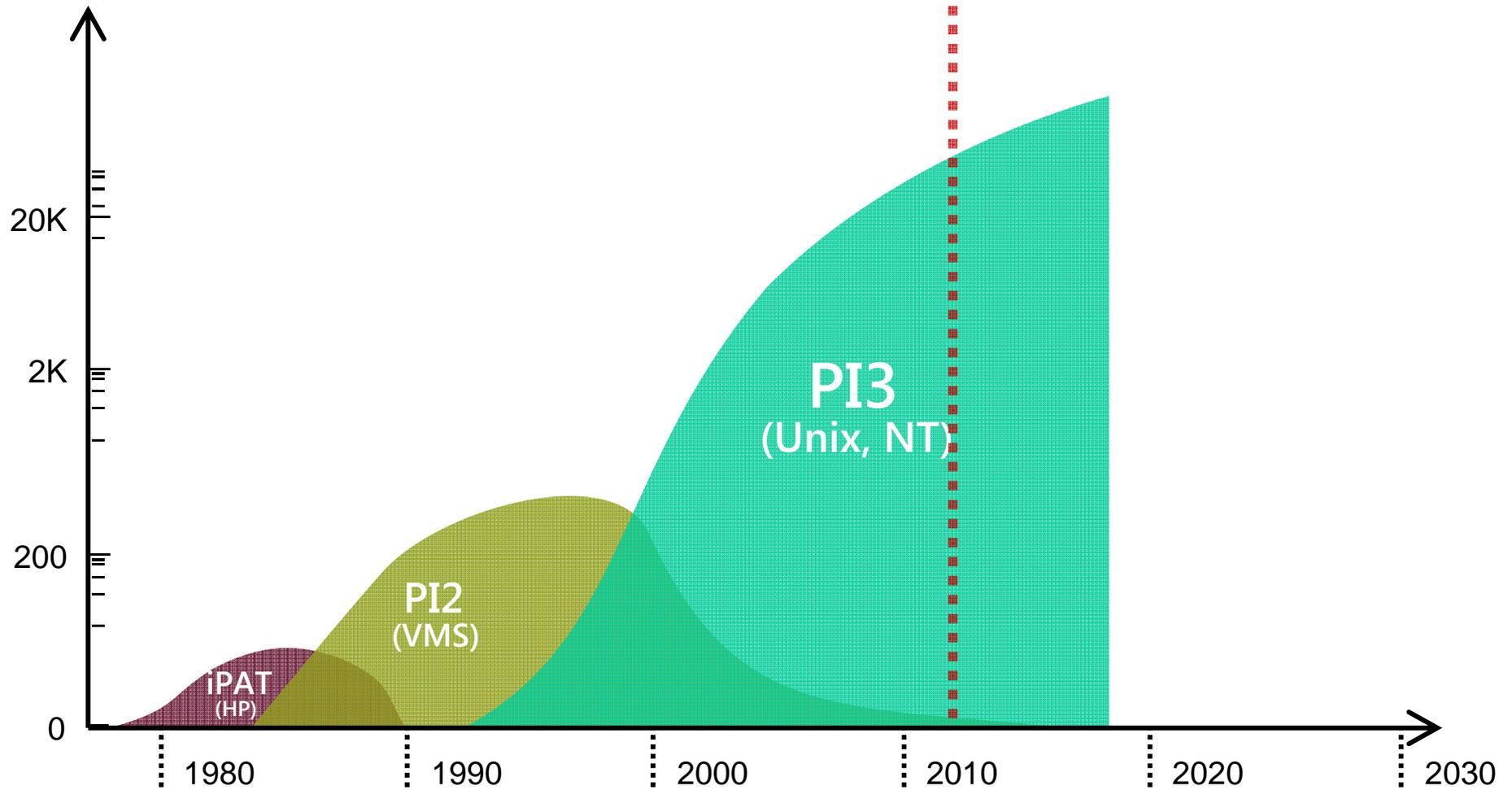
Future Data





Does it still matter?

Customer Installations



FUTURE DATA “PERFECT STORMS”

PI Event Frames

Analysis, Reporting, Visualization

Use Case: capture and search forecast metadata

Search Filter	Value	Event name	Child 1	Child 2	Child 3	Product	Start time	End time	Dur
AF DB	\\WILDEBEEST\MDB	PAINT_323				BLUE PAINT	14-Mar-14 01:26:00	14-Mar-14 02:35:00	0 1
Search Start	3/14/2014	PAINT_323	UP_COLOR:1-1			BLUE PAINT	14-Mar-14 01:26:01	14-Mar-14 02:18:01	0 0
Search End	*	PAINT_323	UP_COLOR:1-1	OP_COLOR:1-1			14-Mar-14 01:26:01	14-Mar-14 02:16:01	0 0
EF Name	*	PAINT_323	UP_COLOR:1-1	OP_COLOR:1-1	FILL:1-1		14-Mar-14 01:27:01	14-Mar-14 01:41:01	0 0
EF Template	PIBatch	PAINT_323	UP_COLOR:1-1	OP_COLOR:1-1	DUMP:1-1		14-Mar-14 01:42:01	14-Mar-14 02:14:01	0 0
Unit Name	*	PAINT_323	UP_BLEND:1-1			BLUE PAINT	14-Mar-14 01:26:01	14-Mar-14 02:28:01	0 1
		PAINT_323	UP_BLEND:1-1	OP_CHARGE:1-1			14-Mar-14 01:28:01	14-Mar-14 02:01:01	0 0
Product	BLUE PAINT	PAINT_323	UP_BLEND:1-1	OP_CHARGE:1-1	CHG_BASE:1-1		14-Mar-14 01:28:01	14-Mar-14 01:39:01	0 0
		PAINT_323	UP_BLEND:1-1	OP_CHARGE:1-1	CI IG_COLOR:1-1		14-Mar-14 01:40:01	14-Mar-14 02:00:01	0 0
		PAINT_323	UP_BLEND:1-1	OP_FINISH:1-1			14-Mar-14 02:03:01	14-Mar-14 02:27:01	0 0
		PAINT_323	UP_BLEND:1-1	OP_FINISH:1-1	AGITATE:1-1		14-Mar-14 02:03:01	14-Mar-14 02:12:01	0 0
Instructions for a smooth live bat		PAINT_323	UP_BLEND:1-1	OP_FINISH:1-1	DRAIN:1-1		14-Mar-14 02:14:01	14-Mar-14 02:25:01	0 0
EF Attribute Filter on Product		PAINT_330				BLUE PAINT	14-Mar-14 12:36:00	14-Mar-14 13:20:00	0 0
Select some additional Procedure		PAINT_330	UP_COLOR:1-1			BLUE PAINT	14-Mar-14 12:36:01	14-Mar-14 13:11:01	0 0
3 Sublevels		PAINT_330	UP_COLOR:1-1	OP_COLOR:1-1			14-Mar-14 12:37:01	14-Mar-14 13:08:01	0 0
Filter on Product		PAINT_330	UP_COLOR:1-1	OP_COLOR:1-1	FILL:1-1		14-Mar-14 12:37:01	14-Mar-14 12:44:01	0 0
		PAINT_330	UP_COLOR:1-1	OP_COLOR:1-1	DUMP:1-1		14-Mar-14 12:46:01	14-Mar-14 13:06:01	0 0

FUTURE DATA “PERFECT STORMS”

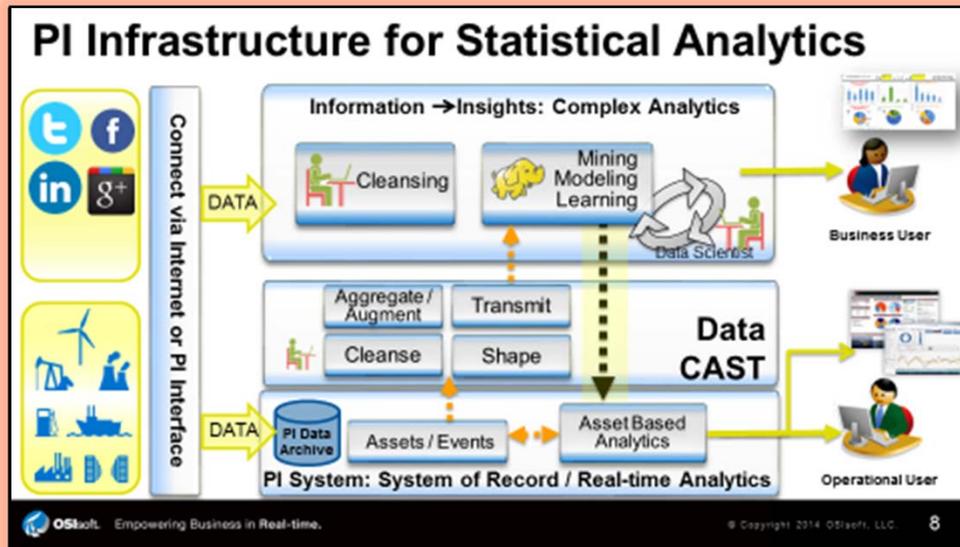
PI Integrator “CAST” for Hadoop
Big Data Analytics

Use Case: feed predictive data back to the PI Server

PI Integrator for Esri ArcGIS

Geospatial Forecasts (e.g., Weather)

Use Case: overlay future data on live maps

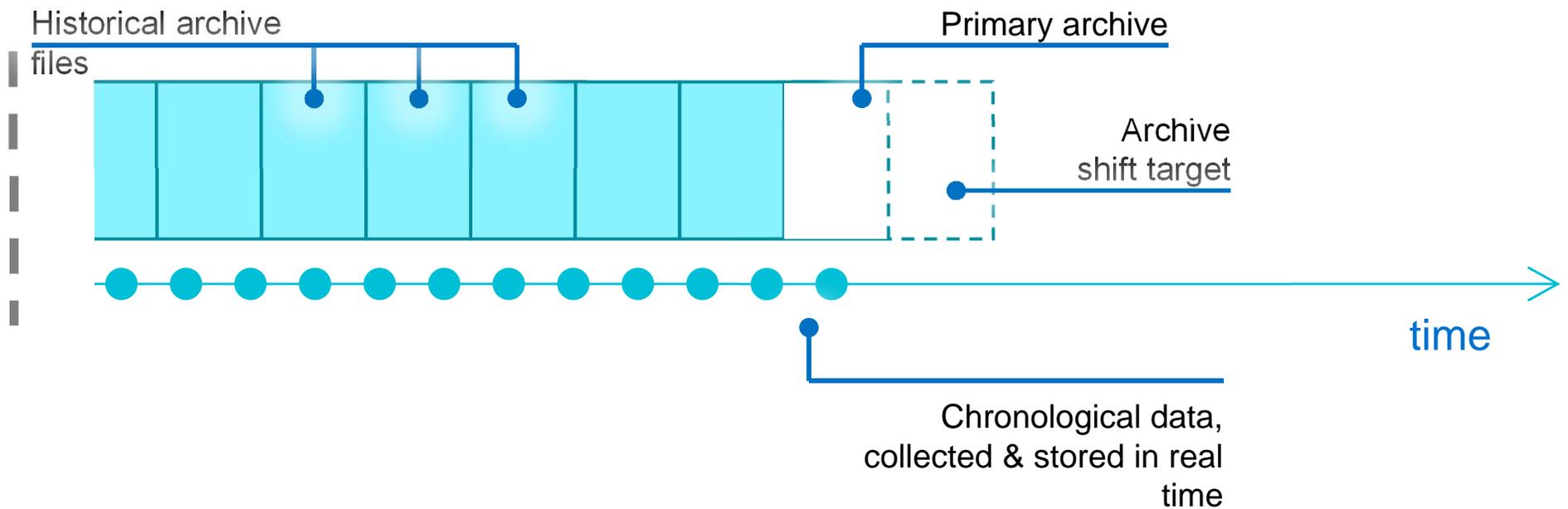


The graphic features the OSIsoft logo (a blue wave) and the Esri logo (a globe) separated by a plus sign. Below the logos, the text 'Bringing Space & Future Time Together' is displayed in white on a black background. The word 'Future' is written vertically on the left side of the text, with a white arrow pointing downwards towards the word 'Time'.

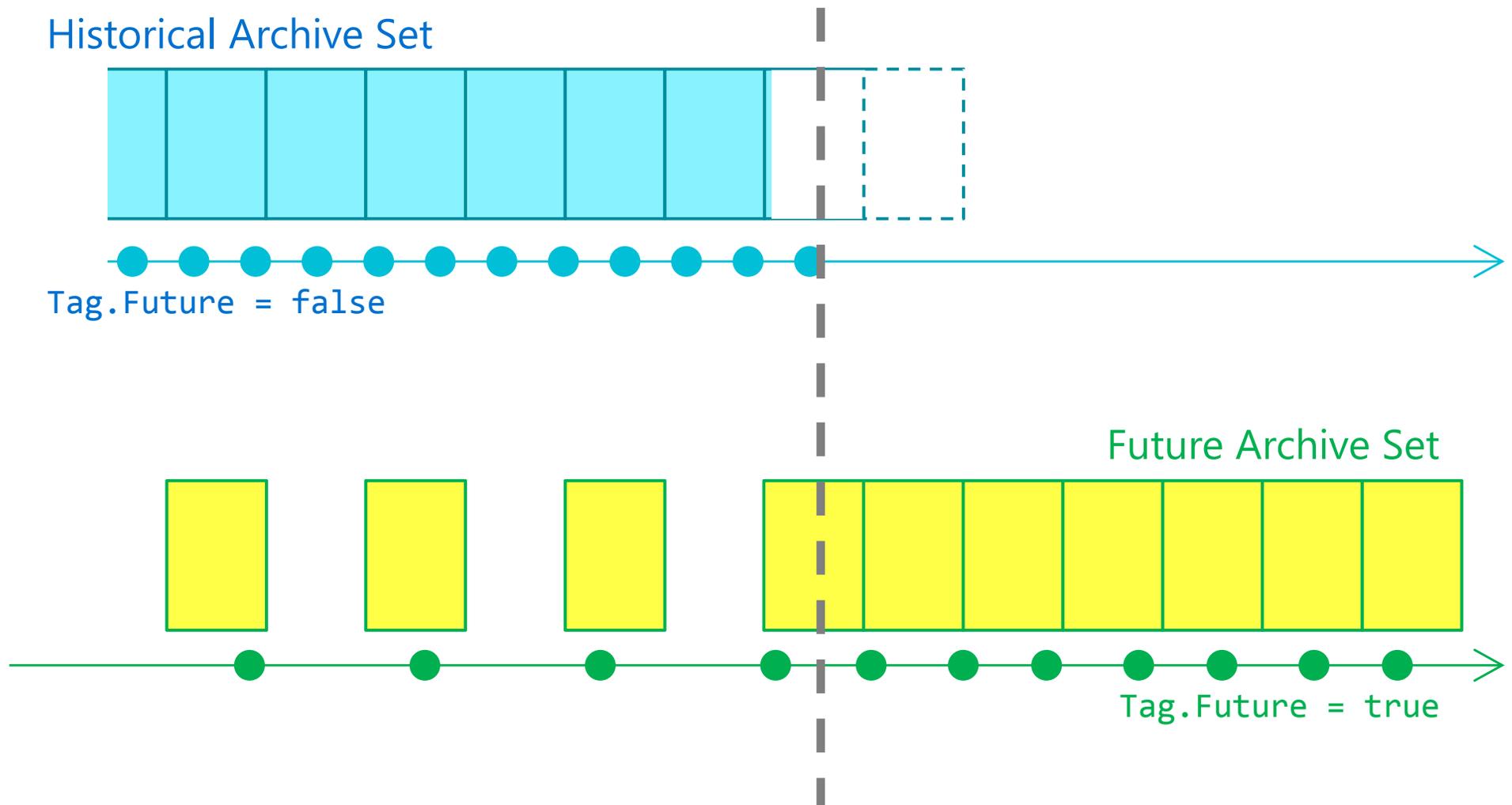
More Than Meets the Eye



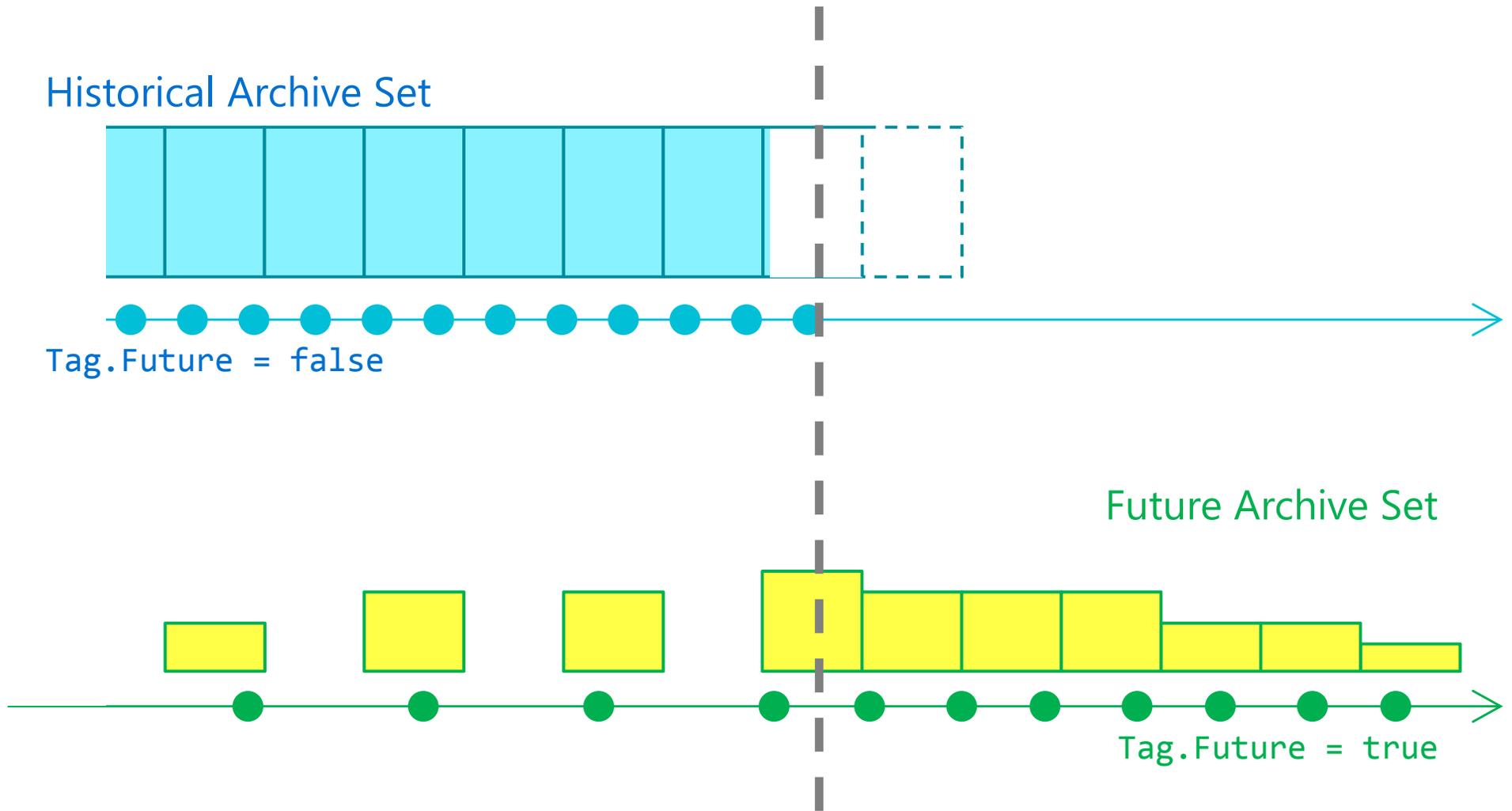
Storing “Historical” Data...



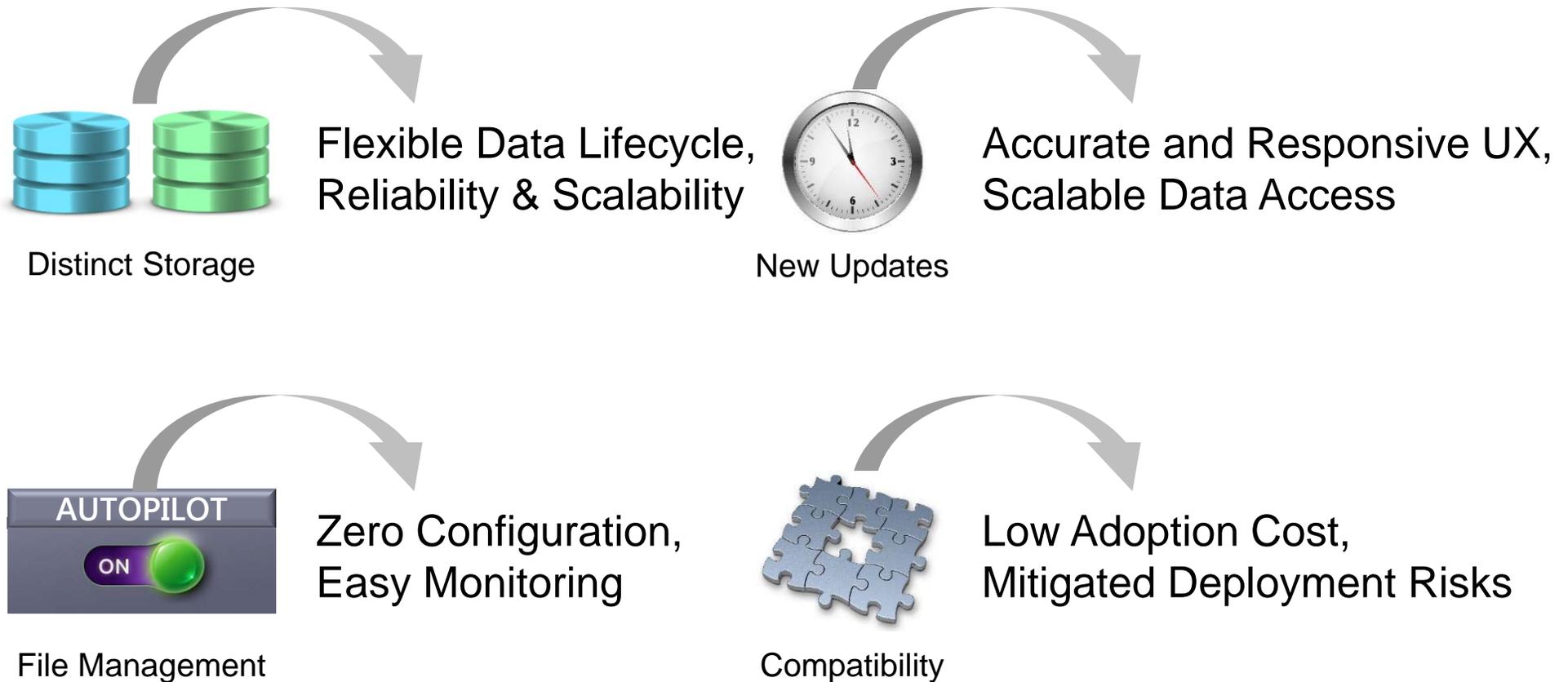
...And Storing “Future” Data

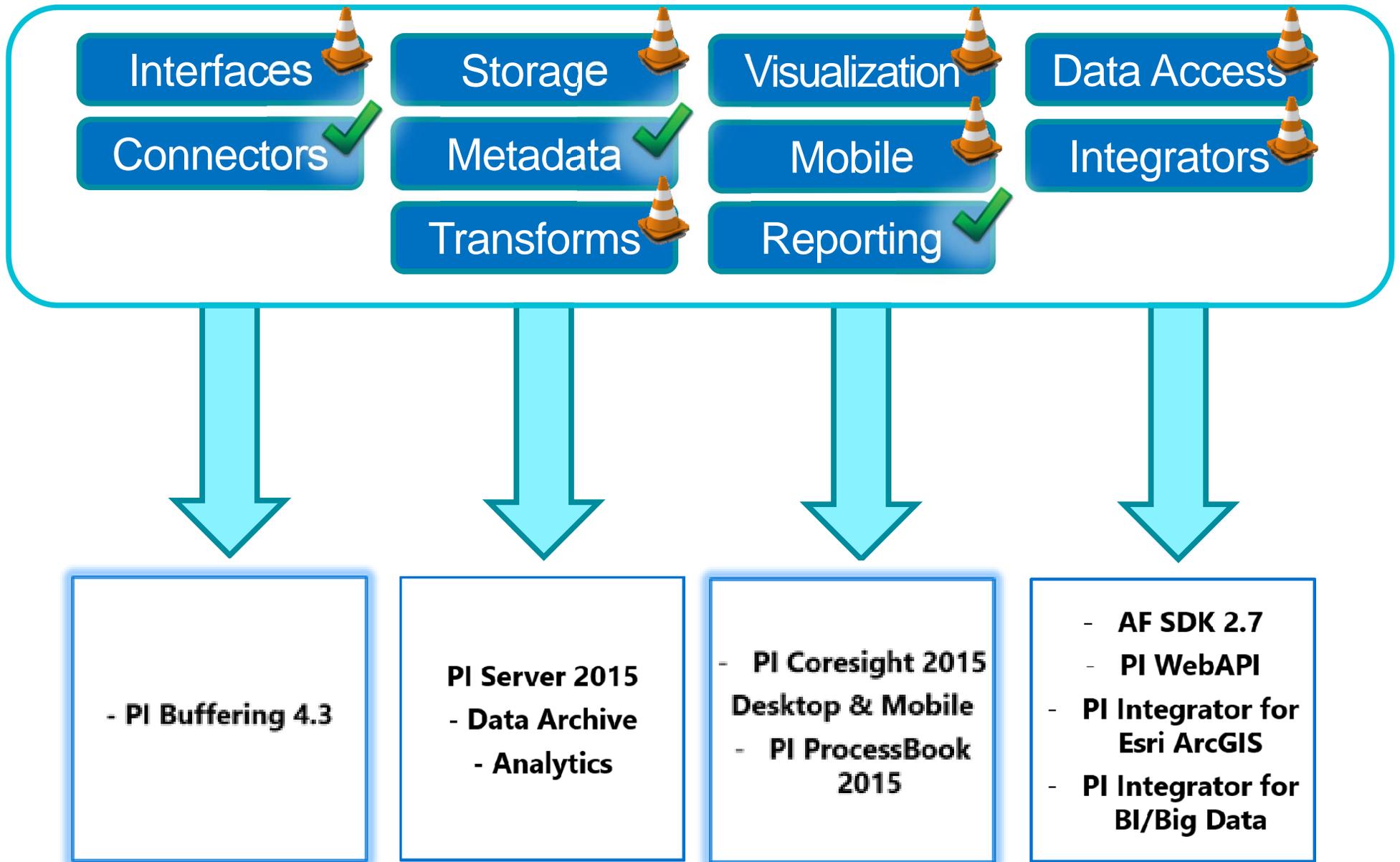


...And Storing “Future” Data



TURNING CHALLENGES INTO DIFFERENTIATORS





Michael Luo

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Technical Consultant

OSIsoft Australia Pty Ltd

PI System Roadmap

<https://techsupport.osisoft.com/Products/Product-Roadmap>



THANK
YOU

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