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REGIONAL SEMINAR 2012

A P A C

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

INDIA



Building an Asset-Centric PI System PI Event Frames

Presented by **Shivesh Suman**, Escalation Engineer, OSIsoft,
Singapore

Outline

Part I

- Building an asset centric PI System
 - Demo I: Building a brand new PI System
 - Demo II: Building on top of an existing PI System
 - Demo III: Integrating PI AF with External Data

Part II

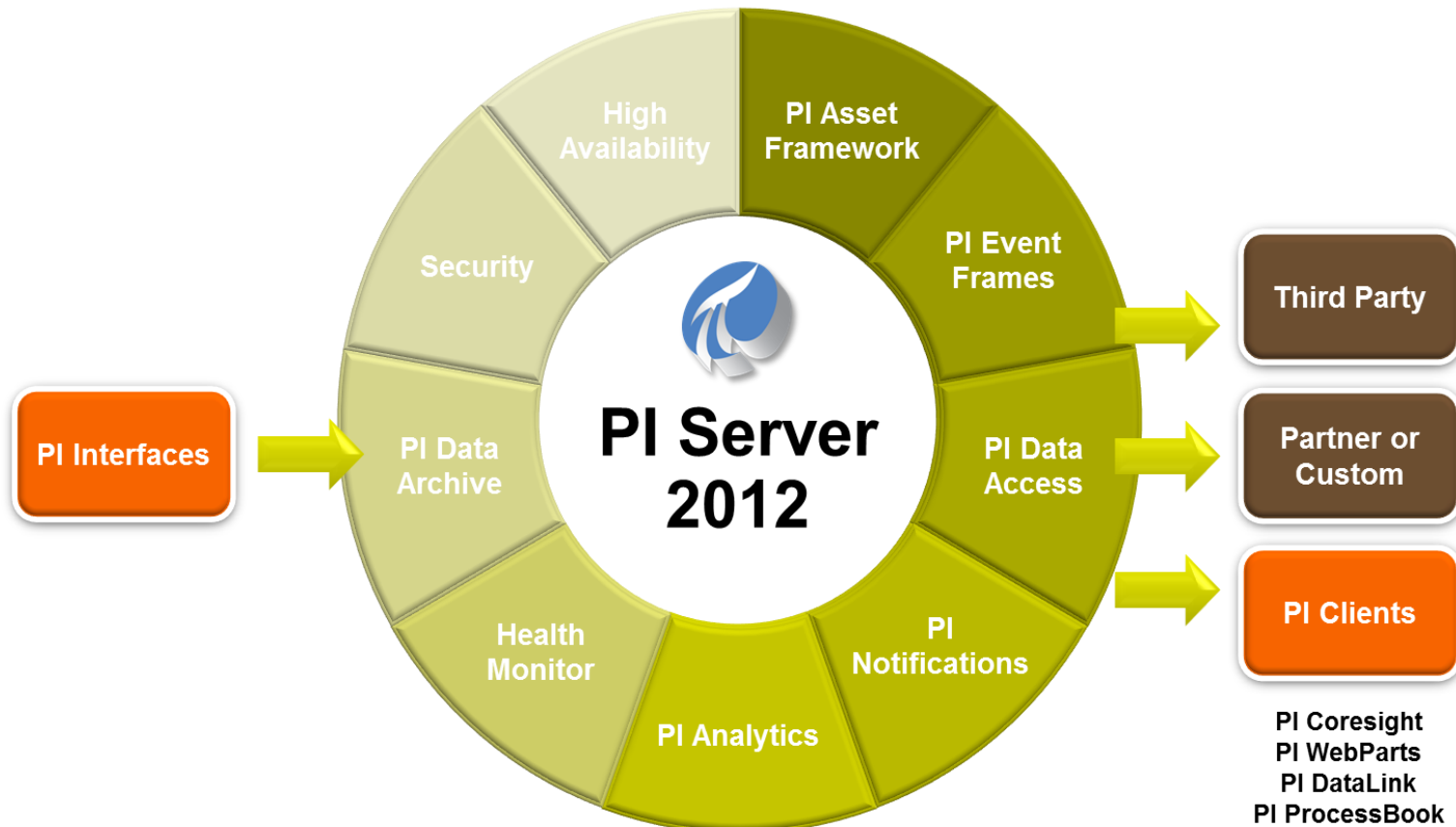
- PI Event Frames: Moving Forward with Data Access and Client Support
 - What are PI Event Frames
 - What's available today
 - What's ahead

Asset-Centric PI System

- Tags and associated data are organized based on physical objects/assets
- Tags/data can be found using asset structure as opposed to tag names on the DCS system
- Analytics can be performed on data leveraging the asset structure

PI AF: PI Asset Framework

PI Server 2012



With Asset Framework You Can ...

- Standardize
 - Use templates for similar/identical assets, automate tag creation
- Establish relationships
 - Employ hierarchies, categories, references
- Employ common visuals across assets
 - Leverage asset relative context in PI clients, use automatic Units of Measure conversion

PI AF Demos

Demo I: Building a brand new PI System

Demo II: Building on top of an existing PI System

Demo III: Integrating PI AF with External Data

I: A New PI System

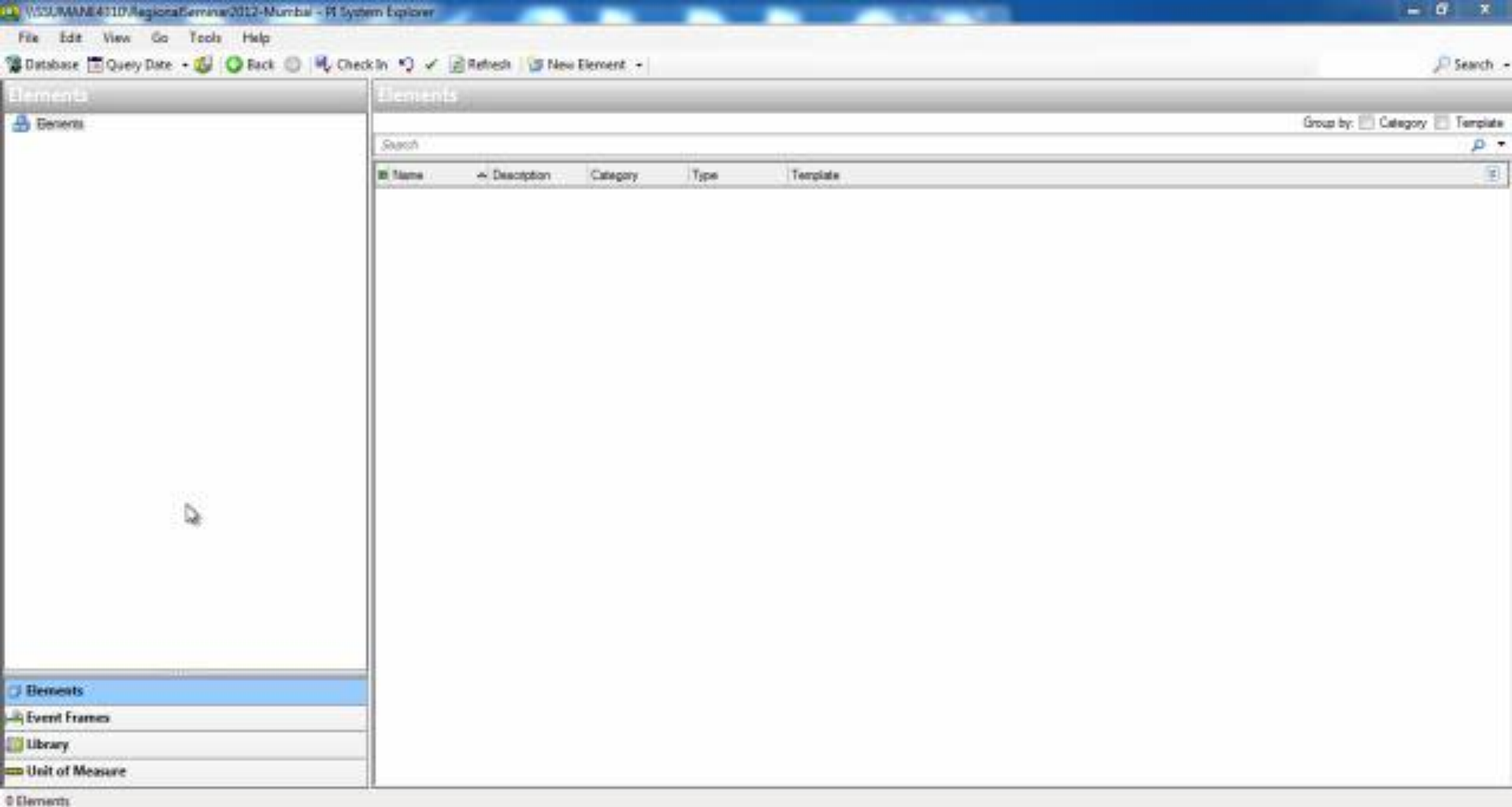
Scenario:

- A brand new PI Server
- PI Interfaces have been installed and configured for data collection
- No PI Tags have been created

You want to create an asset structure of several pumps in your plant



DEMO I



Key Concepts/Takeaways

- Element templates
- PI Point data reference
- Substitution parameters when using attribute templates
- Automatic tag creation

II. An Already Existing PI System

Scenario:

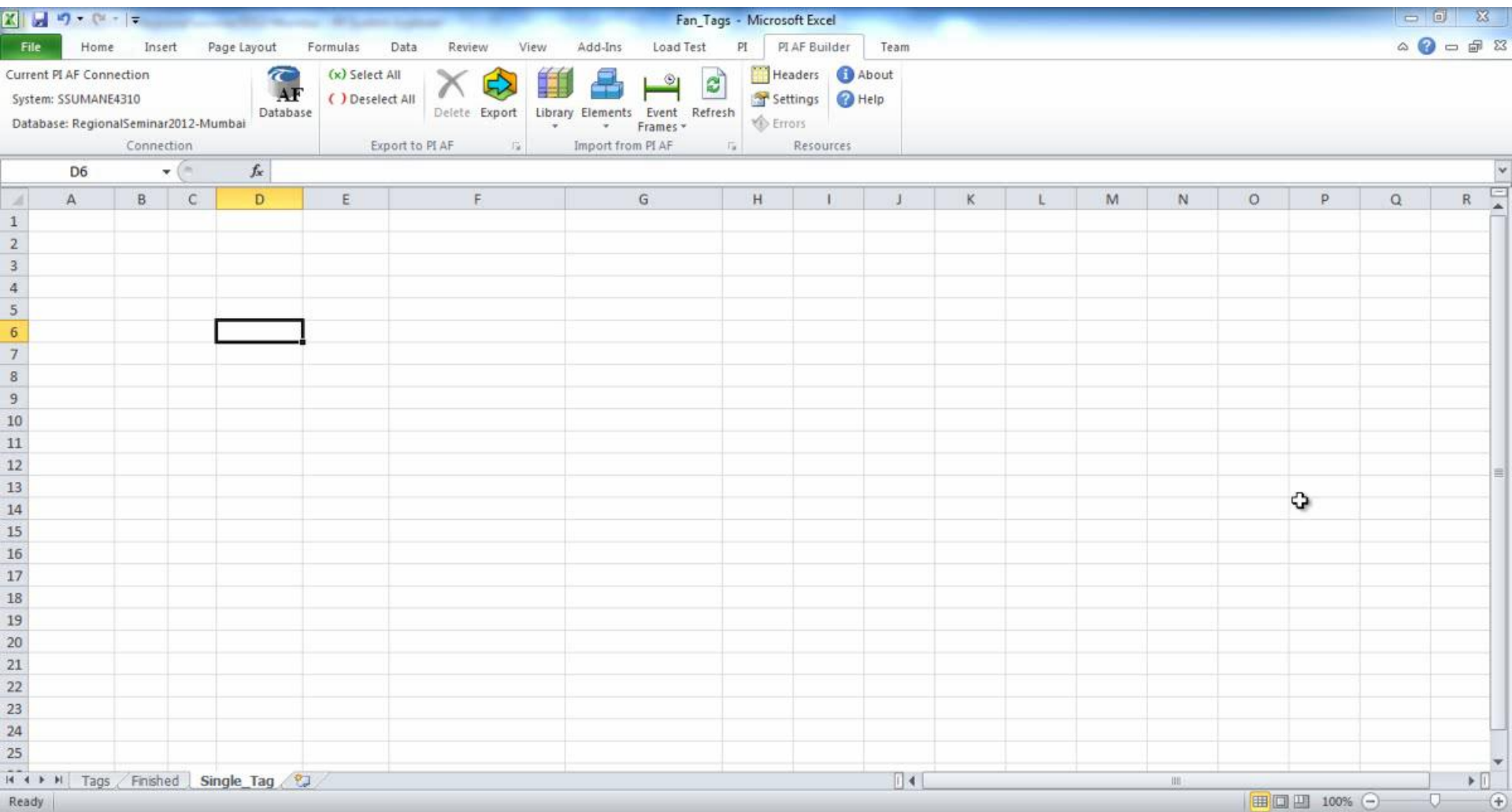
- One or more PI Servers already exist

You want to implement PI AF

- You want to reuse what you already have
- You want to build the asset hierarchy over time



Demo II



Key Concepts/Takeaways

- Use of PI AF Builder (an Excel add-in) with existing tag database

III. External Data Usage

Scenario:

- Data exists on an external relational database and you would like to use it in AF.

You want to create references to these data in PI
AF



Demo III

\\skwan-vm-af25\NuGreen - PI System Explorer (Administrator)

File Edit View Go Tools Help

Database Query Date Back Check In Refresh New Element Search

Elements

Elements NuGreen

Group by: ☐ Category ☐ Template

Search

Name	Description	Category	Type	Template
NuGreen	Our Company E...	Locations	None	Enterprise

Elements

Event Frames

Library

Unit of Measure

Replication

MyPI

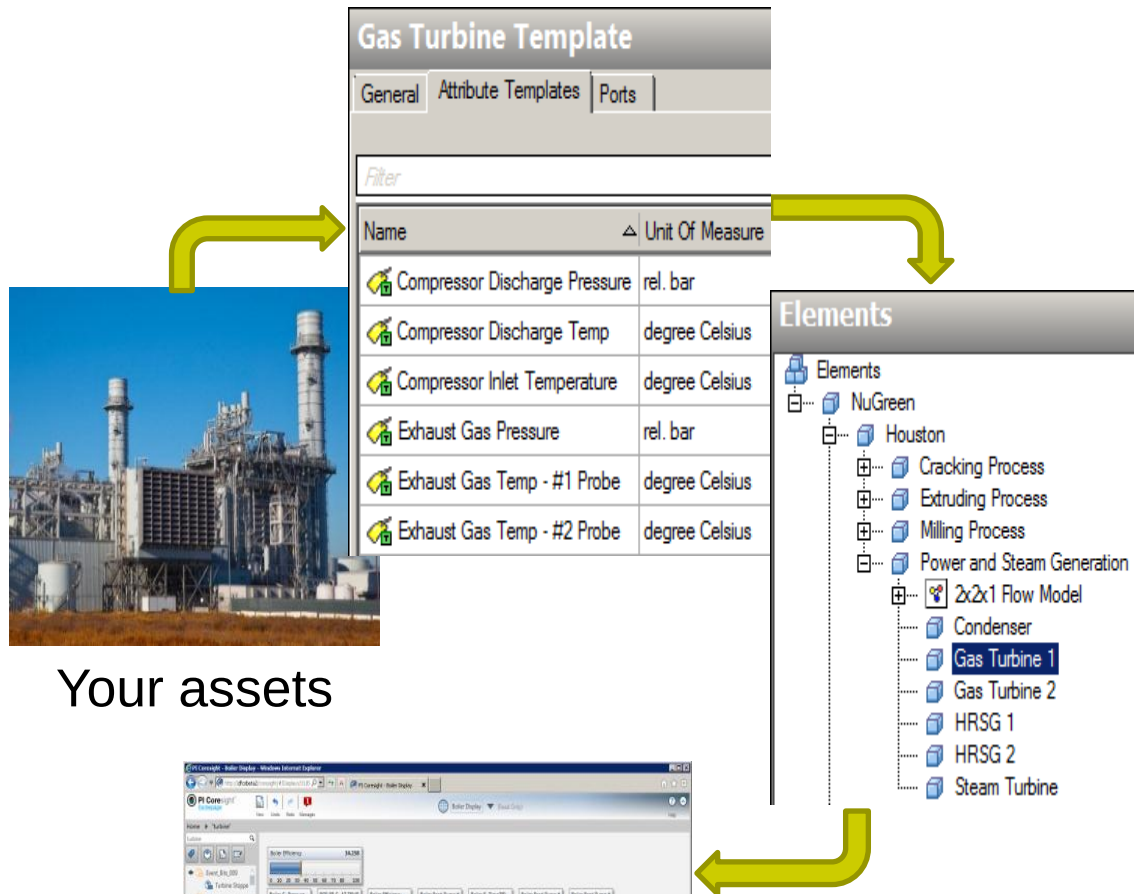
Notifications

Contacts

Model Analyses

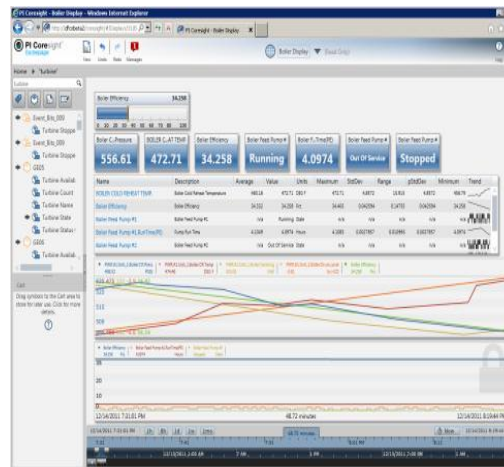
Key Concepts/Takeaways

- Linked Table in PI AF – Connect external database to your PI System
- Table lookup data reference
- Doing simple calculation which includes both PI and external data
- Extending the element templates by adding attribute templates to them



Your assets

Asset Centric PI System

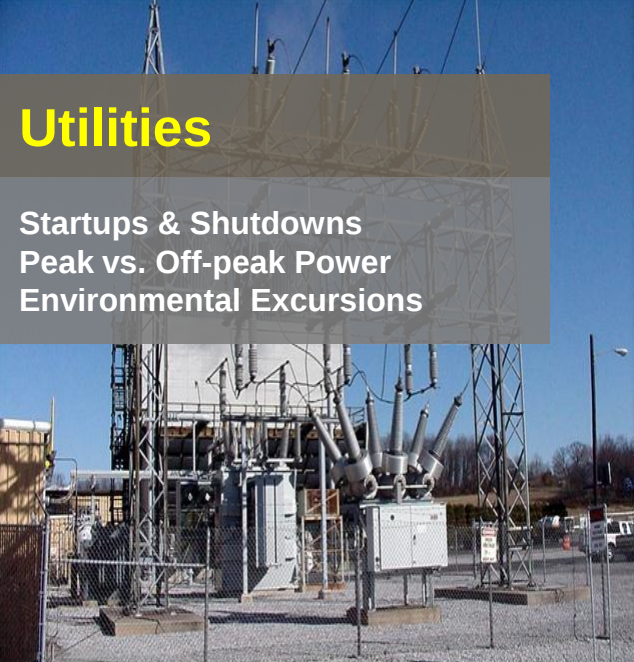


Building an Asset Centric PI System

- Start small and get immediate value
- Expand your asset model over time
- Use templates to enforce standards
- Bring data from disparate sources into PI System
- Reuse your investment in other OSIsoft products

PI Event Frames

*Moving Forward with Data
Access and Client Support*



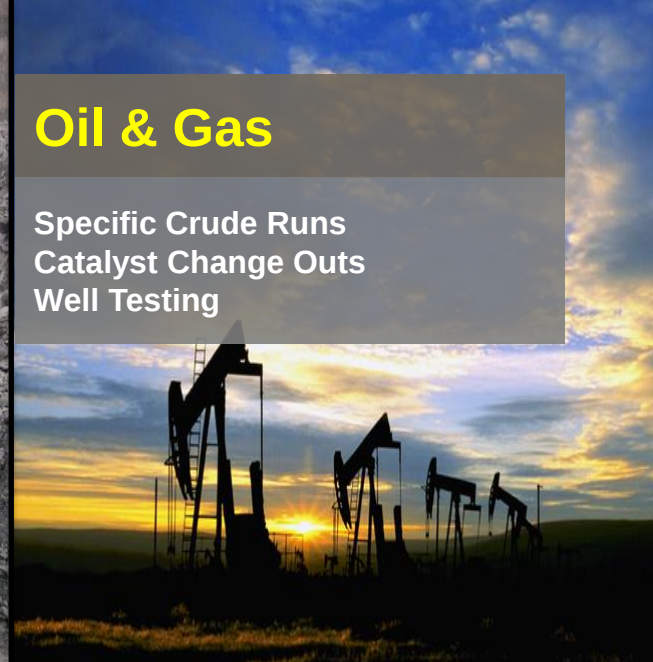
Utilities

Startups & Shutdowns
Peak vs. Off-peak Power
Environmental Excursions



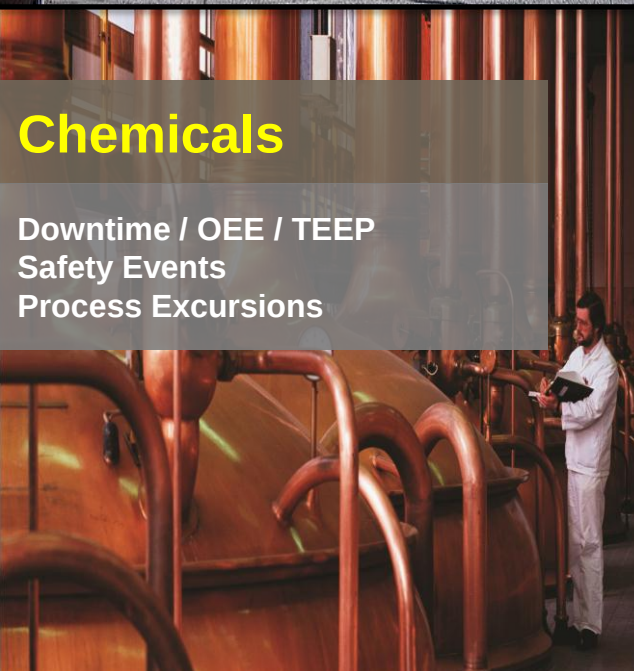
Metals & Mining

Downtime / Reason Codes
Anode Tracking
Material Transfers



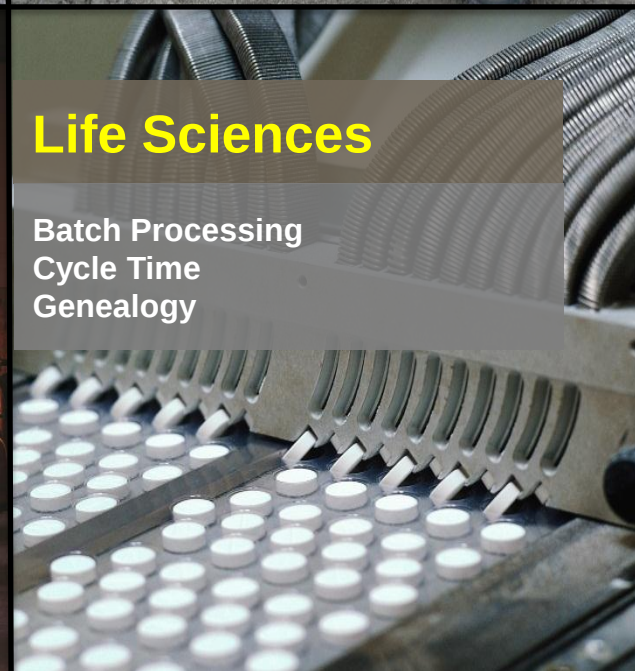
Oil & Gas

Specific Crude Runs
Catalyst Change Outs
Well Testing



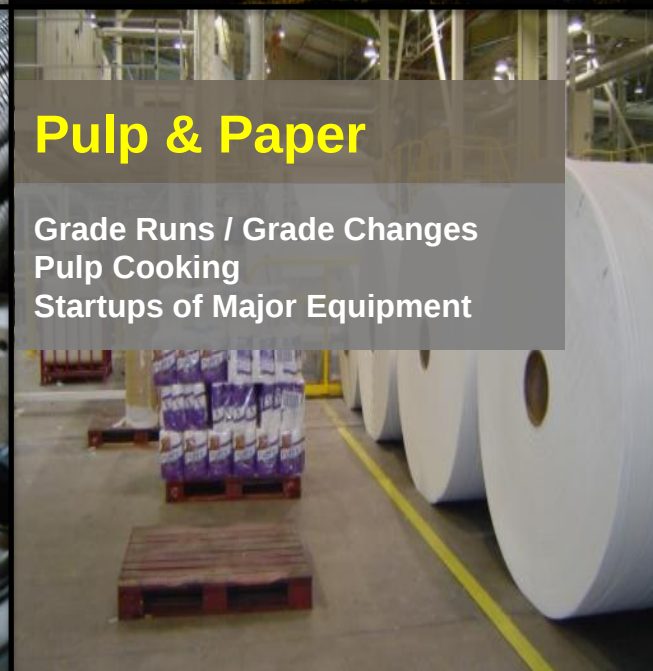
Chemicals

Downtime / OEE / TEEP
Safety Events
Process Excursions



Life Sciences

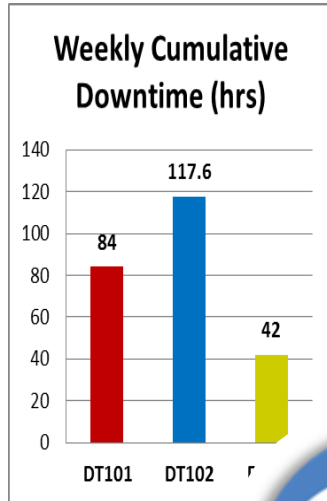
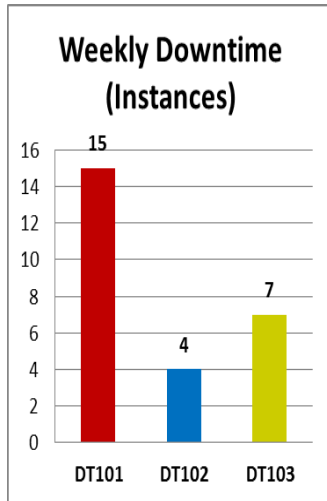
Batch Processing
Cycle Time
Genealogy



Pulp & Paper

Grade Runs / Grade Changes
Pulp Cooking
Startups of Major Equipment

Perform Asset Comparisons

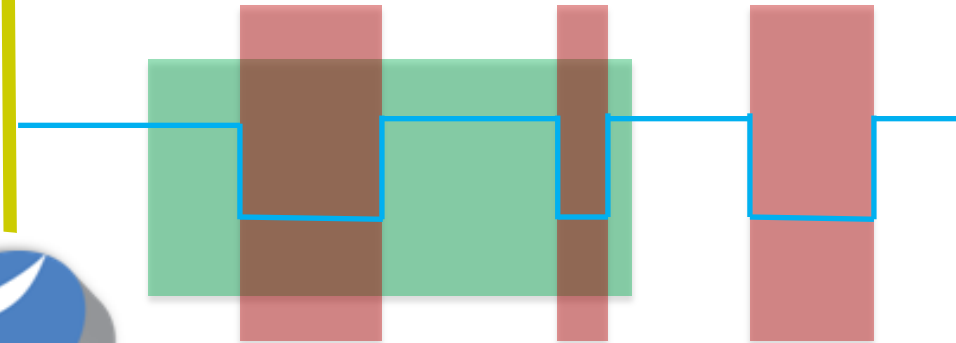


Discover Event Interrelationships

Downtime Events for Product XYZ

Product XYZ (1)

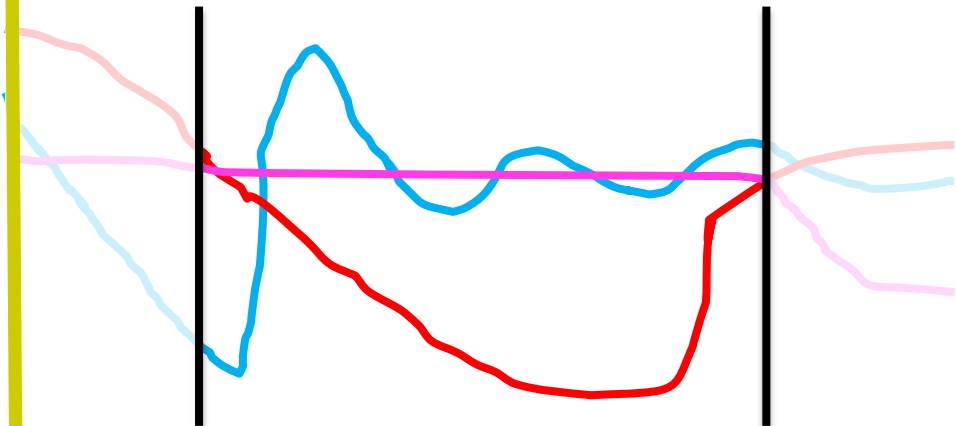
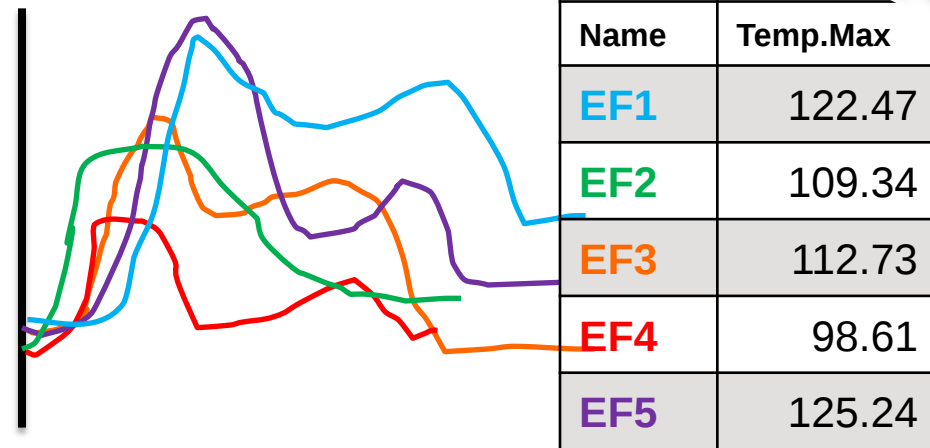
Downtime (2)



Event Overlay Trend (Temp)



myEvent



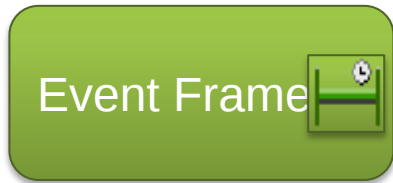
Perform Event Comparisons

Simplify Data Analysis

An Intro to PI Event Frames



Event Frames are time periods plus more



Name = DT23032012-2

Asset = Boiler 3

Start time = 23-Mar-2012 09:32

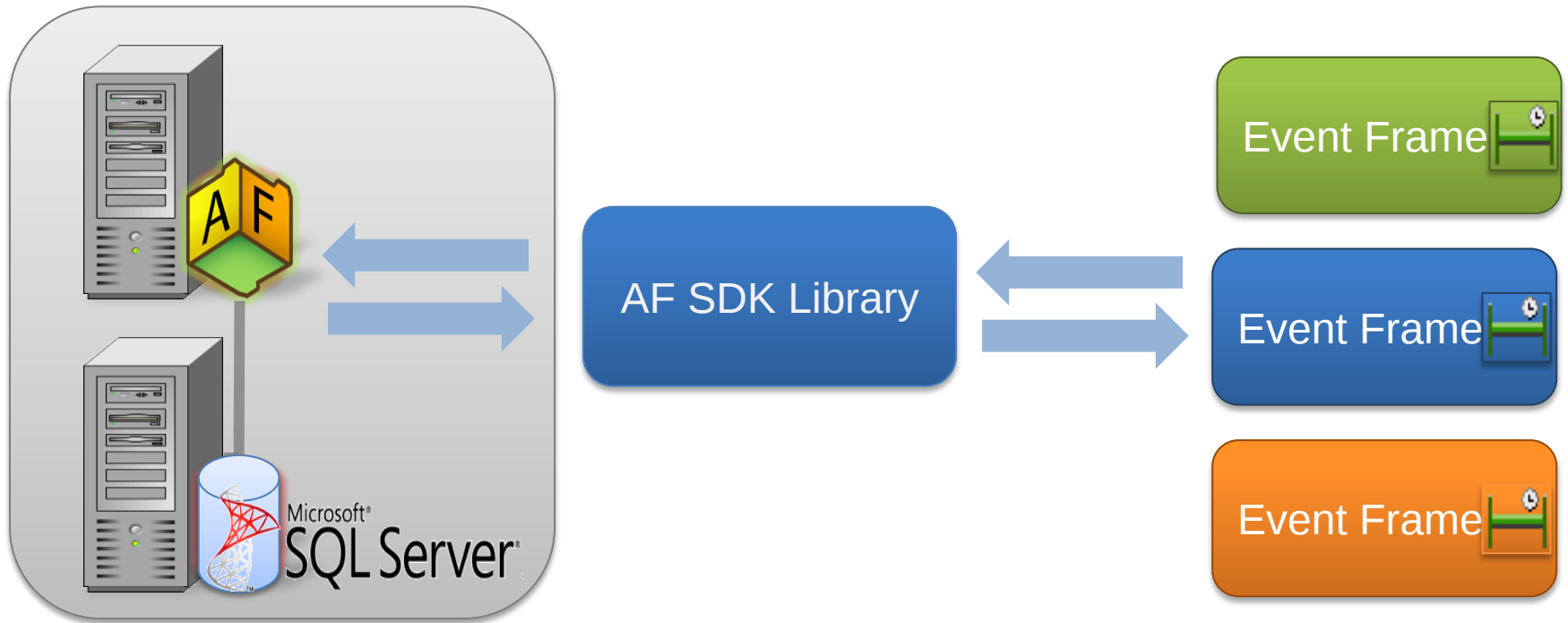
Attribute = Mechanical

End time = 23-Mar-2012 09:50

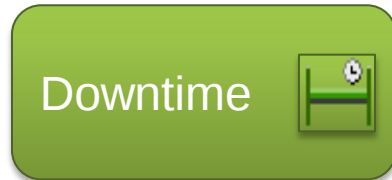
Attribute = Fuel line clogged

Event Frames records important process or business events and help you find the related real-time data.

Event Frames are part of PI Asset Framework



Different events have different attributes



DT23032012-2

Name

ST23032012-2

23-Mar-2012 09:32

Start Time

23-Mar-2012 09:32

23-Mar-2012 09:50

End Time

23-Mar-2012 09:50

Boiler 3

Turbine 2

Related Assets

Mixer 1

Mechanical

Standard procedure

Fuel line clogged

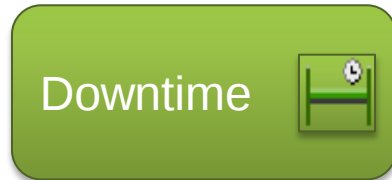
Event-Specific Attributes

BPS77

Prepolymer 16

Feed stock 78-YNW

Different events have different attributes



DT23032012-2

23-Mar-2012 09:32

23-Mar-2012 09:50



ST23032012-2

23-Mar-2012 09:32

23-Mar-2012 09:50



BPS77-23032012-2

23-Mar-2012 09:32

23-Mar-2012 09:50

Boiler 3

Mechanics
Fuel line clogged

i Reason code **T**

T Comment

Turbine 2

Standard procedure

i Startup procedure **T**

Mixer 1

BPS77
Prepolymer 16
Feed

i Recipe **T**

i Product **T**

T Source

More Event Frames Features

- Attributes with units of measure
 - Static numbers and strings
 - PI Point references (value at start or end, or summary value)
 - External data references
- References to other Event Frames
 - Hierarchical
 - Downtime Reason Trees
 - Batch / S88

Summary of Features

- Event Frames are a new time-period data type
- Event Frames are stored in the PI AF database
- They are a lot like Elements
 - Templates and indexing
 - References to assets
 - Attributes
- References to other Event Frames

Event Frames – Infrastructure Changes

- **Interfaces**
 - Batch Interfaces
- **Servers**
 - Events Frames stored in AF Server
 - Batch to EF transition
- **Analytics**
 - Generating Event Frame on patterns
- **Data Access**
 - AF SDK
 - PI OLEDB Enterprise & PI JDBC
 - PI Web Services
- **Clients**
 - PI ProcessBook
 - PI DataLink
 - PI WebParts
 - PI Coresight

Improvement over PI Batch

- Performance
- Event Data
- Referenced Data
- External Data
- Flexible Hierarchy
- More Flexible S88 Rules

Multiple Assets / Elements
Referenced in an Event Frame

Multiple Event Frames Active on
a Unit at a Time

Child Event Frames with Multiple
Parent Event Frames



PI Event Frames Roadmap

2011	2012		2013		FUTURE
4Q	1H	2H	1H	2H	
Wave 1 – Partner and Early Adopters	Wave 2 – Event Frames for the Mainstream				
	Goal <u>First End-to-End Event Frames Experience</u> - Ability to generate Event Frames automatically - Several event frame visualization options				
					Wave 3 – Batch Moves to Event Frames Goal <u>Move PI Batch Customers Forward</u> - Batch to EF Migration - Functional Equivalency with existing Batch Clients
NOTE: Future dates are subject to change. Last Updated: 04-2012					

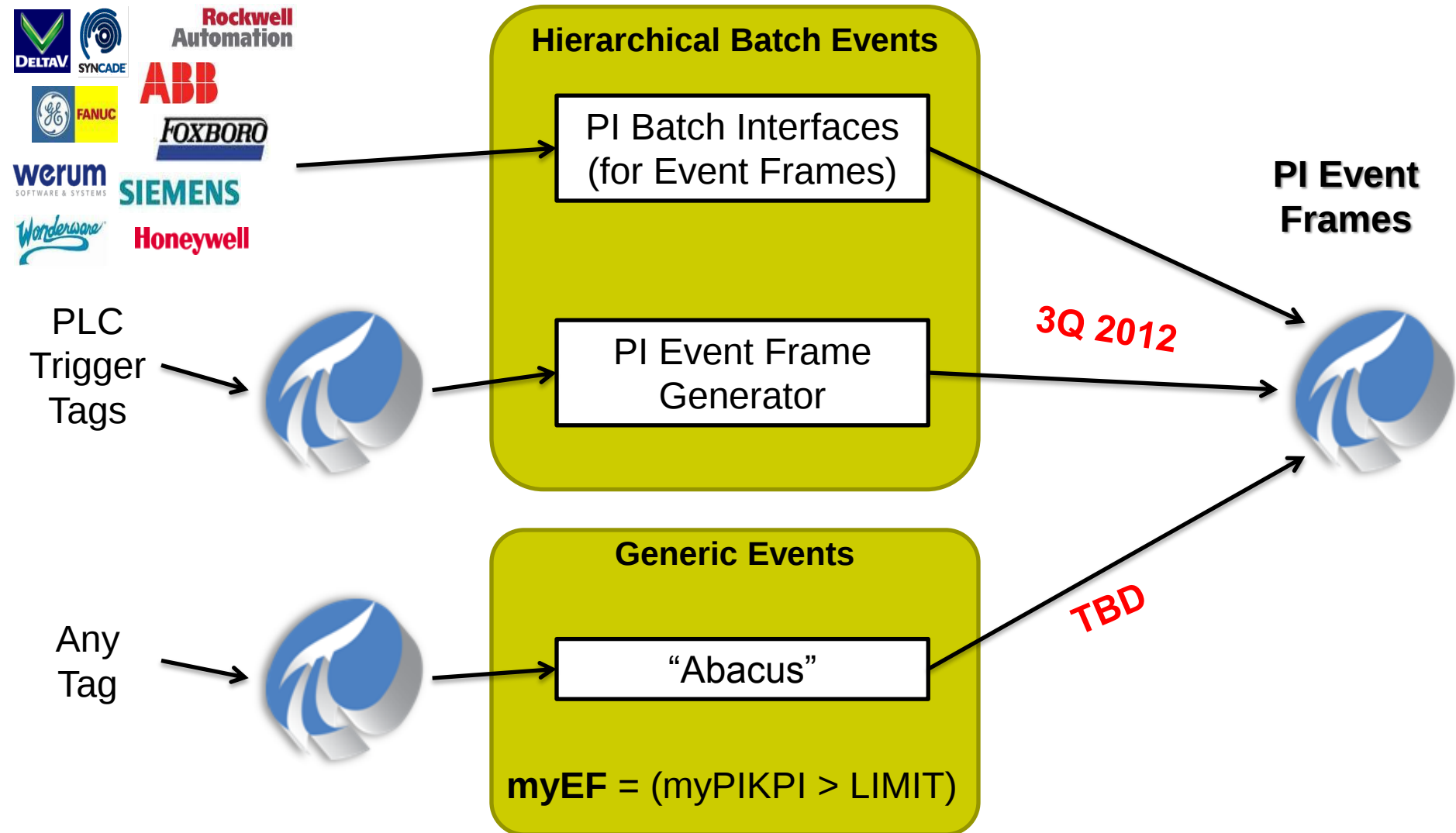


Wave 1: PI Server 2010 R3 PI Event Frames Released!!!

Wave II

End to End Events Frame Experience

Event Generation – What will I use?



Event Generation (PI Batch Generator for Event Frames):

- Migration of Existing Legacy PI-BaGen Configuration
- Writes to PI Event Frames
- Leverages Event Frame Templates for attribute definition

The screenshot shows the 'Batch Interface Configuration Utility' window, specifically the 'PI Batch Generator' tab. The window title is 'Batch Interface Configuration Utility'. The subtitle is 'PI Batch Generator' with a description 'Configure the PI Batch structure as event frames.'.

On the left, there is a 'Settings' sidebar with the following options: File Selection, Server Information, PI Batch Generator (selected), Templates, Time Settings, Operational Settings, and Save Settings. Below this is an 'Options' section with a 'View File' button.

The main area is divided into two tabs: 'TRA100L_Config_Node' (selected) and 'Other Settings'. The 'TRA100L_Config_Node' tab contains the following fields:

- Configuration Name: TRA100L_Config_Node
- Event Frame Template: PIUnitBatch (with a 'Template...' button)
- Active Point: TRA100L (with a dropdown arrow)
- Behavior: ☒ Pulse, ☐ Step, ☐ Include Zeroth State (Continuous)
- Strings indicating zeroth state: *Example: inactive, stop, off*
- Event Frame Name: ☐ Use Active Point value, ☐ Use Static Name, ☒ Use this PIPoint value (OSITrainABatchIndexPoint)

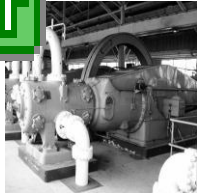
At the bottom, there is a table with columns 'Attribute Name', 'Configuration', and 'Value'. A 'PIPoint Search...' button is located to the right of the table.

Attribute Name	Configuration	Value
ProcedureName	Static Name	Procedure A
BatchID	PIPoint	OSITrainABatchIndexPoint
Product	PIPoint	BIORochePRODUCTID
Procedure	Not Included	

A 'Go to Templates' button with a green arrow is located at the bottom right of the window.

Timing: 3Q 2012

Event Generation (“Abacus”):



|myPIKPI

|Fuel Flow Rate

|Flow Out

“Abacus”



myEF

|myPIKPI



myPIKPI = (**Flow Out** / **Fuel Flow Rate** * 3.14)

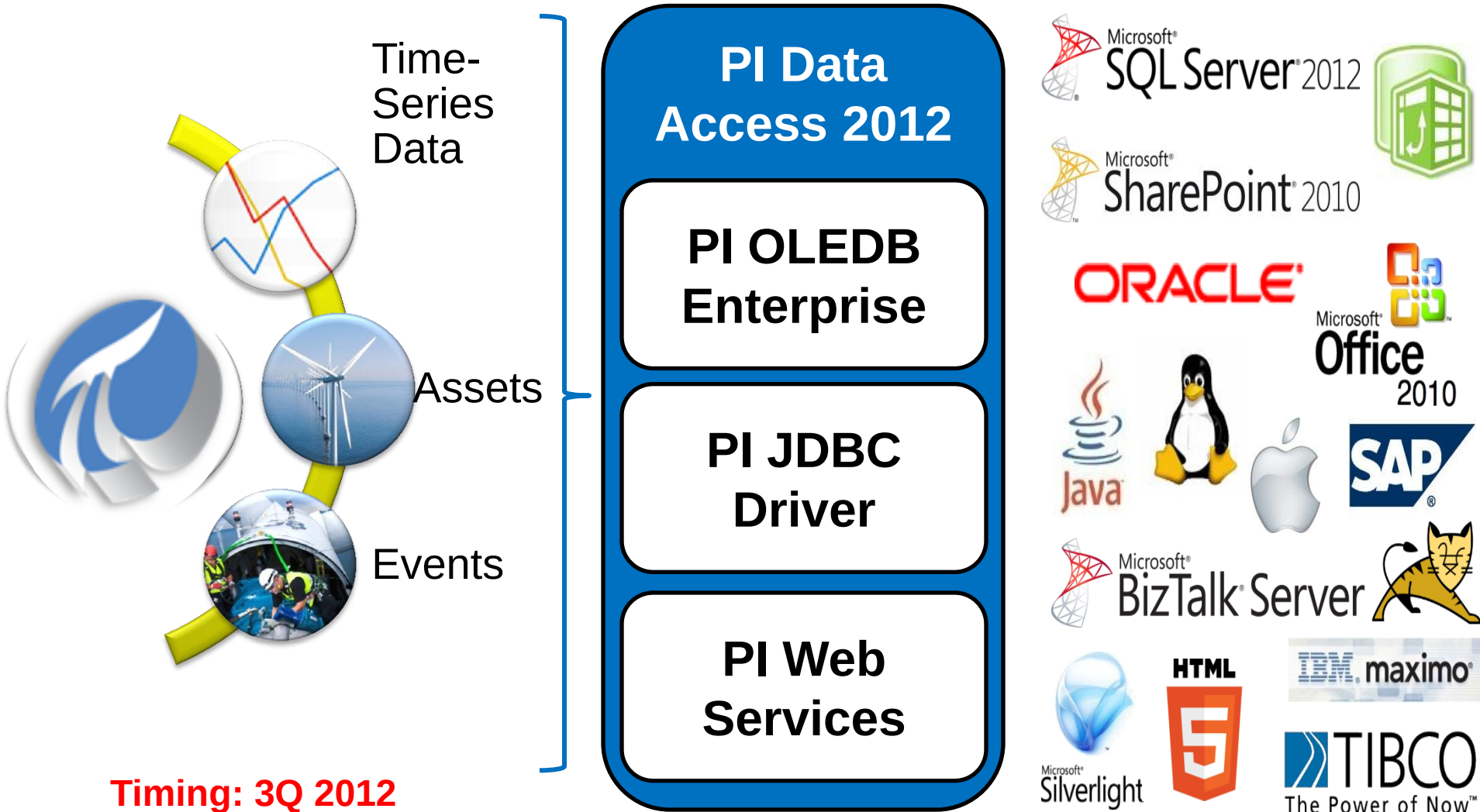


myEF.Start = (**myPIKPI** > LIMIT)

myEF.End = (**myPIKPI** < LIMIT) AND (**Fuel Flow Rate** > 80)

Timing: TBD

Event Integration with PI Data Access 2012

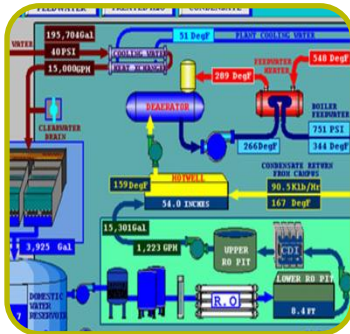


PI DataLink & PI ProcessBook



PI DataLink

- *Reporting & Table Based Analytics in Excel*
- Existing DL functions with an event frame context
- Digging into an event frame
- Rollups across event frames



PI ProcessBook

- *Display Authoring & Process Monitoring*
- Focus on real-time views of event frame data & historical event references
- Element relative displays driving event frame queries
- Table of current event frames
- Event frames driving trend context

Next releases (v2012 + 1) will include support for PI Event Frames; Timing: TBD

Current Value
Single Value

Archive Value
Multiple Value

Compressed Data
Multiple Value

Sampled Data
Multiple Value

Timed Data
Multiple Value

Calculated Data
Calculation

Time Filtered
Calculation

EVENTS
Event Frames

Update
Update

Settings
Resources

About
Resources

Help
Resources

Notification Search
Notifications

	A	B	C	D	E
1	Name	Start Time	End Time	Duration (Days)	Asset(s)
2	AC Failure 1	7/4/2010 15:15	7/5/2010 15:15	1.000	East AC
3	AC Failure 2	7/6/2010 13:17	7/6/2010 15:45	0.103	West AC
4	AC Failure 3	7/6/2010 19:15	7/7/2010 20:15	1.042	East AC
5	AC Failure 4	7/24/2010 15:15	7/25/2010 15:15	1.000	East AC
6	AC Failure 5	7/26/2010 12:05	7/26/2010 15:01	0.122	West AC
7	AC Failure 6	8/12/2010 16:38	8/12/2010 19:15	0.109	East AC
8	AC Failure 7	9/1/2010 11:05	9/1/2010 14:55	0.160	East AC
9	AC Failure 8	9/23/2010 15:15	9/24/2010 15:15	1.000	East AC
10	AC Failure 9	9/25/2010 15:15	10/1/2010 10:05	5.785	Backup AC
11	AC Failure 10	10/4/2010 18:18	10/5/2010 11:19	0.709	East AC

AC Failure

Display

☒ Name

☒ Start Time

☒ End Time

☒ Duration

☒ Asset(s)

☒ -- Value(s)

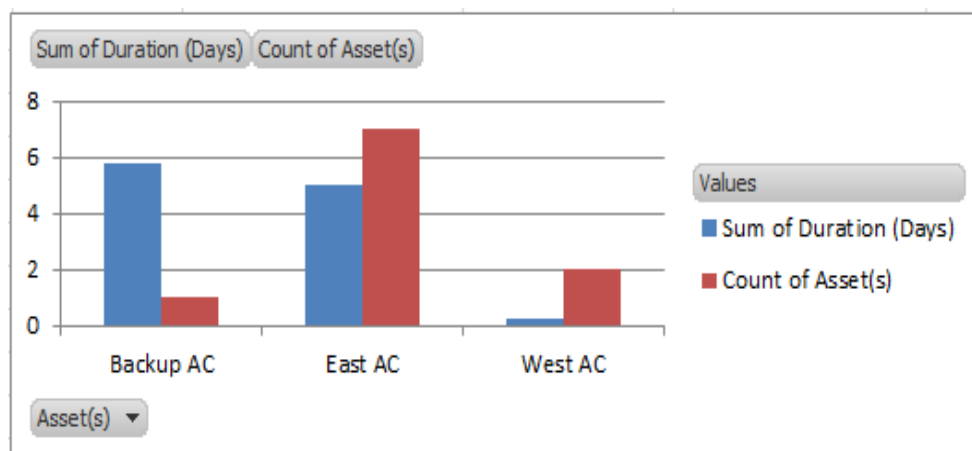
☒ Min

☐ Max

☐ Start

☐ End

☐ Avg



PI DataLink Scenario 1: Pareto

Current Value
Single Value

Archive Value
Value

Compressed Data
Multiple Value

Sampled Data
Multiple Value

Timed Data
Multiple Value

Calculated Data
Calculation

Time Filtered
Calculation

EVENTS

Update

Update

Settings

About

Help

Resources

Notification Search

Notifications

Start Time	End Time	Asset(s)	Attribute	Min	Max	Start	End	Avg
7/4/2010 15:15	7/5/2010 15:15	East AC	Inlet Temp	65	102	92	85	88
			Outlet Temp	65	76	65	65	68
			Outside Temp	65	98	85	82	82
7/6/2010 13:17	7/6/2010 15:45	West AC	Inlet Temp	55	98	74	80	65
			Outlet Temp	65	77	75	65	72
			Outside Temp	55	93	84	81	76
7/6/2010 19:15	7/7/2010 20:15	East AC	Inlet Temp	57	97	72	96	68
			Outlet Temp	65	78	76	66	75
			Outside Temp	57	94	89	77	76
7/24/2010 15:15	7/25/2010 15:15	East AC	Inlet Temp	56	101	76	95	72
			Outlet Temp	65	79	78	72	75
			Outside Temp	55	98	85	92	77
7/26/2010 12:05	7/26/2010 15:01	West AC	Inlet Temp	51	97	75	93	69
			Outlet Temp	65	78	77	71	72
			Outside Temp	51	95	86	80	78
8/12/2010 16:38	8/12/2010 19:15	East AC	Inlet Temp	53	98	72	80	68
			Outlet Temp	65	79	77	72	73
			Outside Temp	52	96	89	72	81

AC Failure
Search

Display

☐ Name

☐ Start Time

☒ End Time

☒ Duration

☐ Asset(s)

-- Value(s)

☒ Min

☐ Max

☒ Start

☒ End

☒ Avg

☒

☒

☒

PI DataLink Scenario 1: Pareto with Expanded Data

Current Value
Single Value

Archive Value
Multiple Value

Compressed Data
Multiple Value

Sampled Data
Multiple Value

Timed Data
Multiple Value

Calculated Data
Calculation

Time Filtered
Calculation

EVENTS
Event Frames

Update
Update

Settings
Resources

About
Resources

Help
Resources

Notification Search
Notifications

Timestamp	Inlet Temp	Timestamp	Outlet Temp	Timestamp	Outside Temp
7/4/2010 15:15	68.4629943	7/4/2010 15:15	88.8094967	7/4/2010 15:15	101.0440563
7/5/2010 15:15	95.7129340	7/5/2010 15:15	76.4532675	7/5/2010 15:15	60.0921256
7/6/2010 15:15	81.7653082	7/6/2010 15:15	80.7667637	7/6/2010 15:15	80.8185982
7/7/2010 15:15	101.7854560	7/7/2010 15:15	83.0991022	7/7/2010 15:15	105.9912055
7/8/2010 15:15	89.8139092	7/8/2010 15:15	76.2973912	7/8/2010 15:15	89.1709799
7/9/2010 15:15	66.8039196	7/9/2010 15:15	61.7796604	7/9/2010 15:15	87.4121913
7/10/2010 15:15	98.6453038	7/10/2010 15:15	75.2556711	7/10/2010 15:15	70.2981627
7/11/2010 15:15	80.5863931	7/11/2010 15:15	78.8409024	7/11/2010 15:15	77.5341696
7/12/2010 15:15	81.8236347	7/12/2010 15:15	87.6253935	7/12/2010 15:15	103.6653854
7/13/2010 15:15	60.7527866	7/13/2010 15:15	88.9080972	7/13/2010 15:15	100.7087382
7/14/2010 15:15	85.3426792	7/14/2010 15:15	85.1032832	7/14/2010 15:15	79.1770753
7/15/2010 15:15	64.7296842	7/15/2010 15:15	64.5978220		
7/16/2010 15:15	99.8245661	7/16/2010 15:15	69.0787749		
7/17/2010 15:15	73.2730121	7/17/2010 15:15	85.0493247		
7/18/2010 15:15	75.3346738	7/18/2010 15:15	65.3270666		
		7/19/2010 15:15	99.8295976		
		7/20/2010 15:15	60.2310299		
		7/21/2010 15:15	100.5663664		
		7/22/2010 15:15	70.6494629		

Compressed Data

Start Time

End Time

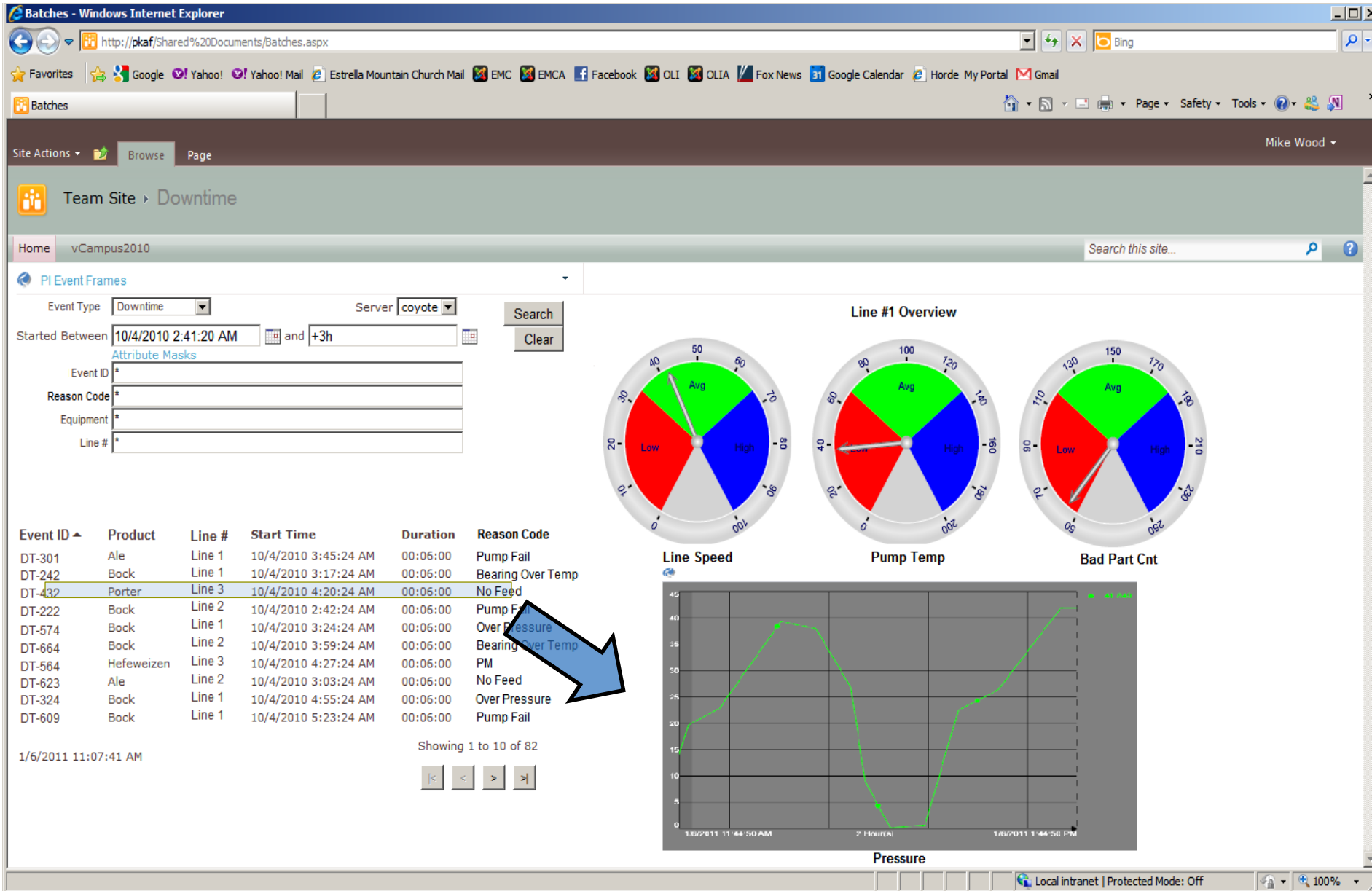
Associated Assets

- ☒ Inlet Temp
- ☒ Outlet Temp
- ☒ Outside Temp

Events

Assets

PI DataLink Scenario 2: Event Frames in existing functions



PI WebParts: Event Frames Table

Wave III

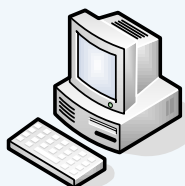
Batch to Events Frame Transition

Batch to Event Frames Transition

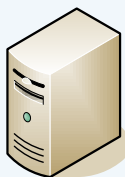
BDB-based Products



PI WebParts
PI ProcessBook
PI DataLink
PI BatchView
RtReports

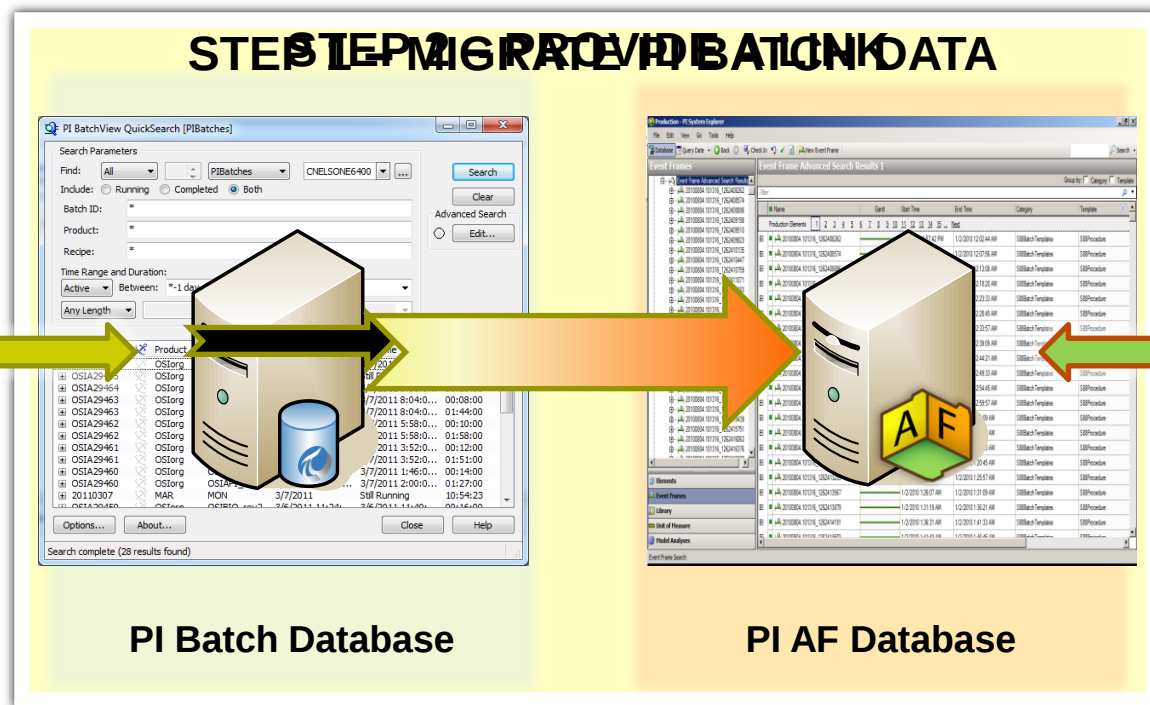


PI OLEDB
PI JDBC
PI SDK



PI ACE

Continue using your existing BDB-based products

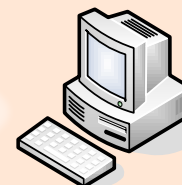


Upgrade to PI AF based products when you are ready

AF-based Products



PI WebParts
PI ProcessBook
PI DataLink
PI Coresight

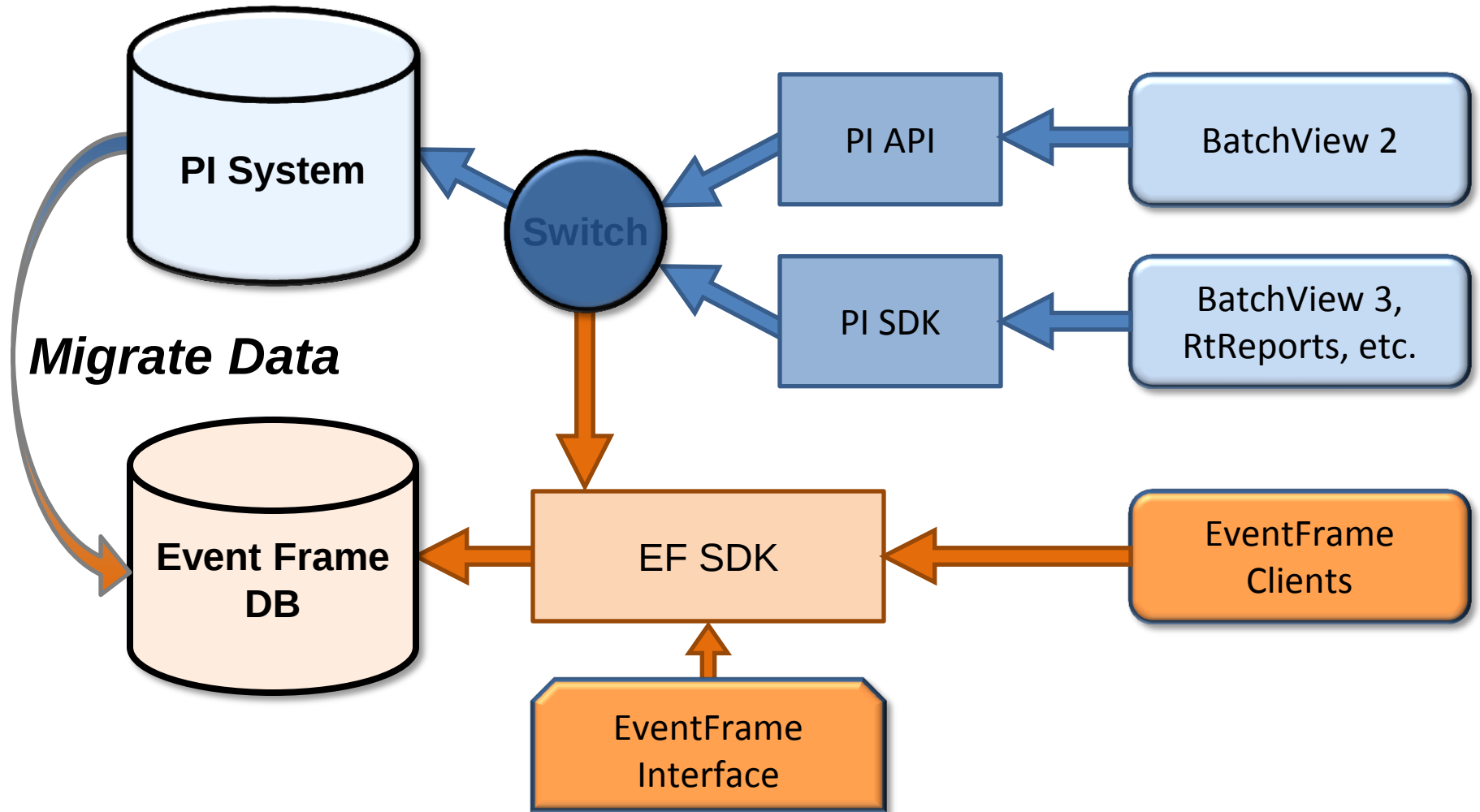


PI OLEDB Enterprise
PI JDBC
PI Web Services
AF SDK



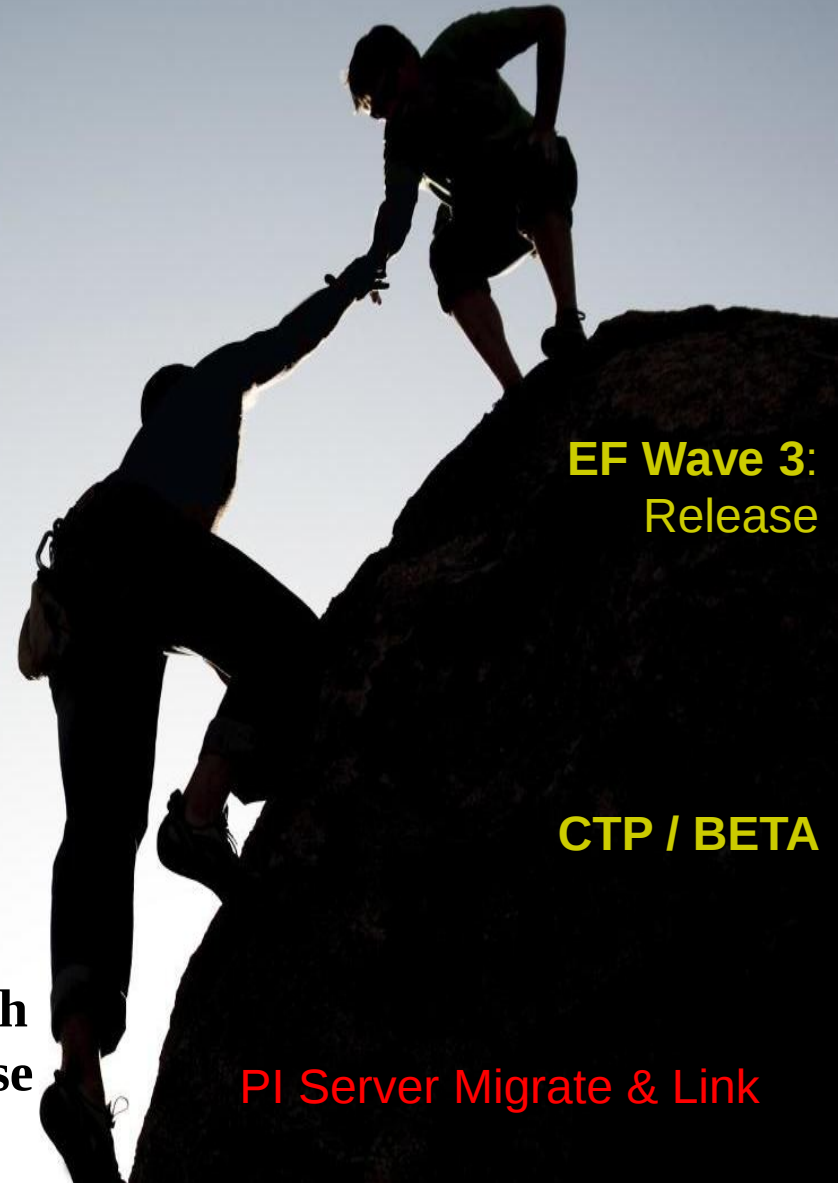
PI Notifications

PI Batch Compatibility Migration Model



PI Event Frames

We will help you get to the top.



**EF Wave 3:
Release**

CTP / BETA

**PI Batch
Database**

PI Server Migrate & Link

Summary - PI Event Frames

- Analyze your events in the context of your asset structure.
- AF SDK and PI System Explorer support event frames (As of PI Server 2010 R3 – Dec 2011)
- PI Data Access Support for event frames is going to enable you to perform reporting.
- Client support for Event Frames on the way.
- We will provide you with a smooth transition from PI Batch to PI Event Frames.

Shivesh Suman

ssuman@osisoft.com

Techsupport Escalation Engineer
OSIsoft, LLC

THANK YOU



Diamond Sponsor

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It's all about Imagineering

