

OSIsoft®

# USERS<sup>2011</sup> CONFERENCE



Turning **insight** into **action**.



# PI Event Frames: Find Your Data by Events

Presented by **Chris Coen**, Product Manager, OSIsoft  
**Chris Nelson**, Software Development Lead, OSIsoft

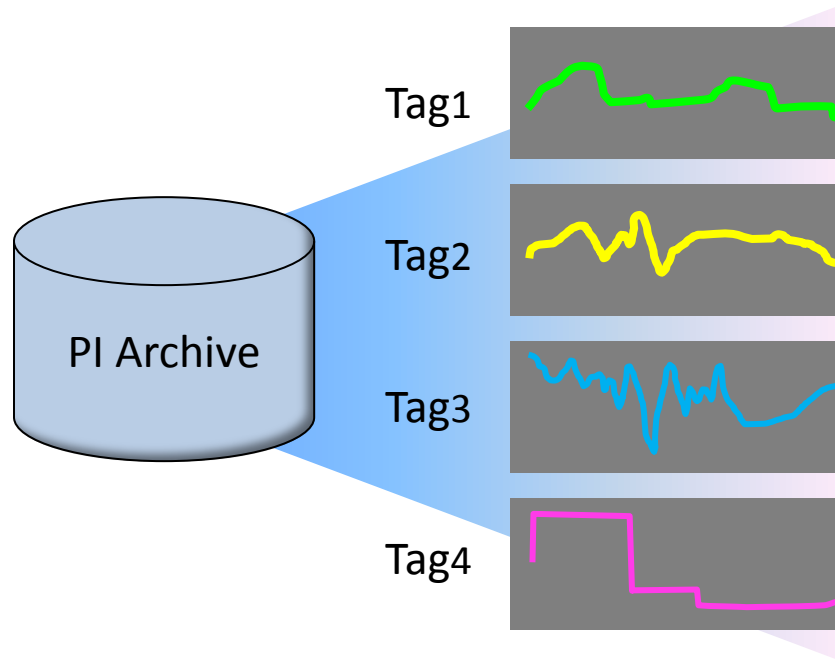
# Goals

- New capability of the PI System
- Roadmap with multi-phase rollout across platform
- The way forward for PI Batch
- Demos and testimonials

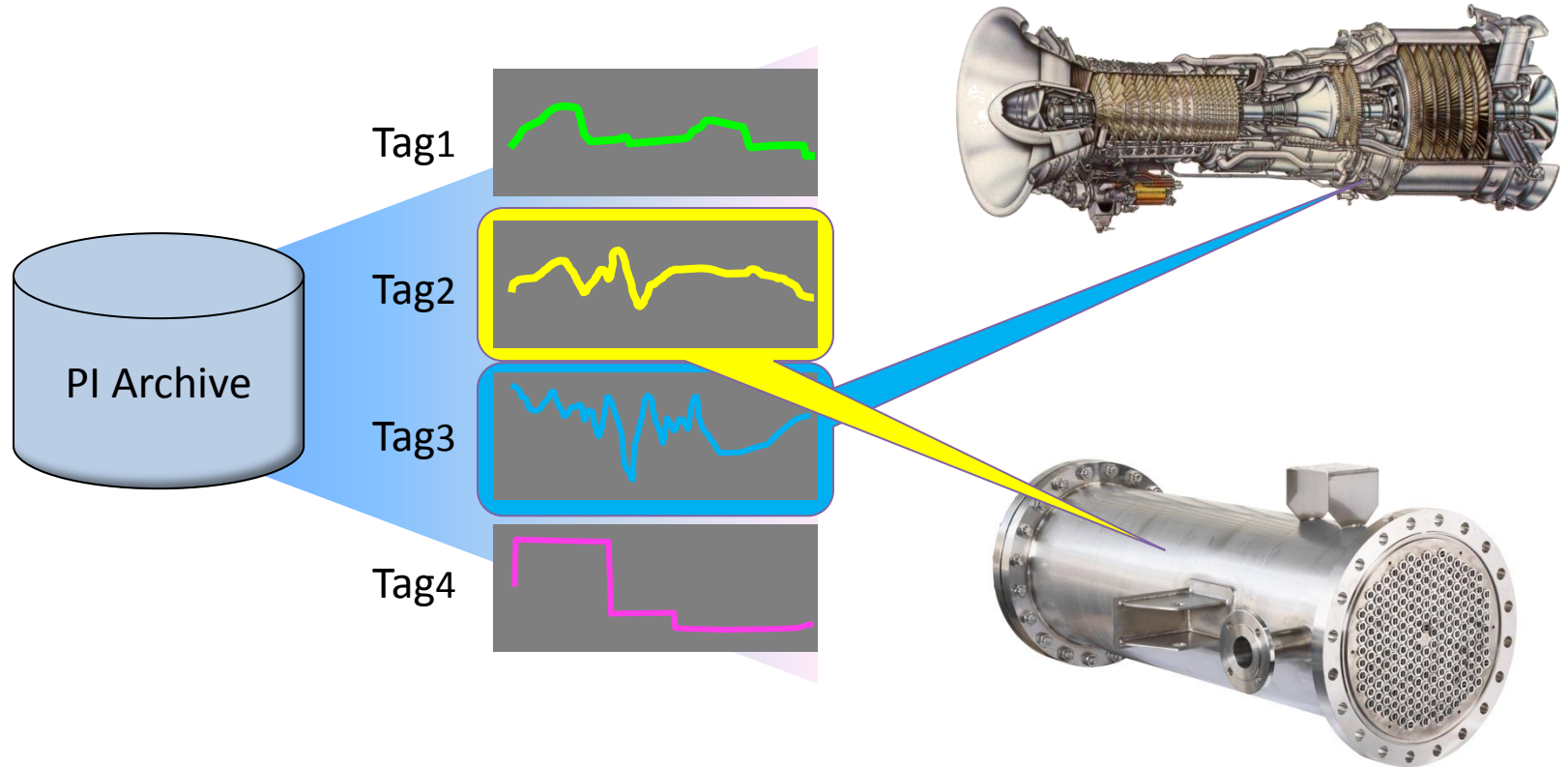
# PI Event Frames Vision

Imagine all that data you have been collecting 24/7...

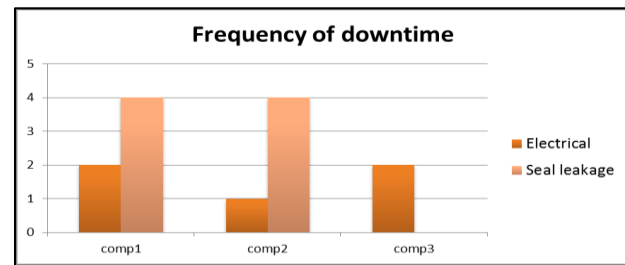
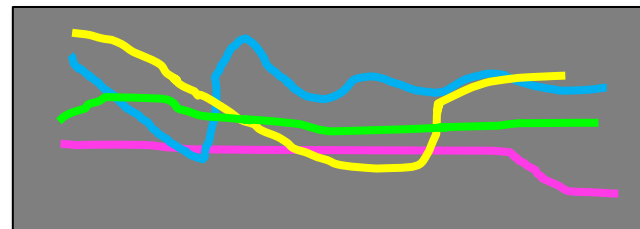
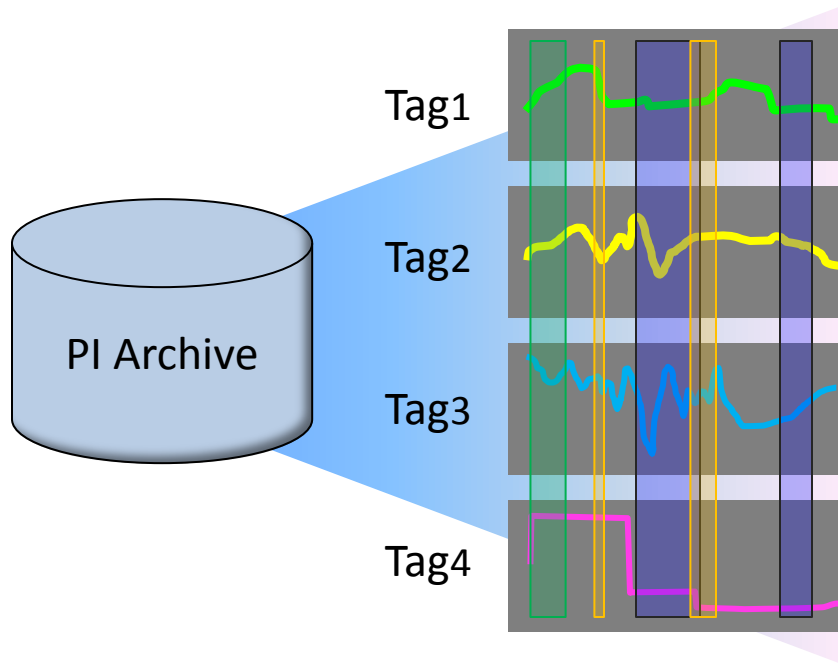
# PI Server – Time series data and Tags



# Assets help you find the right Tags



# Event Frames help you find the right time periods



# What can Event Frames help you understand?

- Downtime and Overall Equipment Effectiveness (OEE)
- Excursions
- Startups, shutdowns
- Products (batch, mining, paper, etc.)
- Shifts, days



# Downtime

- Down equipment is not producing
- How often is it down?
- What are causes of downtime?
- Which causes should I address first?

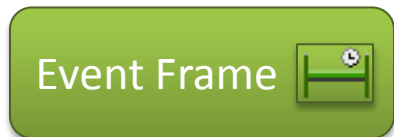
# Intro to PI Event Frames



# PI Event Frames

- What are these Event Frames?
- Where are these Event Frames?
- They are also a lot like PI AF Elements
  - Templates and indexing and show performance
  - References to assets
  - Attributes
- Demo with the downtime scenario

# Event Frames are time periods plus more



**Name** = DT23032011-2

**Start time** = 23-Mar-2011 09:32

**End time** = 23-Mar-2011 09:50

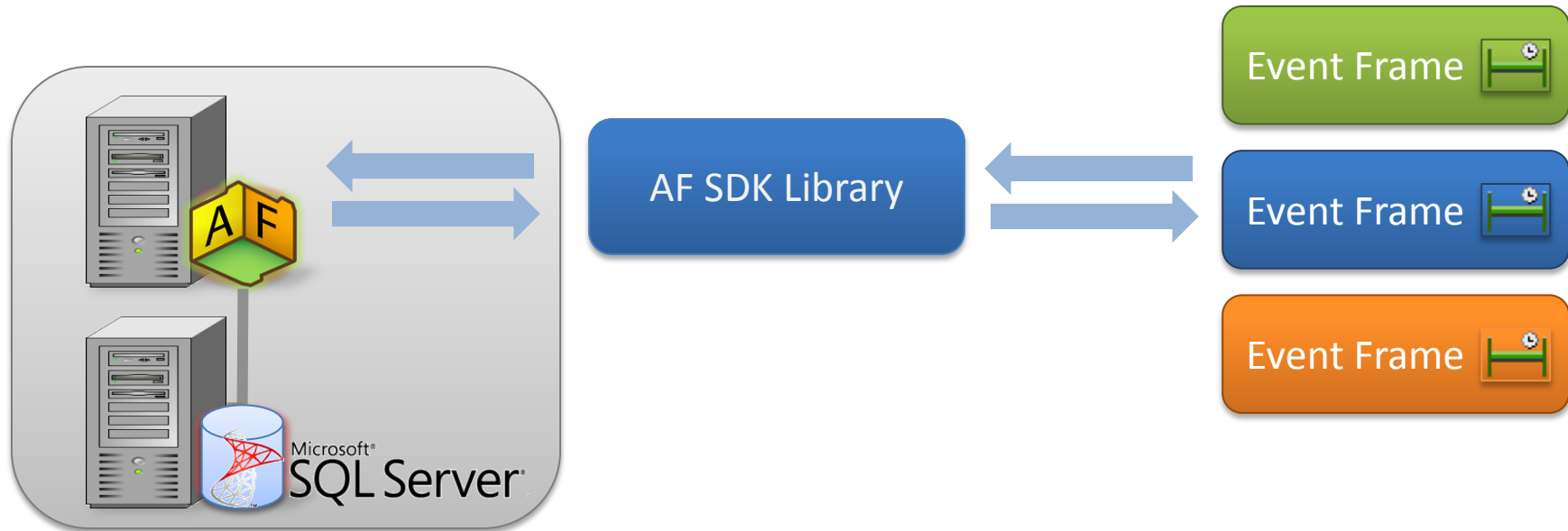
**Asset** = Boiler 3

**Attribute** = Mechanical

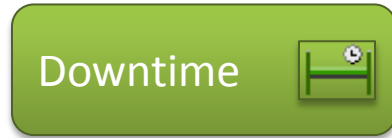
**Attribute** = Fuel line clogged

*An Event Frame records important process or business events and helps you find the related real-time data.*

# Event Frames are part of PI Asset Framework



# Different events have different attributes



DT23032011-2

23-Mar-2011 09:32

23-Mar-2011 09:50

Boiler 3

Mechanical

Fuel line clogged

Name

Start Time

End Time

ST23032011-2

23-Mar-2011 09:32

23-Mar-2011 09:50

Turbine 2

Standard procedure

Related Assets

BPS77-23032011-2

23-Mar-2011 09:32

23-Mar-2011 09:50

Mixer 1

BPS77

Prepolymer 16

Feed stock 78-YNW

Event-Specific Attributes

# Different events have different attributes

Downtime



DT23032011-2

23-Mar-2011 09:32

23-Mar-2011 09:50

Boiler 3

Mechanical

Fuel line clogged



Reason code



Comment



Startup



ST23032011-2

23-Mar-2011 09:32

23-Mar-2011 09:50

Turbine 2

Standard procedure



Startup procedure



Batch



BPS77-23032011-2

23-Mar-2011 09:32

23-Mar-2011 09:50

Mixer 1

BPS77

Prep

Feed stock 78-VME



Recipe



Product



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



# PI Event Frames Demonstration



**PI Event Frames**

# Summary of Features

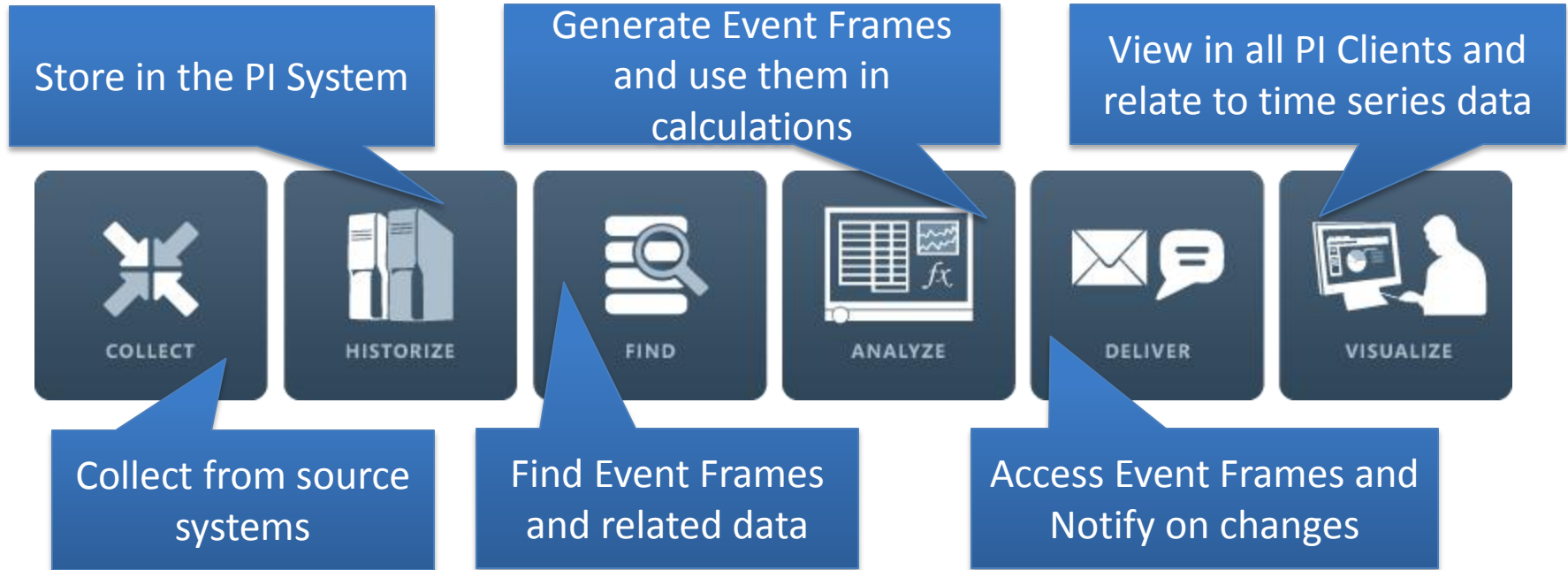
- Event Frames are a new time-period datatype
- Event Frames are stored in the PI AF database
- They are a lot like Elements
  - Templates and indexing
  - References to assets
  - Attributes
- References to other Event Frames

# The Roadmap



# Future State

Event Frames will be supported throughout the PI System



*Note: Future dates are subject to change*

Wave 1 – Partner and Early Adopters

Wave 2 – Mainstream

Wave 3 – Batch moves to Event Frames

2010

2011

2012

FUTURE

Functional equivalence

Wave 2 EF supports basic batch+

Migrate and Link

Batch adoption

# Wave 1 – Partner and Early Adopters

Goal

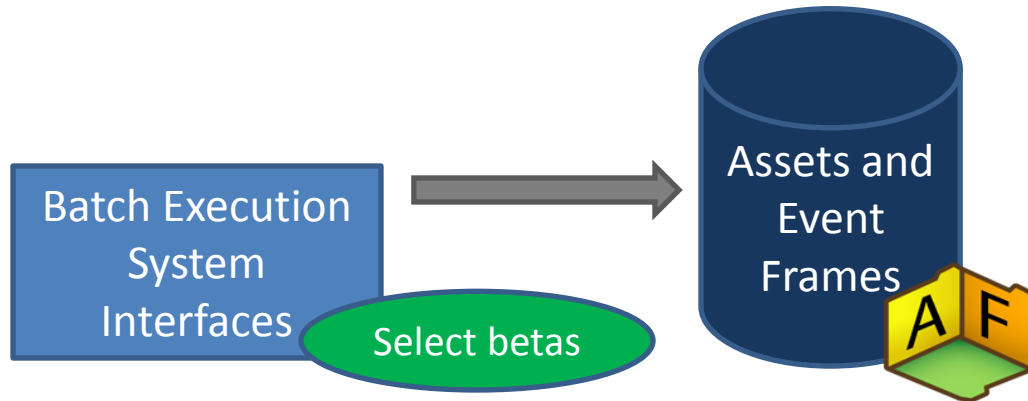
*Infrastructure is able and ready. Partner and custom applications are needed for Event Frame generation and visualization.*

Wave 1

Wave 2

Wave 3

Batch





## Scalability

Templates,  
Reference  
Types

Microsoft SQL  
Technology



## Usability

Search

Extensible  
Attributes



## Reliability

HA  
Solutions

Windows  
Security

PI Event Frames “abilities”

# Partners leveraging PI Event Frames

- Keith Flynn of ADM presents:

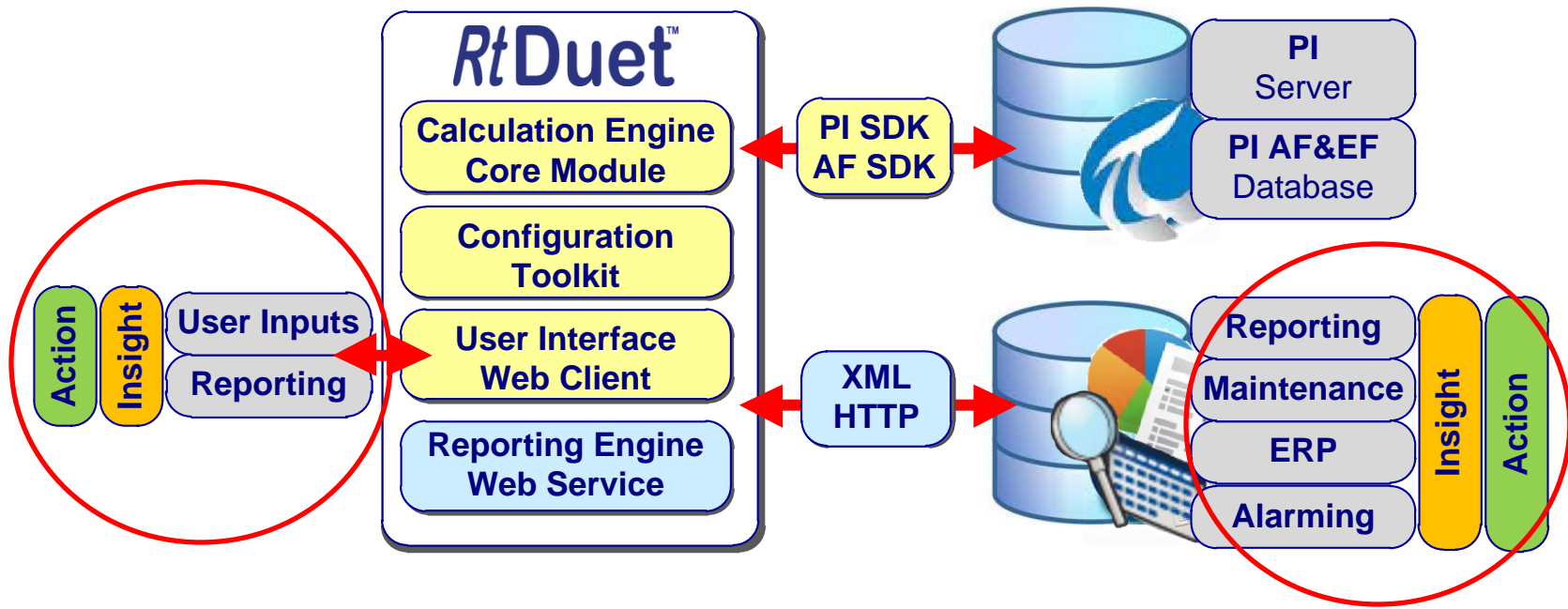


- Yannick Galipeau of iTi presents:





# RtDuet Version 6.0



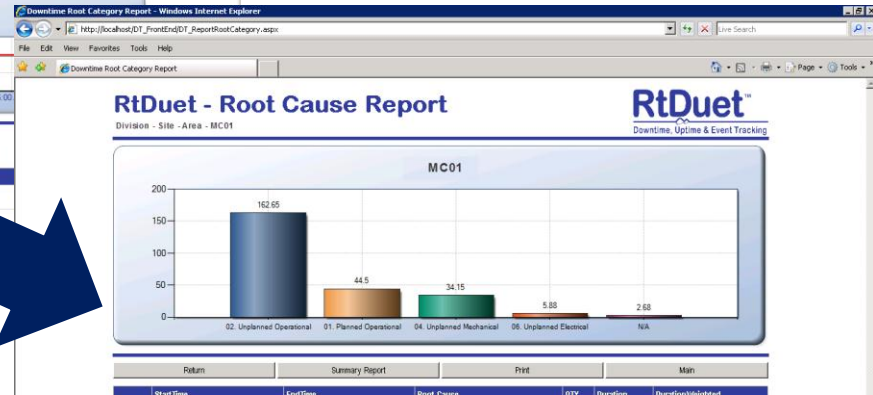
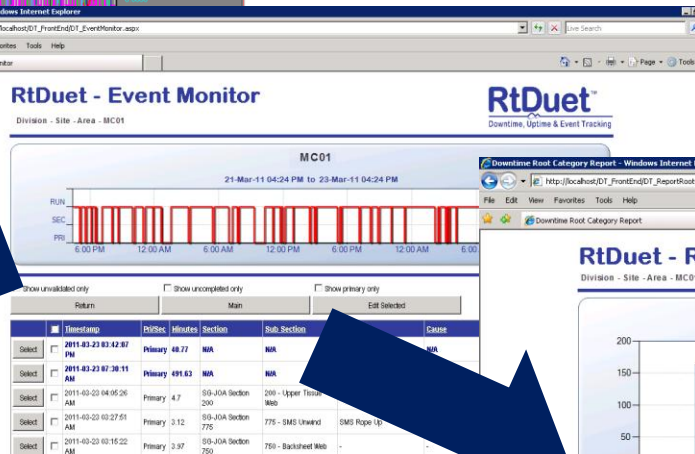
# RtDuet Version 6.0

**RtDuet™**  
Real-time Downtime, Uptime & Event Tracking

Plant Data From PI Server

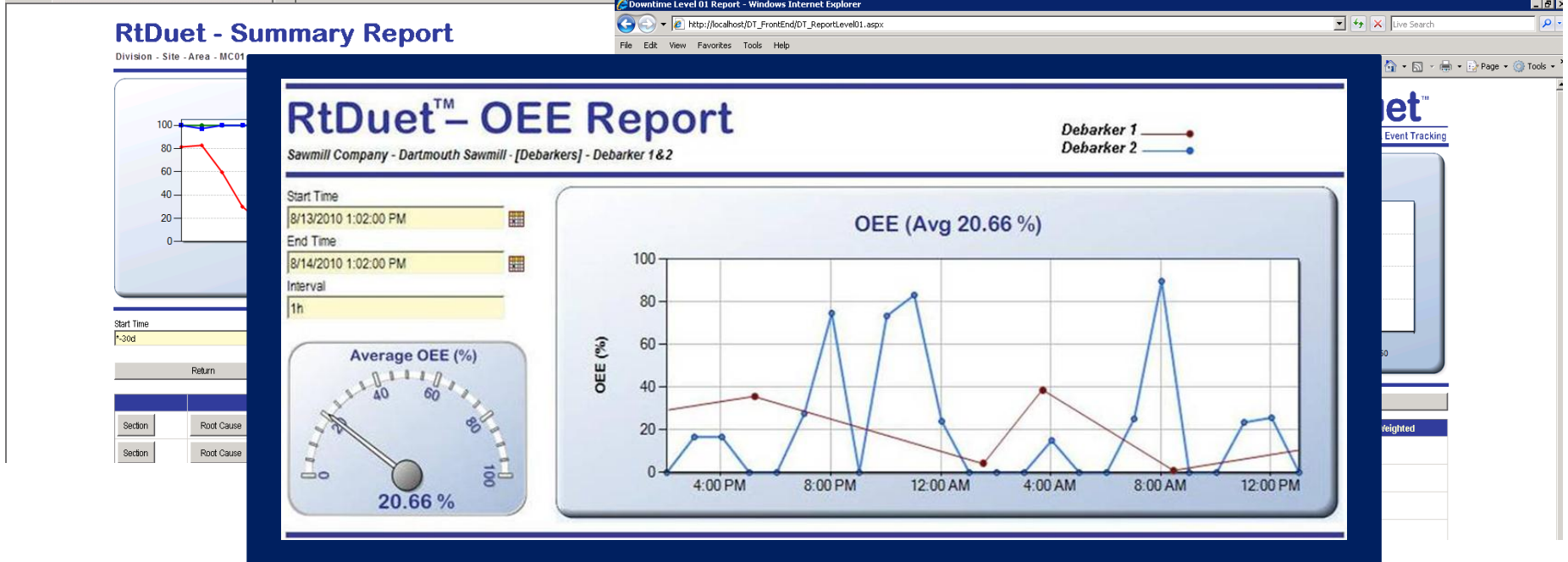
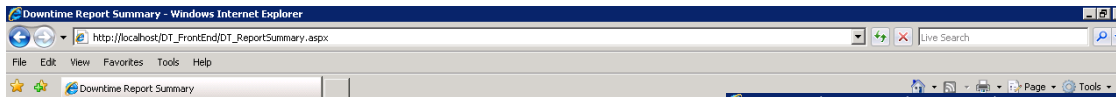
RtDuet generates Event Frames  
Users add reason codes and comments

RtDuet provides insightful reports  
Users can take corrective action



Optimize Performance - Reduce Downtime - Increase Profitability

# RtDuet Version 6.0



My Documents

My Computer

Recycle Bin

Adobe Reader 9

Internet Information...

PI System Explorer

RtDuet Web Pages

Services

ZoomIt.exe

# RtDuet™

Real-time Downtime, Uptime & Event Tracking

Your Solution for Corporate Downtime Reporting.

Configuration | Events | Reason Tree | Miscellaneous

Name: MC02 ☐ Visible in Web Pages [Advanced ...](#)

Event Type: RtDuet Downtime Event

Calculation Server: RTDUETAF\_KEITH

Reason Tree: ...

Status Tag: \\RtDuetAF\_Keith\ADMSE\_DATA\_DARTMOUTH\_MC02.DWPStatus

Primary Triggers

Name	Tag	Operator	Reference	Active
Trigger_1	WRtDuetAF_Keith\CDM158	=	Manual	<input checked="" type="checkbox"/>
Trigger_2	WRtDuetAF_Keith\CDM158	=	Program	<input checked="" type="checkbox"/>

Secondary Triggers

Name	Tag	Operator	Reference	Active
Trigger_3	WRtDuetAF_Keith\BA.CONC.1	<	20	<input checked="" type="checkbox"/>

# What is Ekho?

Ekho is an Event Driven, EMI Software (*Enterprise Manufacturing Intelligence*)

- Packaged Cases
- Chemical Reactor Batch
- Steel Coil
- Raw Material Lot #
- Reel of Paper
- Equipment Downtime
- Order
- Complaint
- Wind Turbine Fault
- Environmental Spill
- Process Centerline Event
- Quality upset
- KPI (OEE)
- Injury
- Recipe
- ....

# Market and Customers



# Shift Performance Review



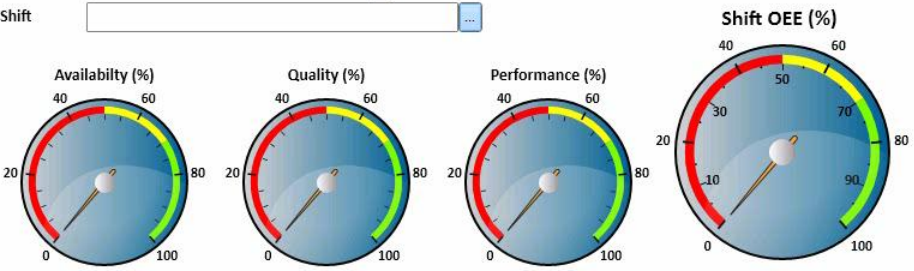
Machine

Section

Date

Shift

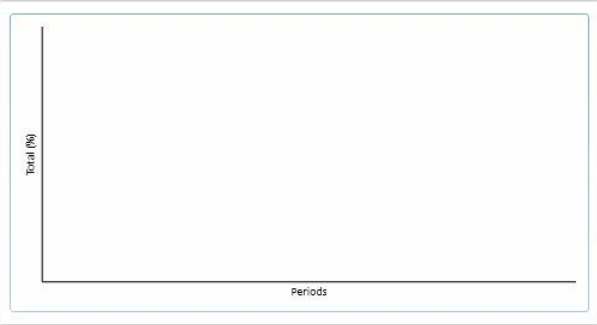
Status	Description	Current	Previous
--------	-------------	---------	----------



Reject Code (Total + Top 3)	Occurrences
-----------------------------	-------------

OEE Summary

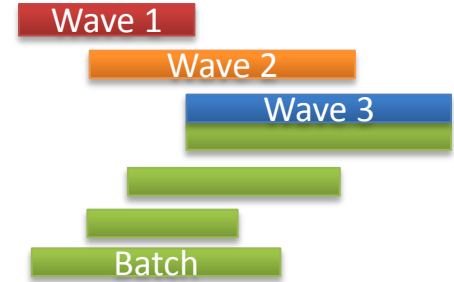
OEE Detail



# Wave 1 – Partner and Early Adopters

Goal

*Infrastructure is able and ready. Partner and custom applications are needed for Event Frame generation and visualization.*



- CTP
  - OSIssoft vCampus
- Release
  - 3<sup>rd</sup> Quarter 2011 as part of the next release of the PI Asset Framework



## Wave 2 – Mainstream

### Goal

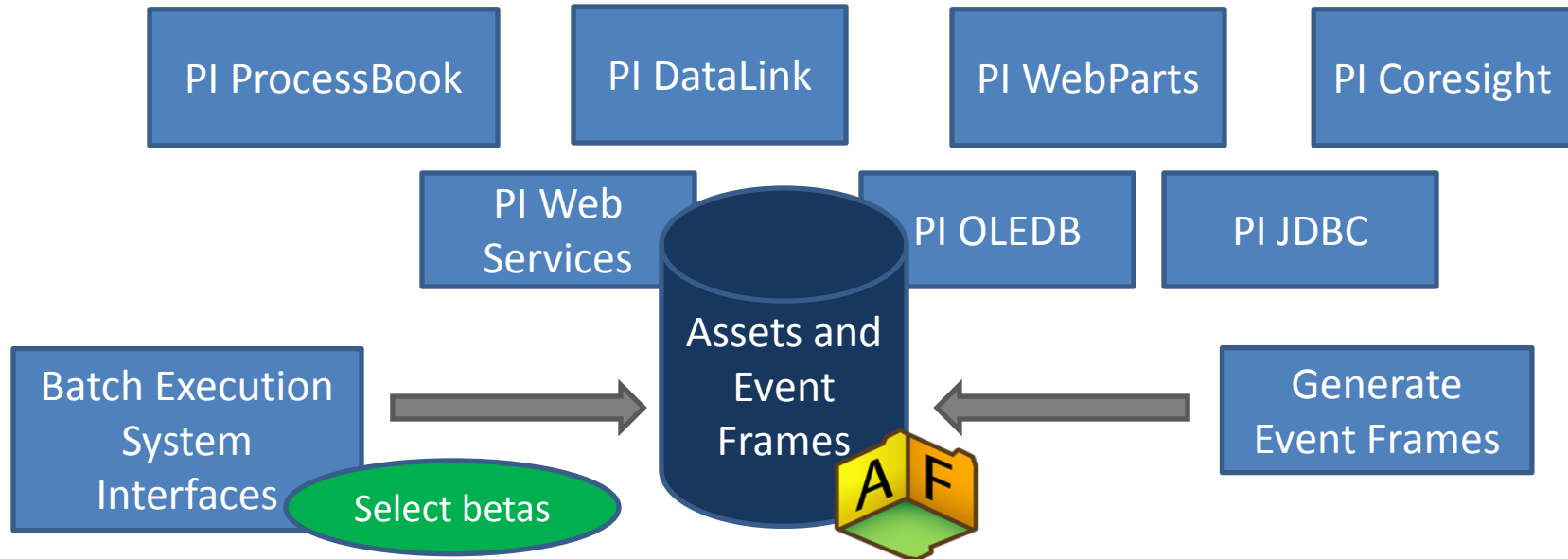
*First end-to-end Event Frames experience. Ability to generate Event Frames automatically. Several visualization options.*

Wave 1

Wave 2

Wave 3

Batch



## Wave 2 – Mainstream

### Goal

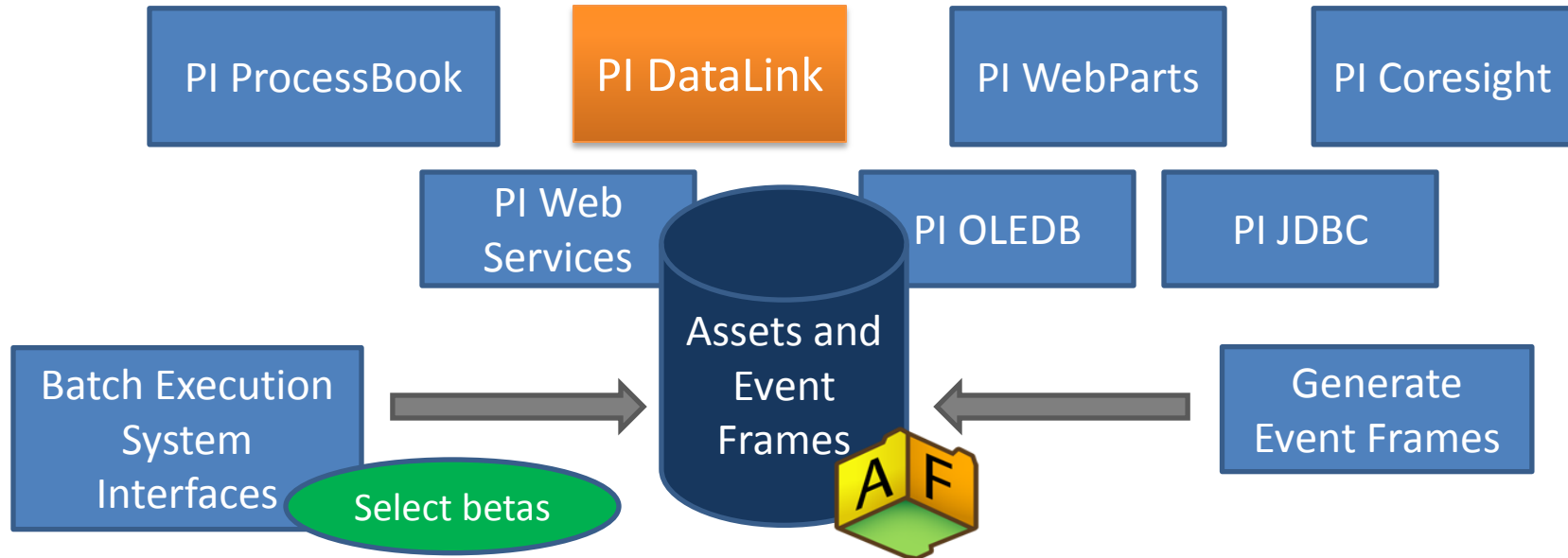
*First end-to-end Event Frames experience. Ability to generate Event Frames automatically. Several visualization options.*

Wave 1

Wave 2

Wave 3

Batch



Current Value  
Single Value

Archive Value  
Single Value

Compressed Data  
Multiple Value

Sampled Data  
Multiple Value

Timed Data  
Multiple Value

Calculated Data  
Calculation

Time Filtered  
Calculation

**EVENTS**  
**Event Frames**

Update  
Update

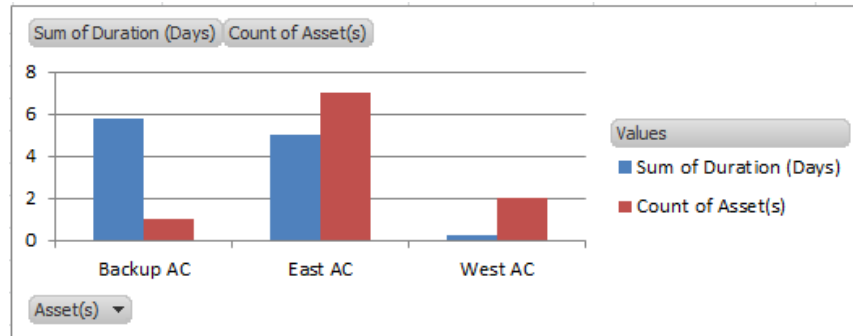
Settings  
Resources

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
 Search

**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  
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

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

AC Failure 12 Search

Start Time

AC Failure 12

End Time

AC Failure 12

Associated Assets

☒ Inlet Temp  
☒ Outlet Temp  
☒ Outside Temp

Events

Assets

## PI DataLink Scenario 2: Event Frames in existing functions

## Wave 2 – Mainstream

### Goal

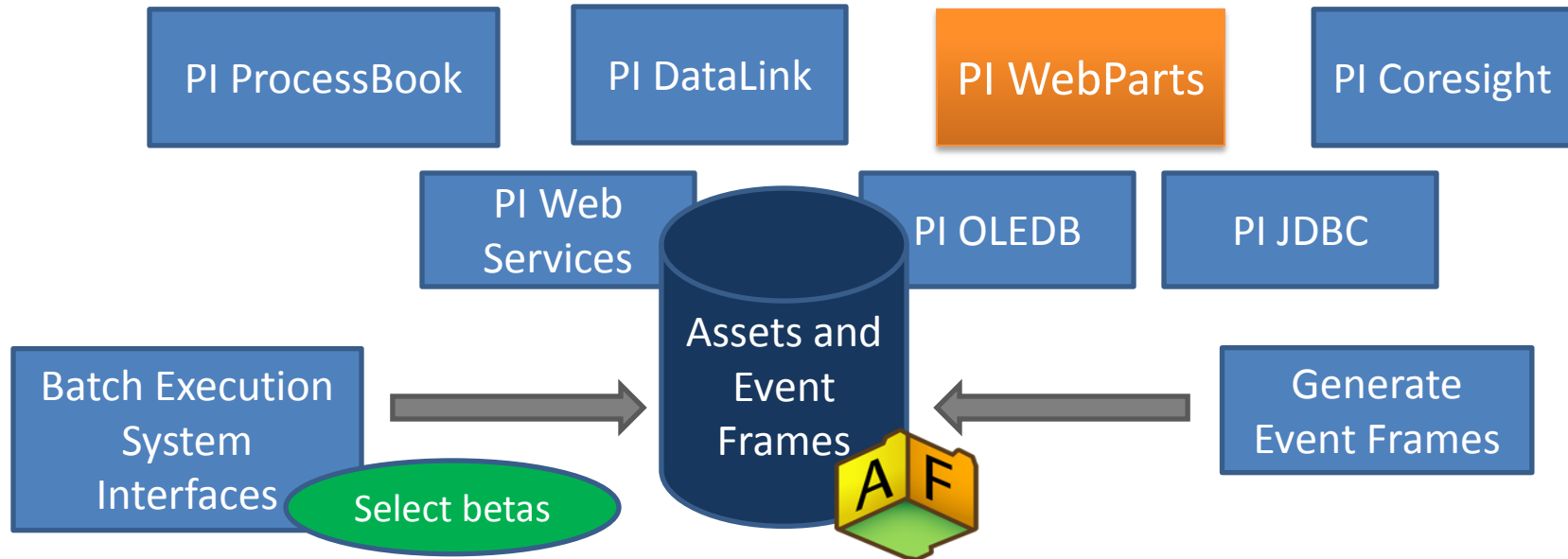
*First end-to-end Event Frames experience. Ability to generate Event Frames automatically. Several visualization options.*

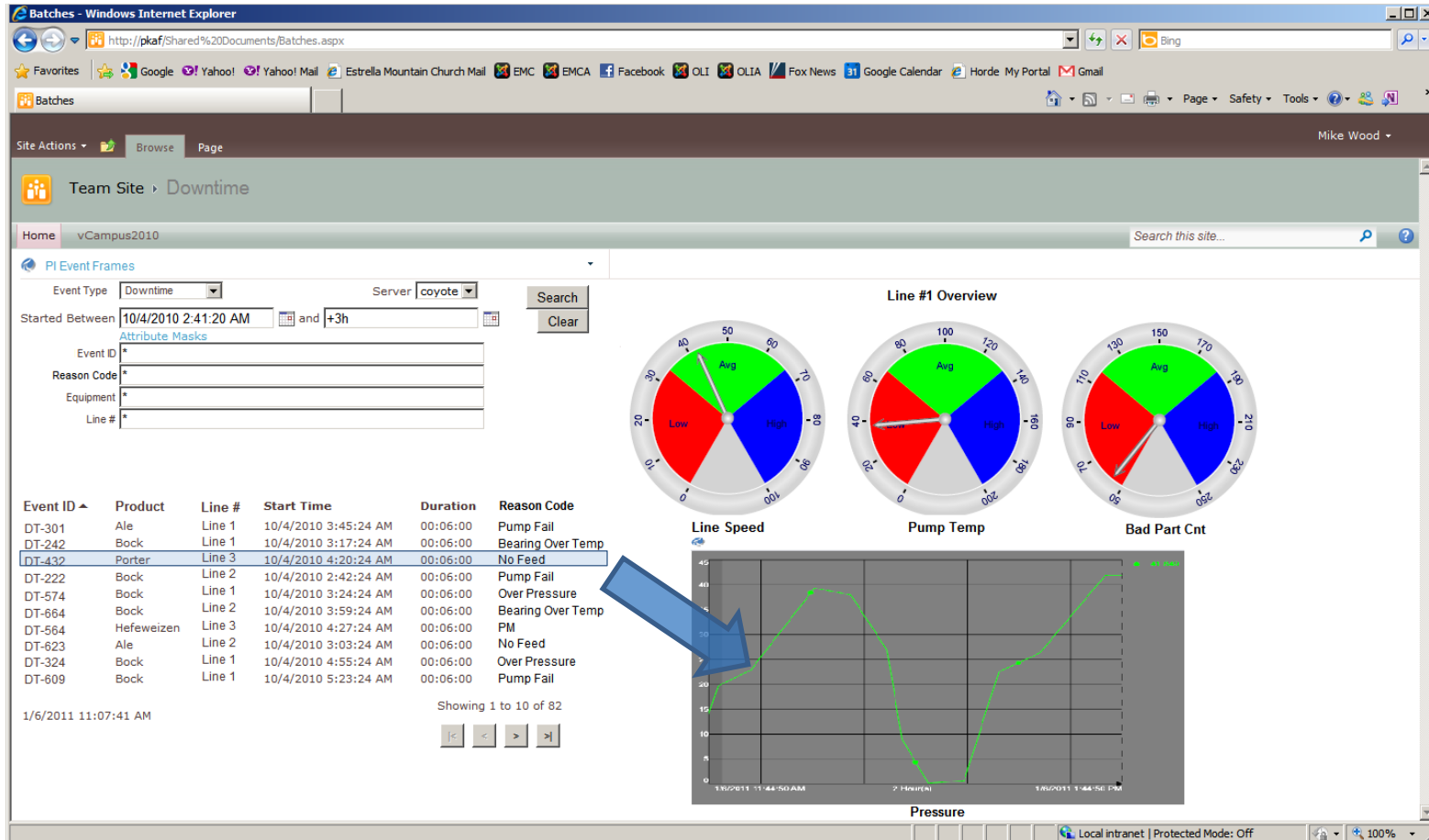
Wave 1

Wave 2

Wave 3

Batch





## PI WebParts: Event Frames Table

## Wave 2 – Mainstream

Goal

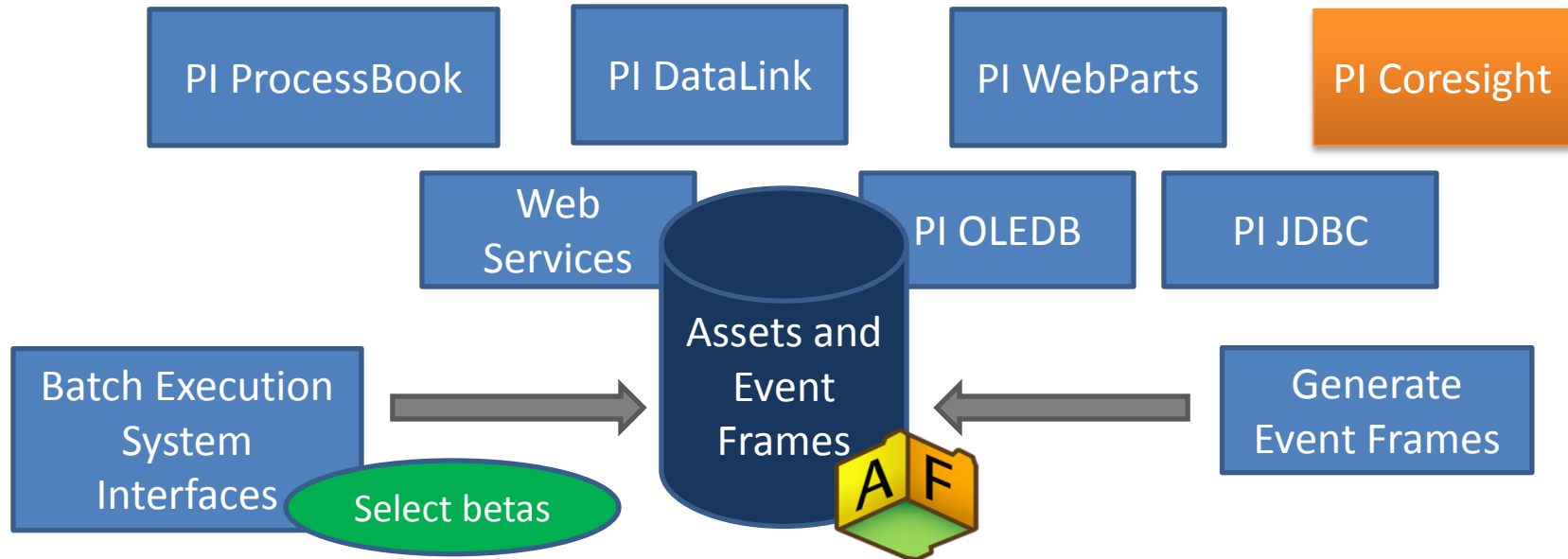
*First end-to-end Event Frames experience. Ability to generate Event Frames automatically. Several visualization options.*

Wave 1

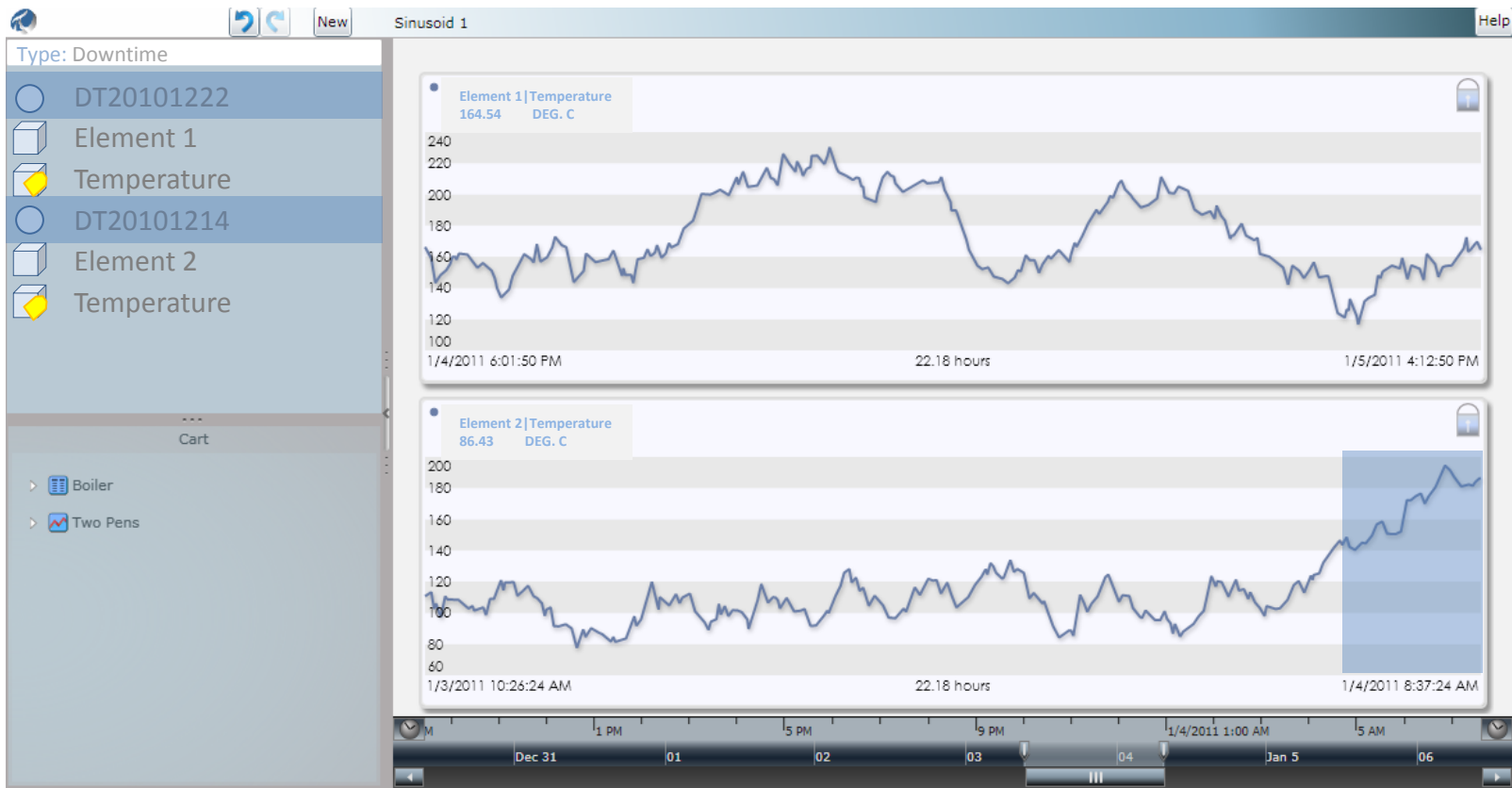
Wave 2

Wave 3

Batch







## PI Coresight: Event Frames Search and Trends

# Batch Adoption

Goal

*Move PI Batch customers forward to PI Event Frames while preserving investment in displays, spreadsheets and reports.*

Migrate and Link

Wave 2 EF supports basic batch+

Functional equivalence

Wave 1

Wave 2

Wave 3

Batch

# Batch Adoption

Goal

*Move PI Batch customers forward to PI Event Frames while preserving investment in displays, spreadsheets and reports.*

Wave 1

Wave 2

Wave 3

Batch

Migrate and Link

Wave 2

Wave 2 EF supports basic batch+

Functional equivalence

Wave 3 – Batch Moves to Event Frames

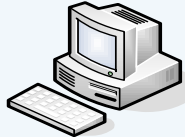
Goal

*Move PI Batch customers forward to PI Event Frames with features that can replace existing clients: displays, spreadsheets and reports.*

## BDB-based Products



PI WebParts  
PI ProcessBook  
PI DataLink  
PI BatchView  
RtReports



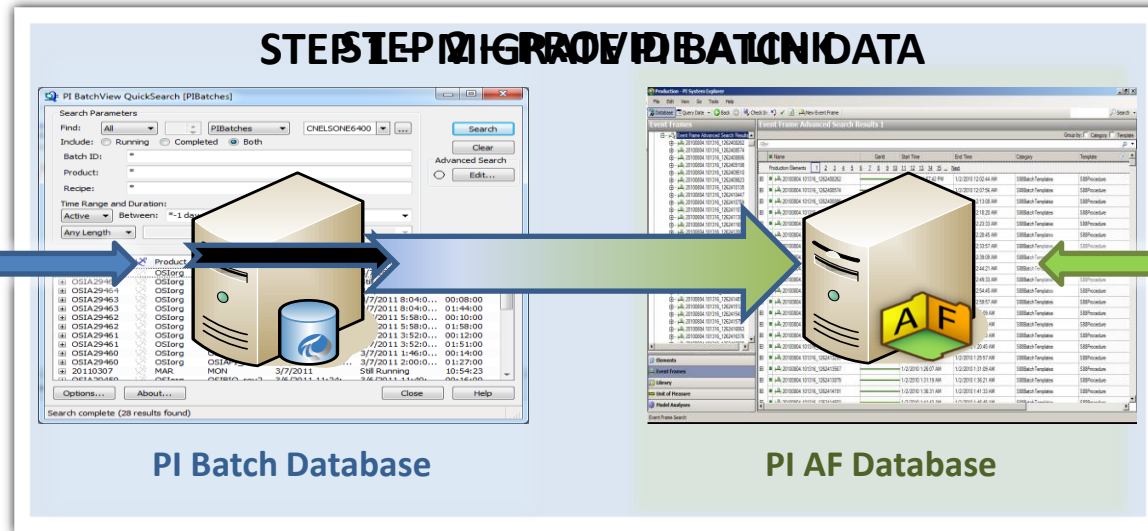
PI OLEDB  
PI JDBC  
PI SDK



PI ACE

# Batch to Event Frames Transition

*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 OLEDB Enterprise  
PI JDBC  
PI Web Services  
AF SDK



PI Notifications



Downtime Example with Multiple Elements						
<div> <div>General</div> <div>Child Event Frames</div> <div>Referenced Elements</div> <div>Attributes</div> </div> <div>Group by: <input type="checkbox"/> Category <input type="checkbox"/> Template</div> <div>Search </div>						
Name	Description	I In Service Date	I Last Service Date	I Manufacturer	I Serial Number	
Condenser	A generic condenser template	2/25/2009 12:00:00 AM	2/25/2011 12:00:00 AM	TubesEx	CDN5876	
Gas Turbine 1	A generic gas turbine template	2/25/2009 12:00:00 AM	2/25/2011 12:00:00 AM	Acme GT	AGT1185	
HRSG 1	A generic HRGS template	2/25/2009 12:00:00 AM	2/25/2011 12:00:00 AM	Acme Kettle	AK489	

# Batch Benefits

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

# Event Frames Demonstration



**PI Batch Interface**

## Elements

- Elements
  - OOE
  - OSIssoft Batch Interfaces
    - DeltaV:Factory 1
  - OSIssoft Big Creek Power Plant
  - OSIssoft Bio
  - OSIssoft Chemical

## Elements

## Event Frames

## Library

## Unit of Measure

## Model Analyses

## OSIssoft Batch Interfaces

General Child Elements Attributes Ports Version

Group by: ☐ Category ☐ Reference Type ☐ Template

Search

Name	Description	Category	Type	Template
DeltaV:Factory 1			None	

# Summary

- PI Event Frames – new capability of the PI System
- Release infrastructure 3Q 2011
  - Targeted to Partner applications and Early Adopters
- Next release
  - PI Event Frames for the mainstream
- Batch adoption roadmap already in development





# Thank you

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Turning **insight**  
into **action.**