



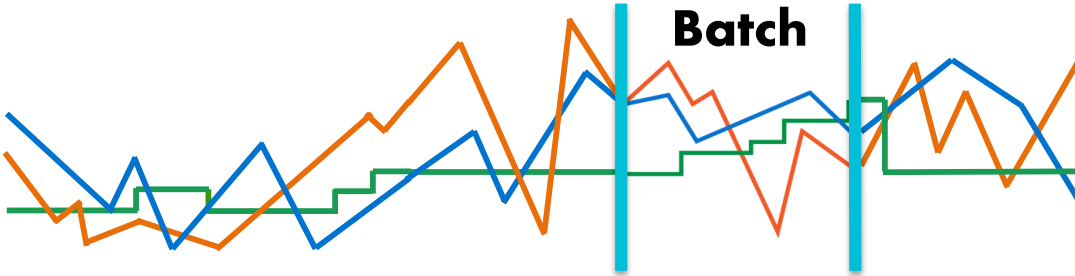
PI Event Frames: How to Provide Context to Critical Events

Presented by **Todd Brown & Lingli Zheng**

PI Event Frames

**PI Event Frames automatically bookmarks
PI System time-series data so that it's more
meaningful to engineers and business users,
AND easier to for them to find, analyze, and
report on.**

**Downtime
Excursion
Batch**



PI Event Frames

PI Event Frames automatically bookmarks PI System time-series data so that it's more meaningful to engineers and business users, AND easier for them to find, analyze, and report on.

**Downtime
Excursion
Batch**

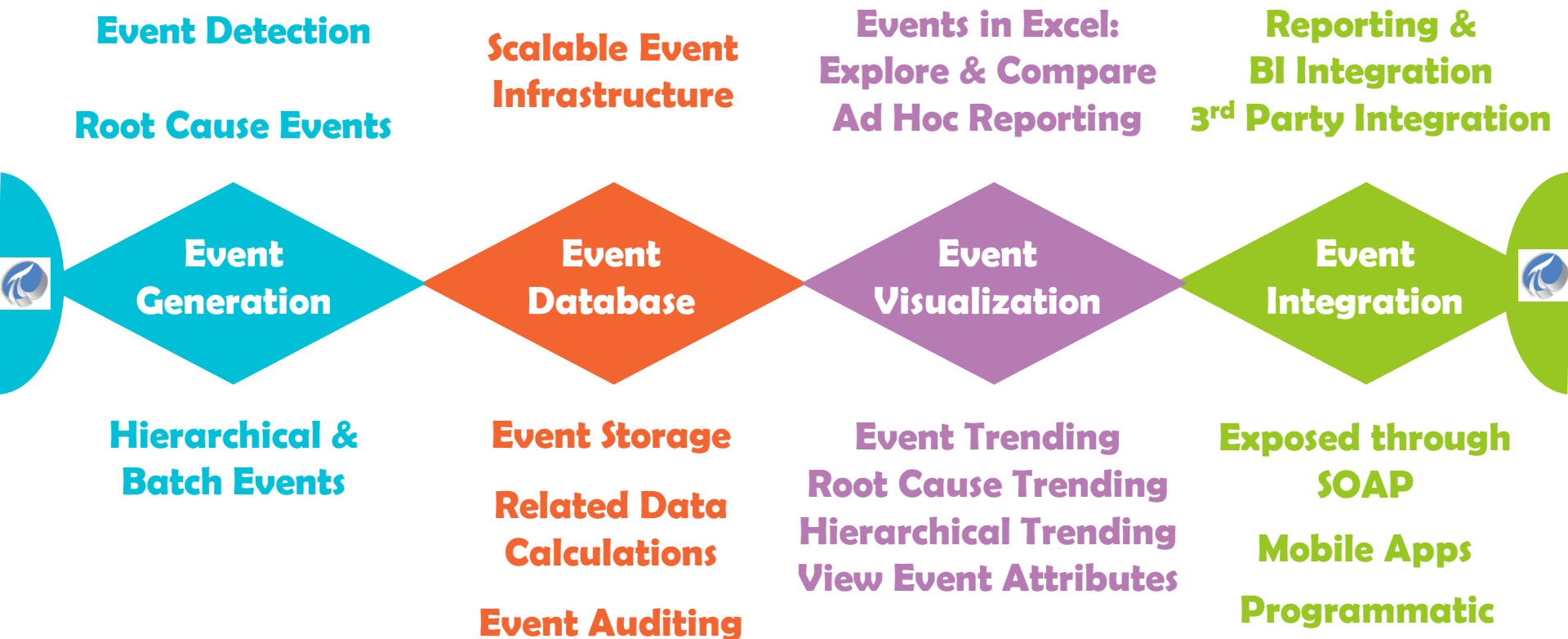
Related Data!

Event Attribute	Value
Name	Ex 20121215-0002
Start	15-Dec-2012 10:35:02
End	15-Dec-2012 10:47:26
Duration	12 min, 24 sec
Asset	Boiler-352
Excursion Type	High Violation
Fuel Gas Flow.Avg	37.12 k sft3/h
Fuel.Start	823.48 k sft3/ton
myPIKPI.Max	47.19 bbl/d



EMEA13: More Event Frames support is coming!

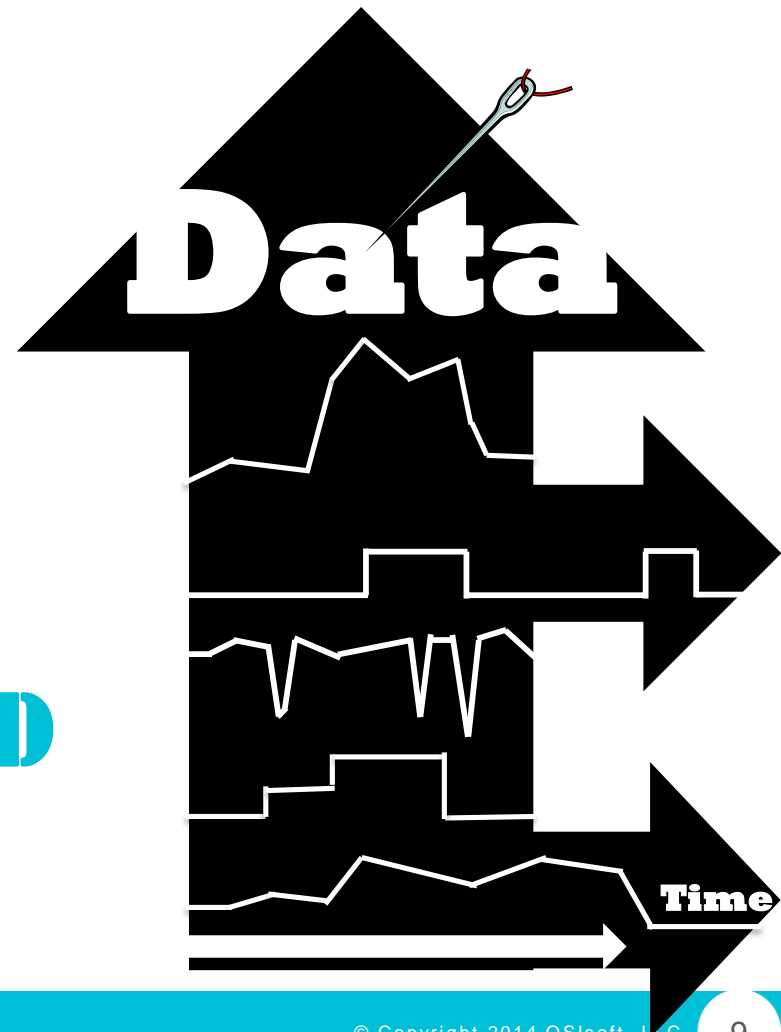
PI System in 2014: Event Infrastructure Capabilities





Information Challenges

**AS TIME GOES ON,
IT'S HARDER TO FIND
INFORMATION.**

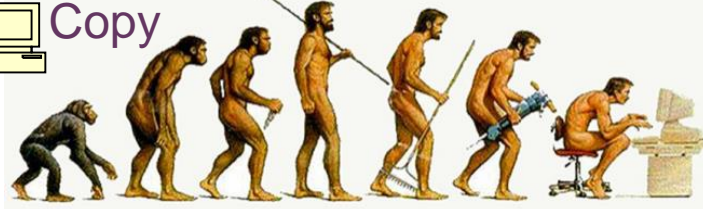


Information Challenges

“Homosapien Data Integration”



Copy

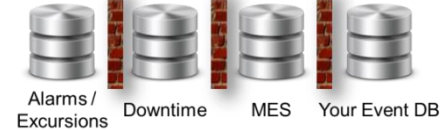
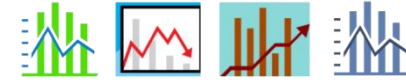


Paste

Hard to Find
Related Data

Events &
Process Data
Are Not
Integrated

Increasing
Data



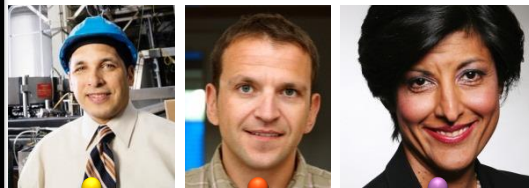
Process Data

Data

Time



Information Challenges



PI Event Frames

Events Shorten the Time to Insight

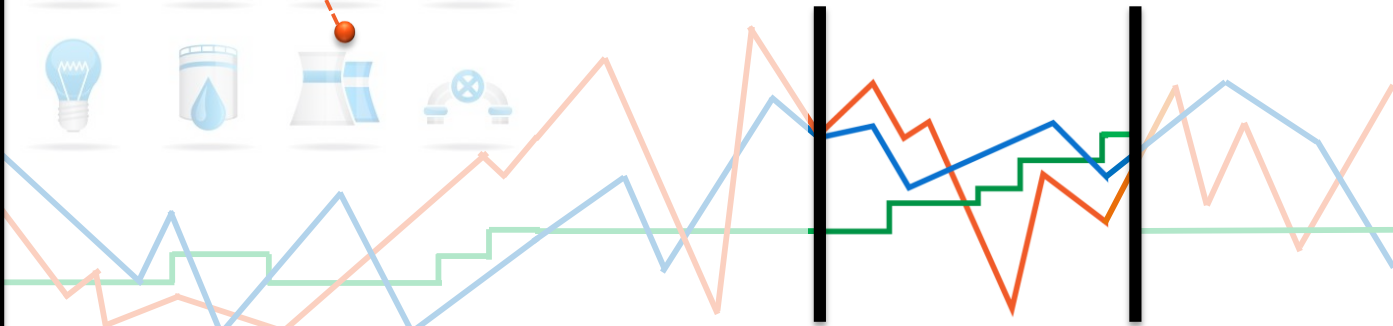
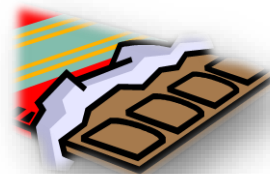
Too High!

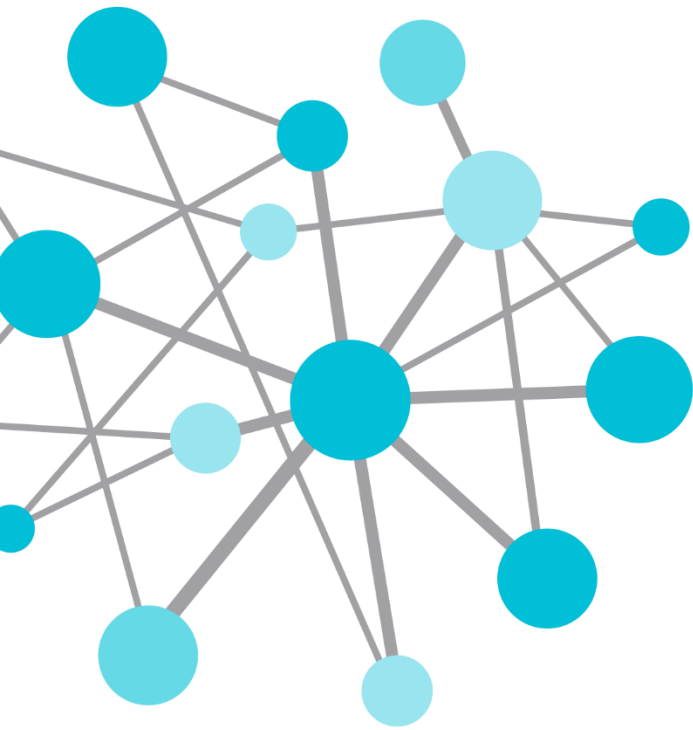


Downtime



Batches





How Are Customers Using PI Event Frames?



Business Problem

“Track information on generation units that can help us determine the reason for breaker trips”

Event Types

“Study 10-30 min before a breaker trip.”

Value

“Automating our GADS (Generation Availability Data System) reporting process.”



Wind



Business Problem

“Quantify impact of downtime, reduction in mean downtime, root cause analysis”

Event Types

“Site Curtailments, Turbine Curtailments, Stop Causes, Excursions”

Value

“Quickly analyze the curtailments ... allowing a quick way to pick up how much generation or revenue was lost due to curtailments.”



Chemicals



Business Problem

“Big Data, finding records where production issues are.”

Event Types

“Emissions, batches, motor starts, pump service.”

Value

“Quickly find data.”



Business Problem

“Reduction in downtime and increased reliability.”

Event Types

“Downtime, process excursions, startups, shutdowns.”

Value

“Automatically build a database of outages. Quickly classify the cause of each outage.”



Business Problem

“Our manufacturing operation is batch based ... time periods that our production centers are manufacturing products.”

Event Types

“Processing plates, pre-heat, annealing, heat treat furnaces, ... Equipment downtime.”

Value

“Event frames is key to our success in utilizing the PI system. Otherwise we have to search through hours of time series data”



Business Problem

“Increased accessibility to data in multiple manufacturing systems, which will allow us to visualize, analyze, and share our data with global users.”

Event Types

“Batch, build complex Batch models with the ability to have overlapping unit batches.”

Value

“Ensure we have a consistent process and a quality product. Detect problems before they become a problem.”

Business Problem

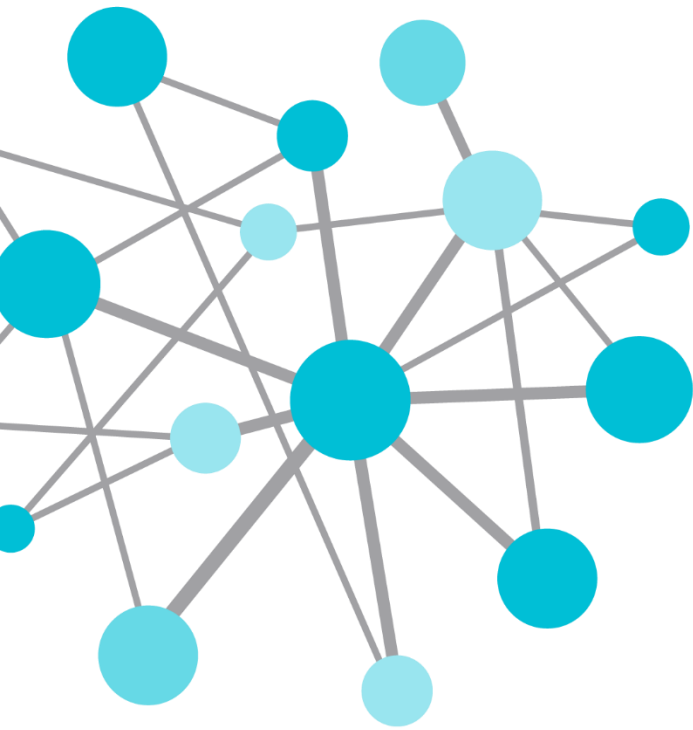
“Product Quality,
Minimizing Grade
Switchover Times”

Event Types

“Downtime, Grade
Runs, Reels”

Value

“Easily determine the
timeframe for downtime,
grade, and reel events.”



Value to Customers

What value do you see PI Event Frames bringing to your company ?

"Clearer picture of my process."

"Easier Batch Analysis."

"Easily Analyze Events."

"Saves a lot of time to automatically link data to events."

"More configuration, less programming."

"View our time series data in a meaningful way."

"Easier reporting."

"Early event detection before they become a problem."

"An integrated system is a force multiplier."

"Easily find event related data."

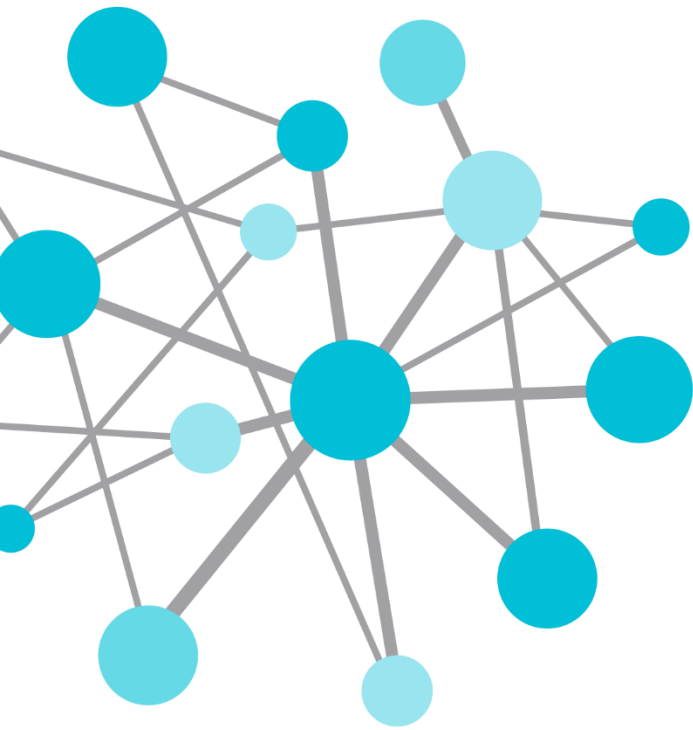
"Drive events from real time data, not manual data entry."

"Easily surface abnormal events."

2/13/2012 9:33:50 PM

2.00 minutes

2/13/2012 9:35:50 PM



PI Event Frames Demo



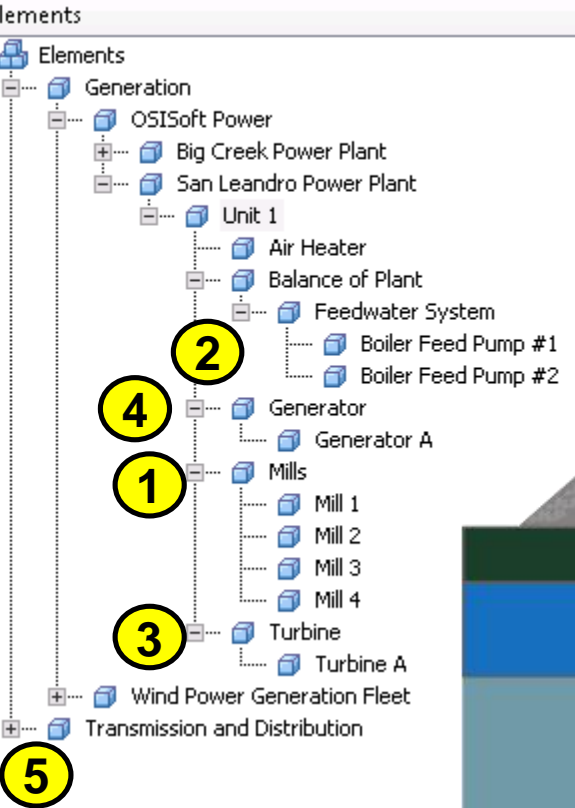
Released



Coal Fired Power Plant



Plant Assets



Event Types

0

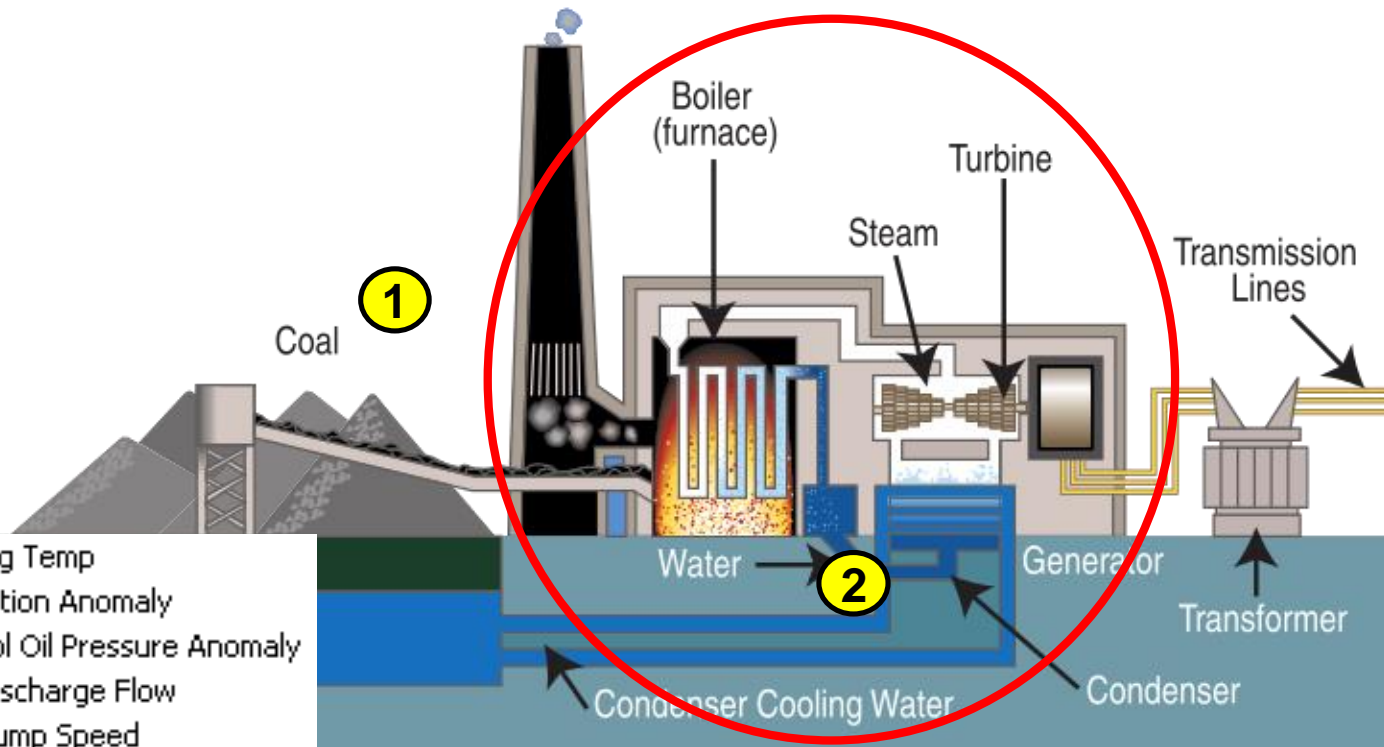
- Unit Shutdown
- Unit TIME.Day
- Unit TIME.Hour
- Unit Trip

1

- Mill Low Feeder Speed

2

- 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
- Boiler Feed Pump Vibration Anomaly





PI AF Asset Based Analytics (Event Detection)

DEMO



PI Coresight 2014 (Event Trending)

DEMO



PI DataLink 2014 (Event in Excel)

DEMO

PI Event Frames Demo Recap

AF Asset Based Analytics (Event Detection)

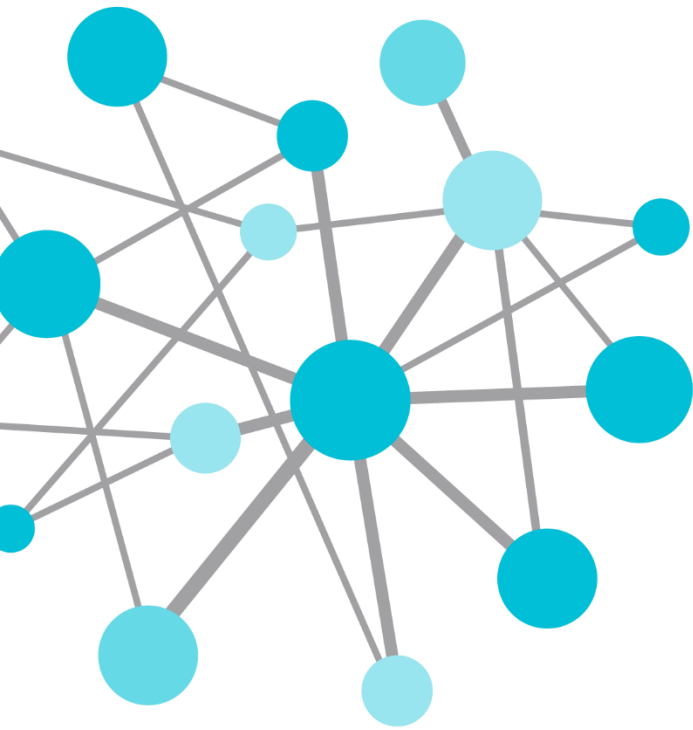
- Configurable Event Detection
- Create Rules Once, Apply to Many
- History Regeneration
- Root Cause Events

PI Coresight (Related Events)

- Automatically Discover Related Events
- Event Trending
- Root Cause Trending
- View Event Attribute Values

PI DataLink (Events in Excel)

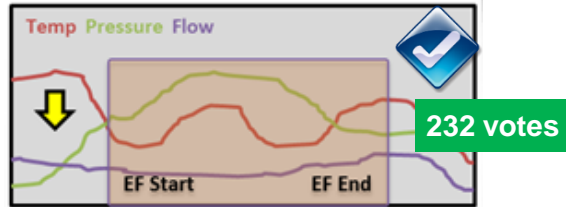
- Explore Events and Compare events
- Easy Event Analysis and Reporting
- Build Flexible Ad hoc Reports Out of the Box



Looking Ahead & Roadmap Update

EF Customer Survey: Most Important EF Visualization

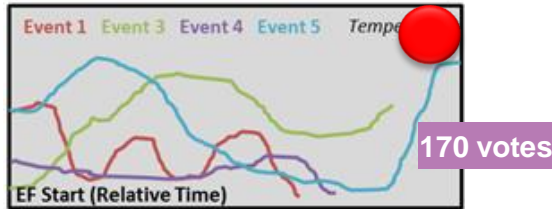
(1) Trend: Time Leading up to EF Start



(2) Trend: EF Start to EF End




(3) Event Overlay Trend



(4) View Event Attributes in Table

Name	Duration	Start Time	End Time	Location
EPDemo: Event Frames	1	01:00:00	5/6/2013 3:00:00 PM	5/6/2013 4:00:00 PM
EP20130509 15:00	01:00:00	5/6/2013 3:56:00 PM	5/6/2013 4:00:00 PM	Downline
EP20130509 15:56	00:04:00	5/6/2013 4:14:00 PM	5/6/2013 4:18:00 PM	Downline
EP20130509 16:14	00:03:00	5/6/2013 4:26:00 PM	5/6/2013 4:29:00 PM	Downline
EP20130509 16:26	00:04:00	5/6/2013 4:56:00 PM	5/6/2013 5:00:00 PM	Downline
EP20130509 17:14	00:04:00	5/6/2013 5:14:00 PM	5/6/2013 5:18:00 PM	Downline

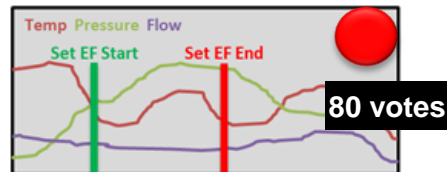


154 votes

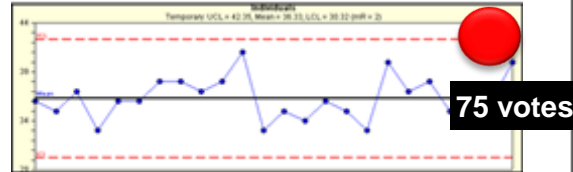
(5) Gantt Chart (aligned w/trend)



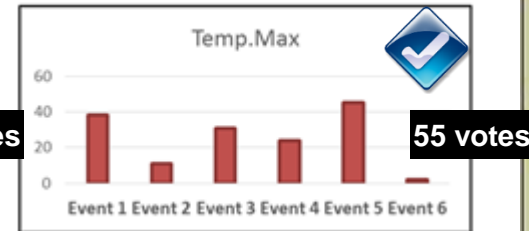
(6) Manual Creation of Events



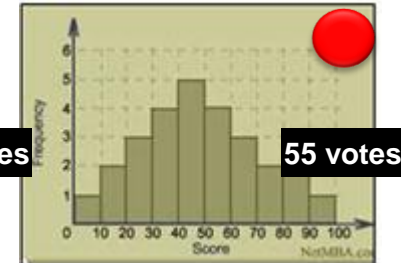
(7) SQC Chart



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



(9) Histogram



The Road to the Overlay Trend ... Building on PI CS Foundation

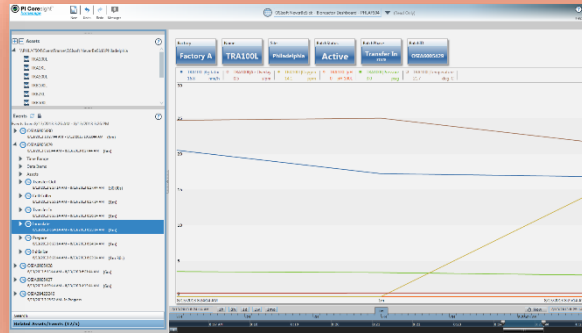
PI Coresight 2012 R2



PI Coresight 2013/2014



Future PI Coresight
Overlay Trend



Advanced EF Search

Relative Time of Event

Overlay Trend

Support Hierarchical Events (Operations, Phases, etc.)

Search for Events on Asset

View EF Attribute Values

Trend Data Over Events





Summary



PI Event Frames

Bookmarks for your
Real-Time Data

Curtailment

Breaker Trip

Downtime

Your Data

Startup

High Temperature

Batch

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

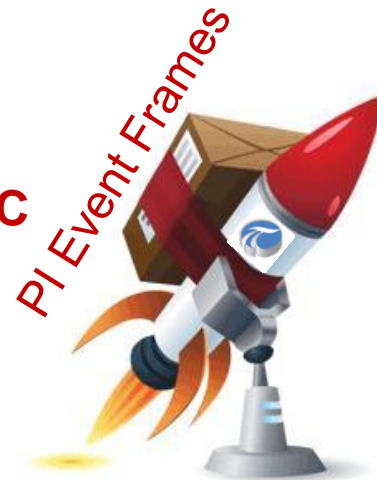
 PI System Access – PI OLEDB
Enterprise, PI Web Services, PI JDBC

 PI Event Frames Generator

 PI AF SDK – Programmatic Access

 PI AF – PI Event Frames Database

2013



2012

 PI Event Frames Generator

 PI AF SDK – Programmatic Access

 PI AF – PI Event Frames Database

Thank You to ALL our *Development Teams* and their *Product Managers* that have been working so hard over the last several years to release PI Event Frames to the market:

- PI AF Team – Johnson City, TN
- PI AF Analytics (Abacus) Team – San Leandro, CA
- Batch Interfaces Team – Philadelphia, PA & San Leandro, CA
- PI Coresight Team – Philadelphia, PA
- PI Data Access Team – Germany, Philadelphia, & Czech Republic
- PI DataLink Team – San Leandro, CA
- PI Server Team (Batch Migration) – San Leandro, CA

Sincerely,
Todd Brown & Chris Nelson

So the bottom line ...

Batch Process Monitoring

Life Sciences

Batch Processing
Cycle Time
Genealogy

Chemicals

Batch Processing
Genealogy

Pulp & Paper

Grade Runs / Grade Changes
Pulp Cooking

Events in T&D

Startups & Shutdowns
Loss of Generation / Load
Frequency Deviations
Unusual Oscillations
Daily Load Curves
Bus Voltage Rate of Change

Events in Power Gen

Startups & Shutdowns
Outage History
Peak vs. Off-peak Power
Environmental Excursions - NOx
Generation Availability Data System
Lake Level Low / Rate of Change

Events in Oil & Gas - Downstream

Equipment Startups & Shutdowns
Crude Runs
Catalyst Change Outs
Process Excursions
Environmental Excursions
Downtime

Events in Metals & Mining

Downtime / Reason Codes
Truck Fleet Events
Truck Deliveries
Material Transfers
Anode Tracking
Coil Tracking

Events in Wind Power

Downtime / Outages
Turbine Faults
Generation Forecasting
Low vs. High Wind Production
Curtailments
Turbine Operating State

Events in Solar Power

Downtime
Sun vs. Shade Days

Events in Oil & Gas - Offshore

Pump Vibrations
Meter Pressure Excursions
Well Testing
Well Step Number / Phase
Ramp Ups / Ramp Downs
Downtime

Events in Pulp & Paper

Equipment Startups
Downtime
Process Excursions

Events in Water Utilities

Leaks
Process Excursions
Water Source Level Excursions
Large Water Consumptions

Come to the Batch Users
talk tomorrow @ 12:00 in
Track 1

Use PI Event Frames!!!

PI Event Frames – Contact Us!

Todd Brown

tbrown@osisoft.com

Product Manager
OSIsoft, LLC

Chris Nelson

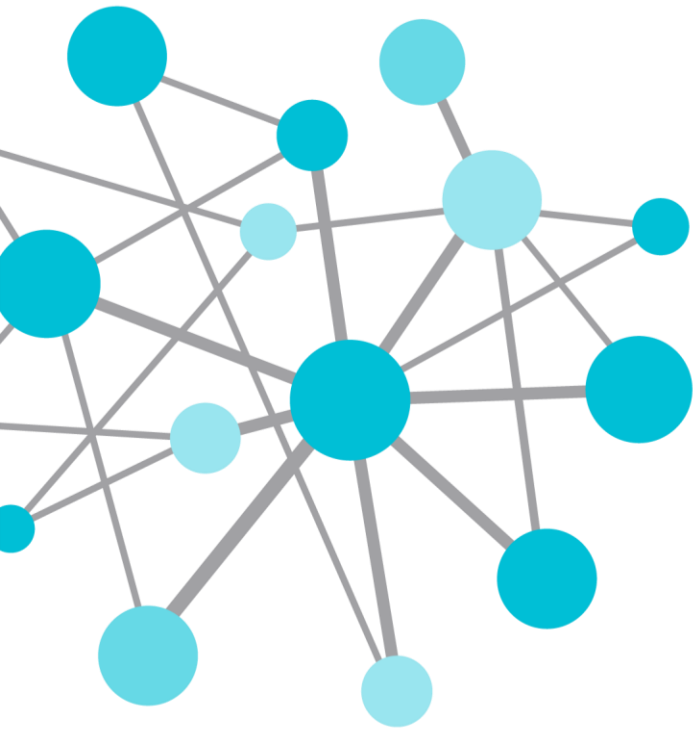
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