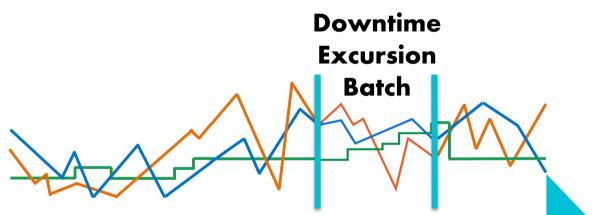# Detect, Visualize and Act: How to Provide Context to Your Critical Events

Presented by **Todd Brown & Chris Nelson**

PI Event Frames

PI Event Frames automatically bookmarks PI 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

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

UC2013: More Event Frames support is coming!

PI System in 2014: Event Infrastructure Capabilities

Event Detection

Root Cause Events

Scalable Event Infrastructure

Events in Excel: Explore & Compare Ad Hoc Reporting

Reporting & BI Integration 3rd Party Integration

Event Generation

Event Database

Event Visualization

Event Integration

Hierarchical & Batch Events

Event Storage
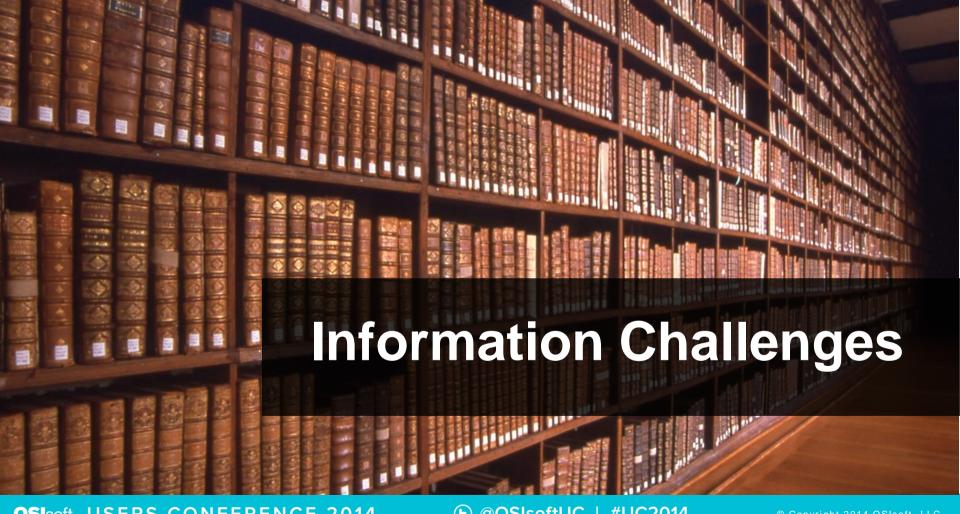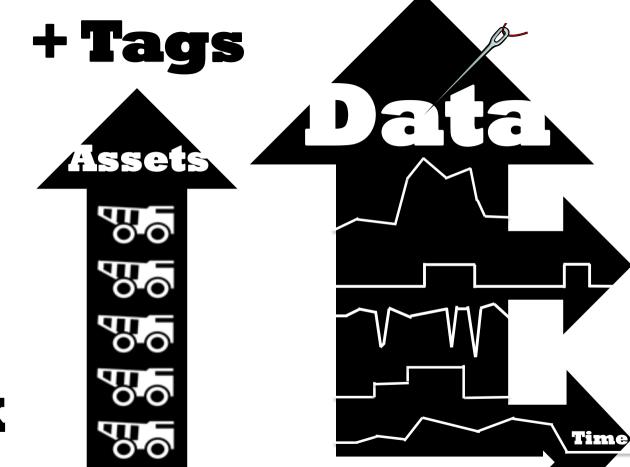
Related Data Calculations

Event Auditing

Event Trending Root Cause Trending Hierarchical Trending View Event Attributes

Exposed through SOAP

Mobile Apps

Programmatic

Information Challenges
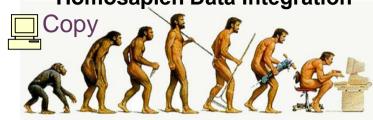
+ Tags

Assets

Data

Mining
50K
Tags

Processing
100K
Tags

Time

AS TIME GOES ON, IT'S HARDER TO FIND INFORMATION.
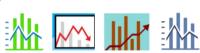
"Homosapien Data Integration"

Copy

Paste

Information Challenges

Hard to Find Related Data

Increasing Data

Events & Process Data Are Not Integrated

Data

Time

Alarms / Excursions   Downtime   MES   Your Event DB   Process Data

PI Event Frames
Events Shorten the Time to Insight

Too High! Downtime Batches
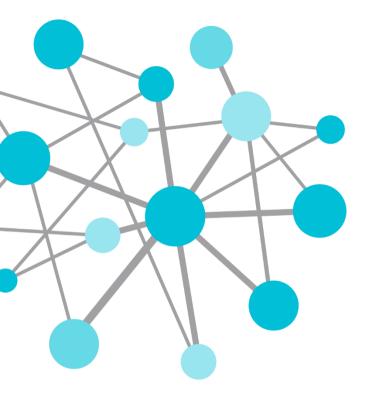
Information
Challenges

How Are Customers Using PI Event Frames?

Power & Utilities

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."

Chemicals

Business Problem	Event Types	Value
"**Big Data**, **finding** records where **production issues** are."	"Emissions, batches, motor starts, pump service."	"**Quickly find data**."

Metals & Mining

Business Problem

"Our manufacturing operation is batch based … time periods that our production centers are manufacturing products."

Event Types

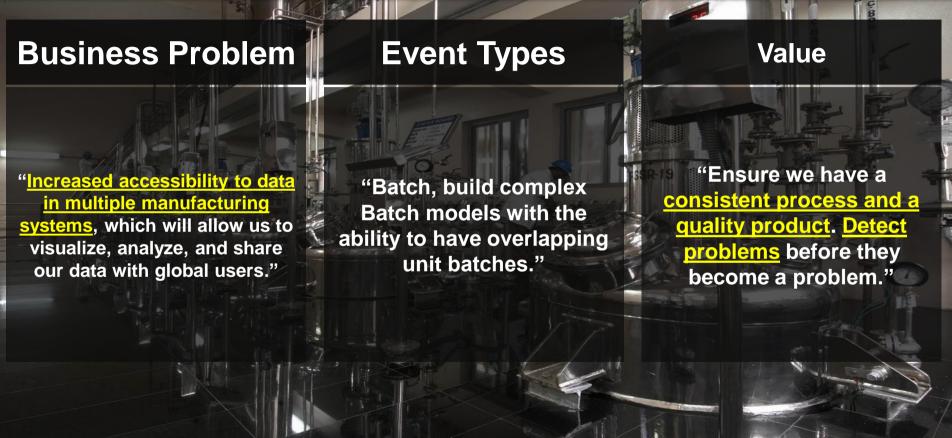"Processing plates, pre-heat, annealing, heat treat furnaces, … Equipment downtime."

Value

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

Pharma & Life Sciences
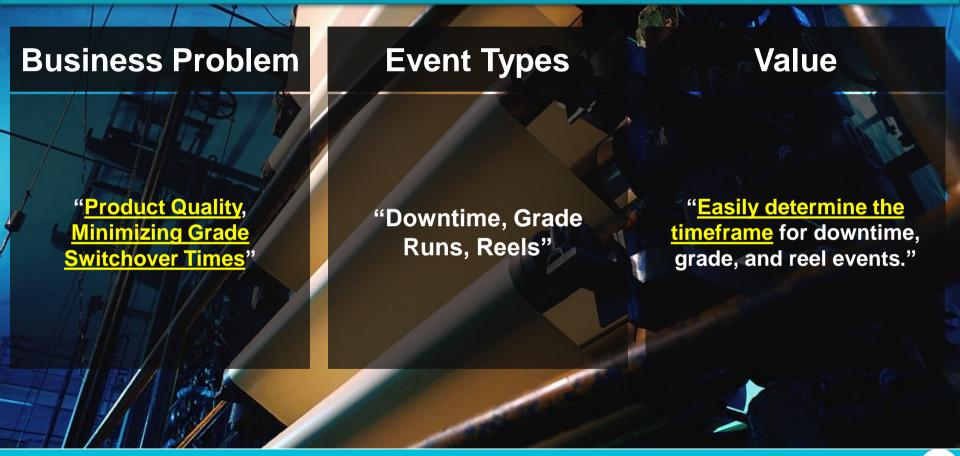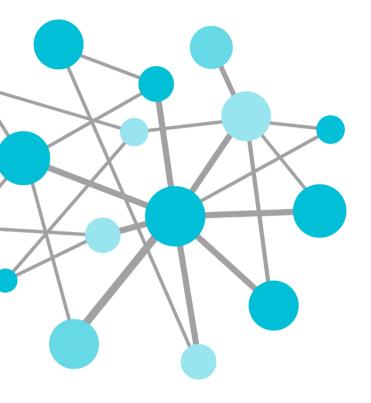
Business Problem

"**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."

Value to Customers

"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."
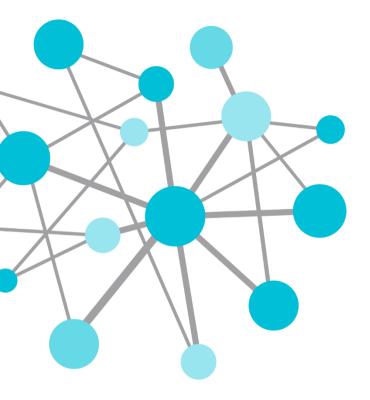
"Early event detection before they become a problem."

"An integrated system is a force multiplier."

"Easily find event related data."

"Easily surface abnormal events."

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

PI Event Frames Demo

Released ✔

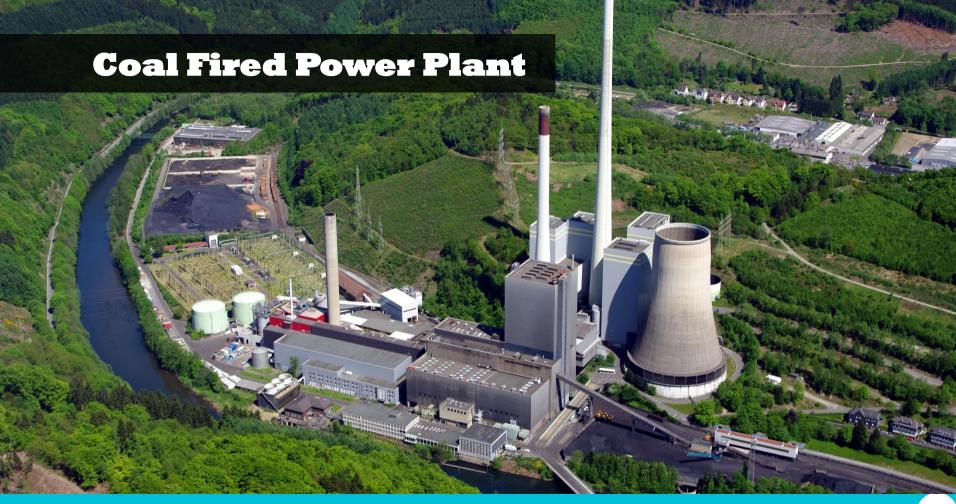Last Year @ UC2013 ...

Coal Fired Power Plant
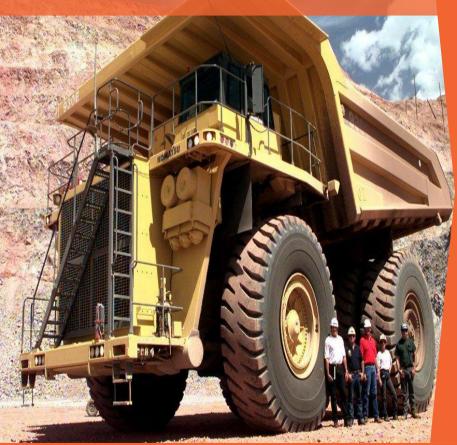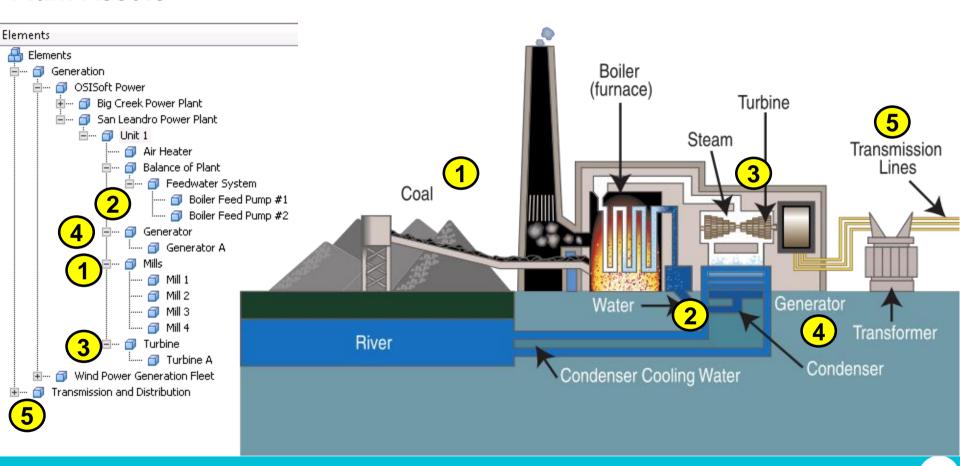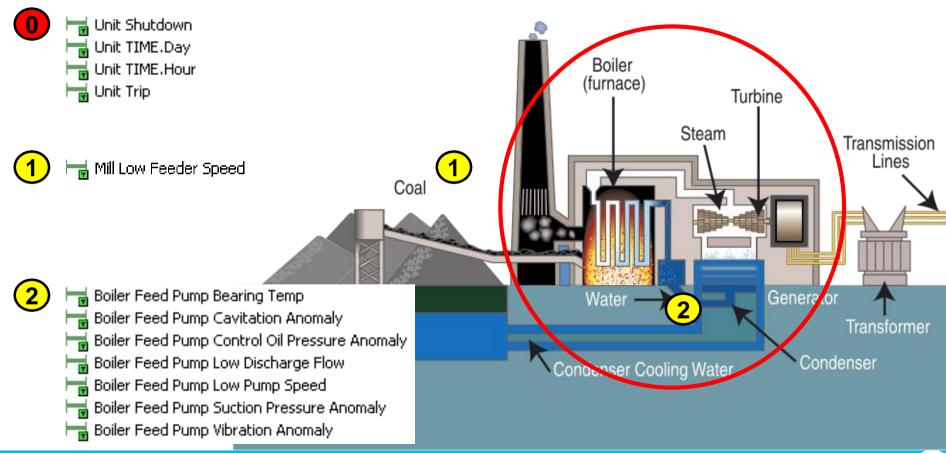
Plant Assets

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 AF – Event Frame Template
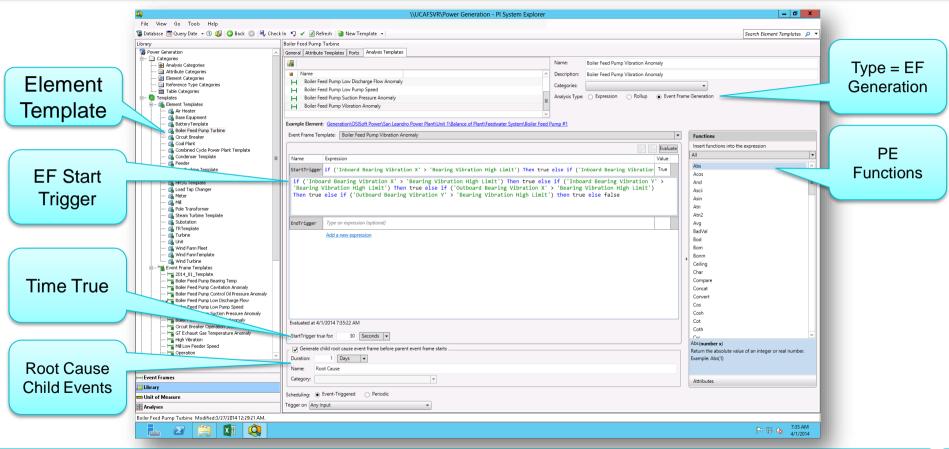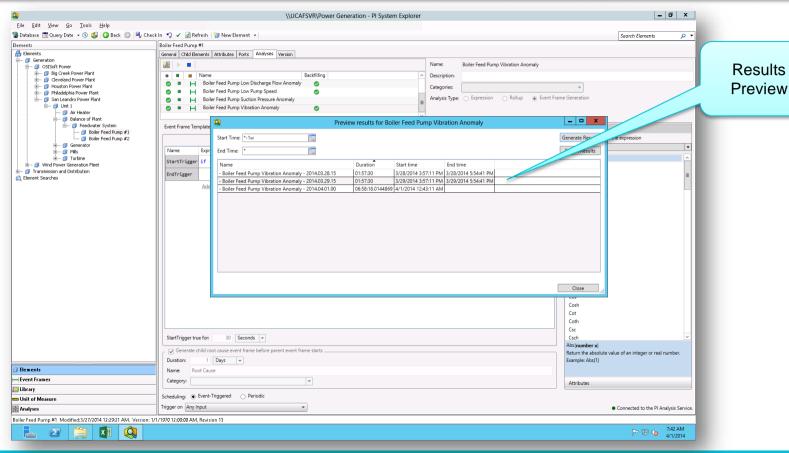
Event Naming Pattern

Event Attributes

PI Coresight 2014
(Event Trending)

DEMO
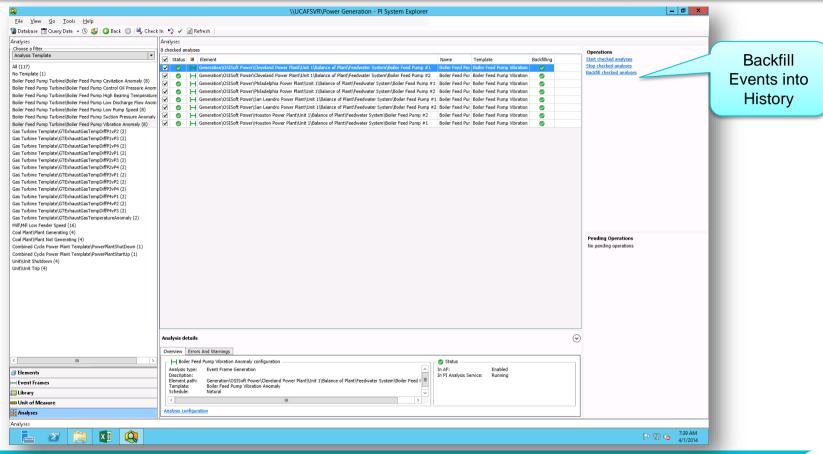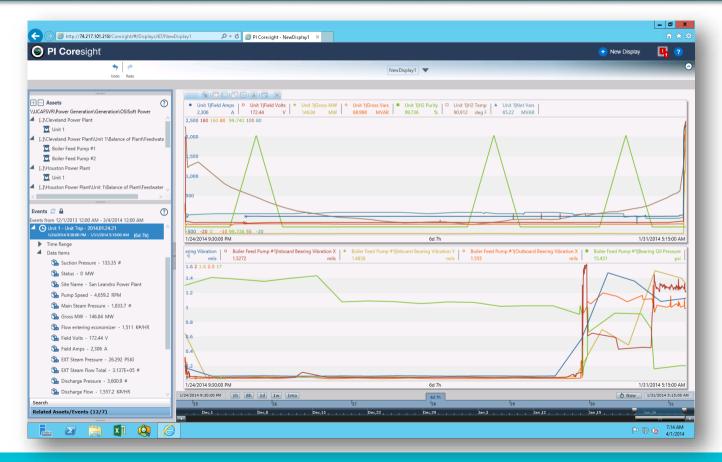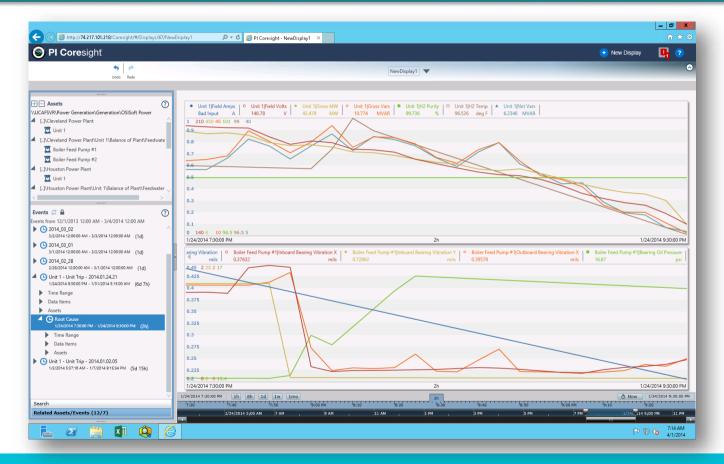
PI Coresight – Root Cause Event Trending

PI DataLink 2014 (Event in Excel)

DEMO
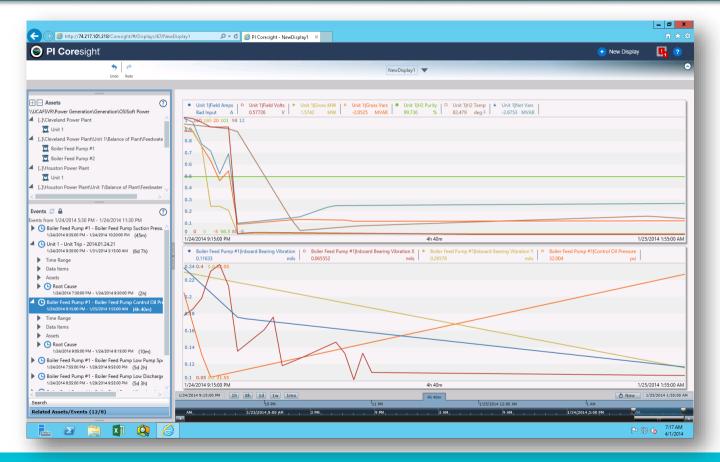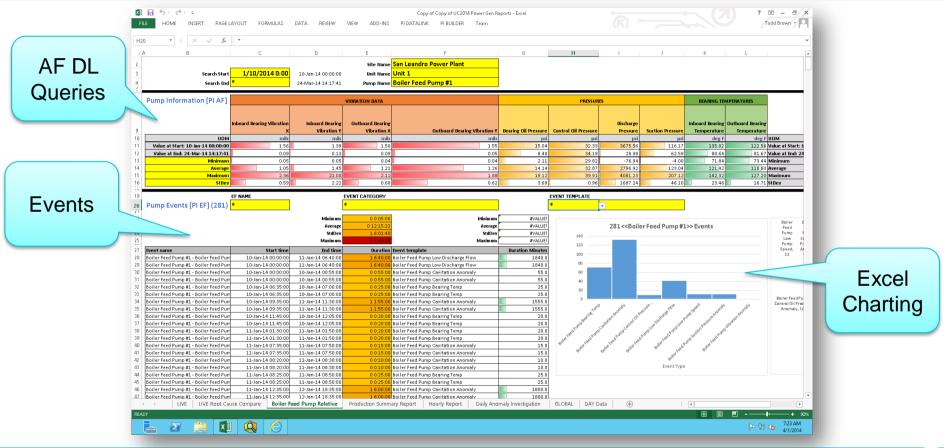
PI DataLink 2014 – Pump Relative Report

AF DL Queries

Events

Excel Charting

PI DataLink 2014 – Daily Events Production Report

PI DataLink 2014 – Hourly Production Report
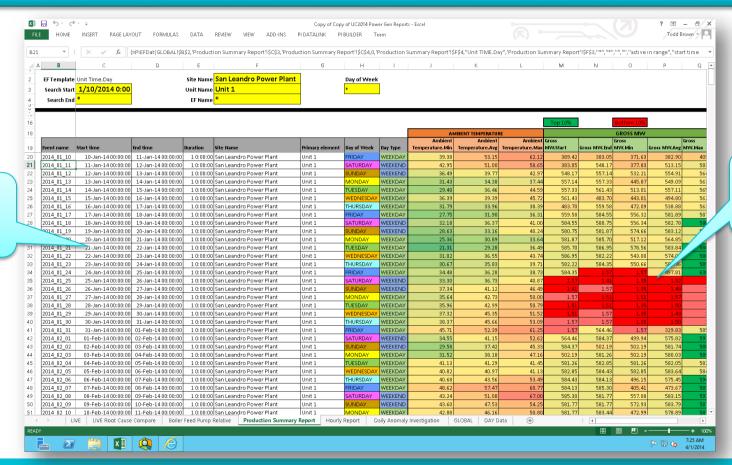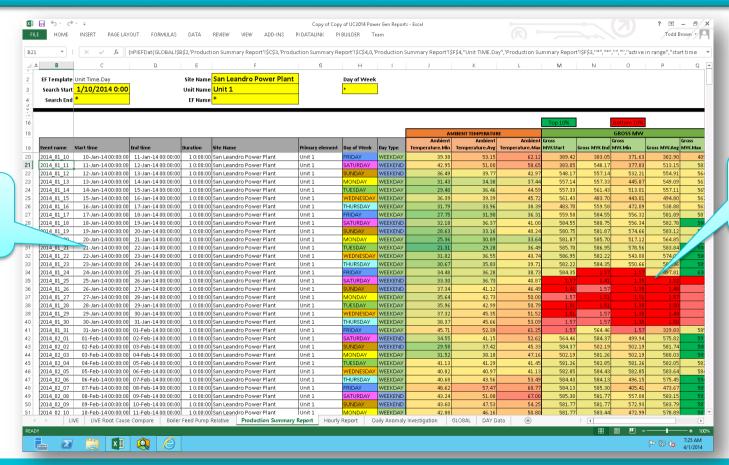
Hourly Events
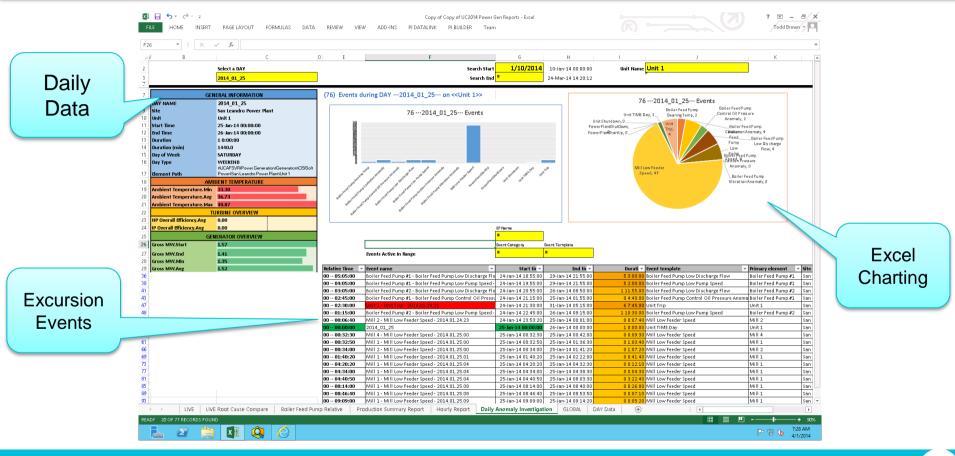
PI DataLink 2014 – Daily Anomaly Report

Daily Data

Excursion Events

Excel Charting

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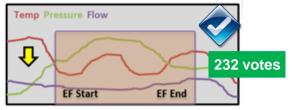
- Explore Events and Compare events
- Easy Event Analysis and Reporting
- Build Flexible Ad hoc Reports Out of the Box

Looking Ahead & Roadmap Update

EF Customer Survey: Most Important EF Visualization

(1) Trend: Time Leading up to EF Start

232 votes

(2) Trend: EF Start to EF End

214 votes

(3) Event Overlay Trend

170 votes

(4) View Event Attributes in Table

154 votes

(5) Gantt Chart (aligned w/trend)

144 votes
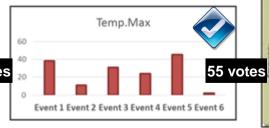
(6) Manual Creation of Events

80 votes

(7) SQC Chart

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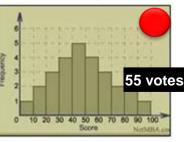
(8) Line / Column Chart (Event x-axis)

55 votes

(9) Histogram

55 votes

The Road to the Overlay Trend ... Building on PI CS Foundation
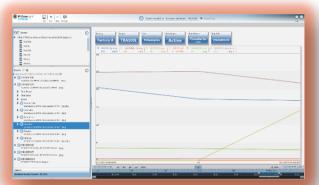
PI Coresight 2012 R2 → **PI Coresight 2013** → **Future PI Coresight Overlay Trend**
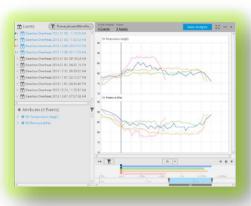
Advanced EF Search	Relative Time of Event	Overlay Trend

Support Hierarchical Events (Operations, Phases, etc.)		
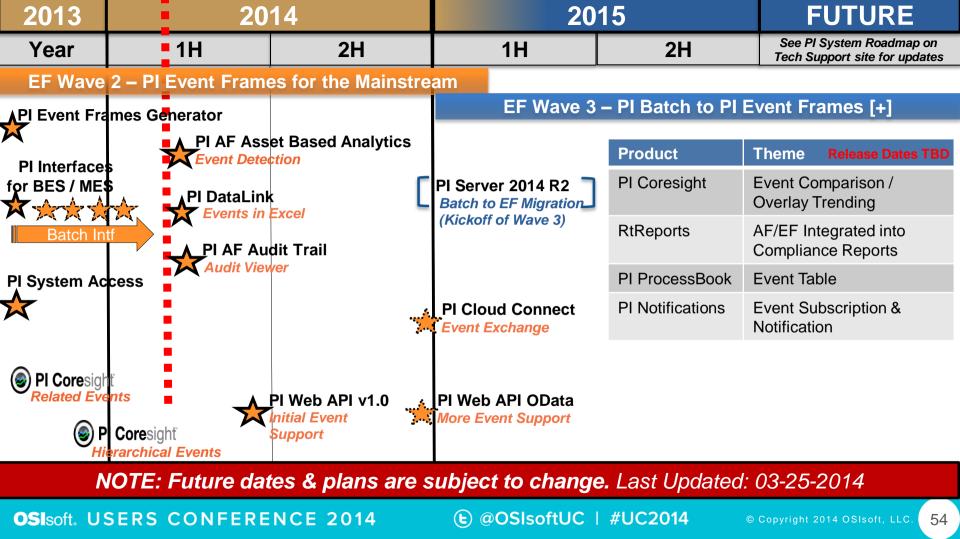
Search for Events on Asset	View EF Attribute Values	Trend Data Over Events
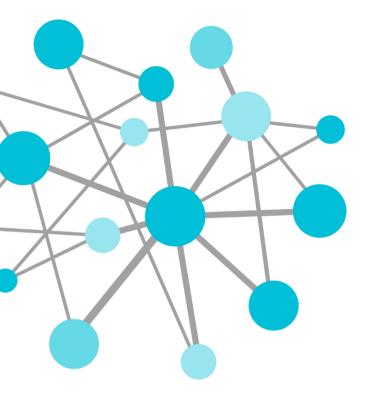
PI Coresight

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

PI Event Frames Generator
⭐

PI Interfaces for BES / MES
⭐ ⭐ ⭐ ⭐ ⭐
➡ Batch Intf

PI System Access
⭐

◉ **PI Core**sight™
Related Events

◉ **PI Core**sight™
Hierarchical Events

PI AF Asset Based Analytics
⭐ *Event Detection*

PI DataLink
⭐ *Events in Excel*

PI AF Audit Trail
⭐ *Audit Viewer*

PI Web API v1.0
⭐ *Initial Event Support*

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

PI Cloud Connect
⭐ *Event Exchange*

PI Web API OData
⭐ *More Event Support*

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

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	

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

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**

2013
- **PI Coresight – Related Events**
- **PI System Access – PI OLEDB Enterprise, PI Web Services, PI JDBC**
- **PI Event Frames Generator**

2012
- PI AF SDK – Programmatic Access
- PI AF – PI Event Frames Database

PI Event Frames

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:

Credits

- **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
Geneaology

Pulp & Paper
Grade Runs / Grade Changes
Pulp Cooking

Come to the Batch Customers talk tomorrow @ 12:00 in Continental 5-9

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

Use PI Event Frames!!!

PI Event Frames – Contact Us!
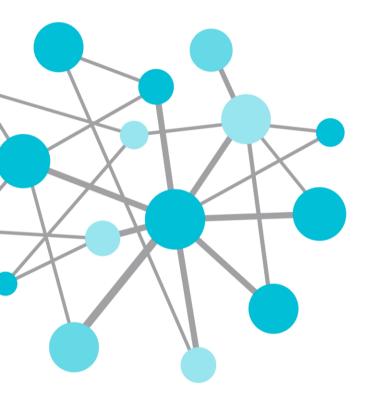
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Director, Initiatives

OSIsoft, LLC

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