



PI System Product Roadmap

Presented by
John Baier
Director, Product Management
OSIsoft, LLC

PI System Overview



The OSIsoft PI System is the highly scalable and secure real-time and event infrastructure that connects people and systems with the right operational information at the right time in order to *analyze, collaborate, and make smart decisions*

PI System Themes

What are we working on?



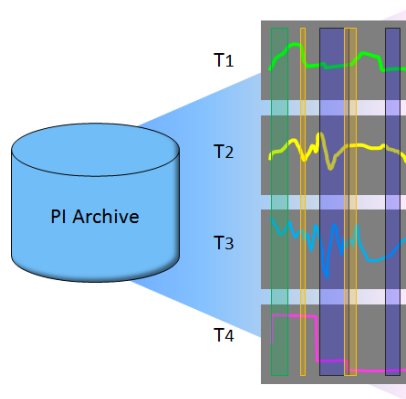
Scaling

More data
More updates
More robust



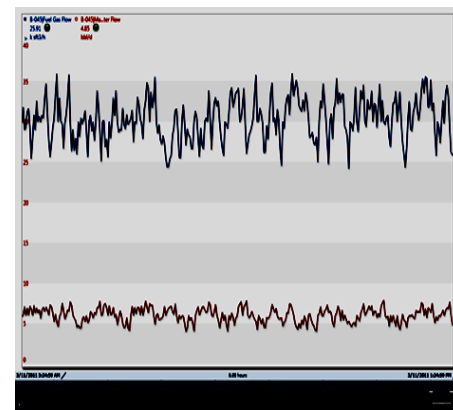
Analytics

Manage large numbers of calculations



Event Frames

Identify and user important events in your data



Visualization

The fastest, easiest way to visualize PI data

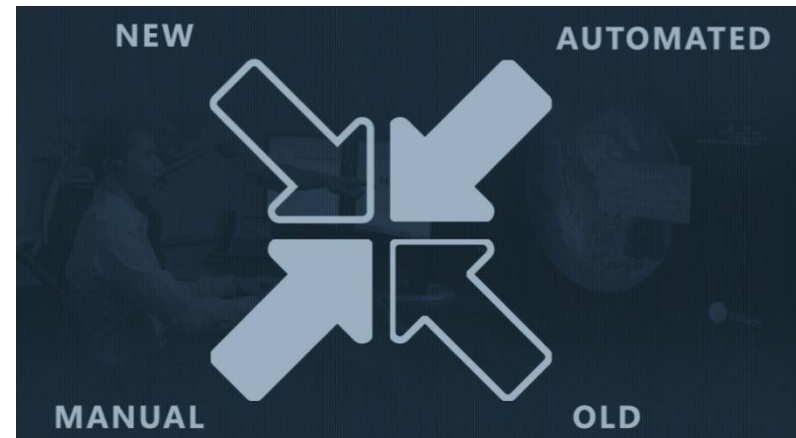
Also, significant work in: Asset-PI, Security, Interfaces, Data Access

Collect



- Over 400 PI Interfaces getting data from:

- Devices
- Systems
- Standards
- Manually entered data
- IT assets
- Manufacturing assets
- Databases
- Internet



Collect

- Interface Themes
 - High Speed
 - Meta Data, Auto Configuration
 - High Availability
 - Buffering
 - Proactively built—let us know if you have a data source in need



Historize



- Store large volumes of data for a long period of time with the least amount of disk space possible.
- Allows retrieval of any data, no matter how old, in seconds.
- Securely Scale Up and Scale Out to support growing business needs



PI Server 2010 Waves

PI Server 2010 (Q3 2010)

- Complete infrastructure:
 - Common asset model
 - Includes analytics, notifications, and system monitoring
 - New web services and JDBC data access tools

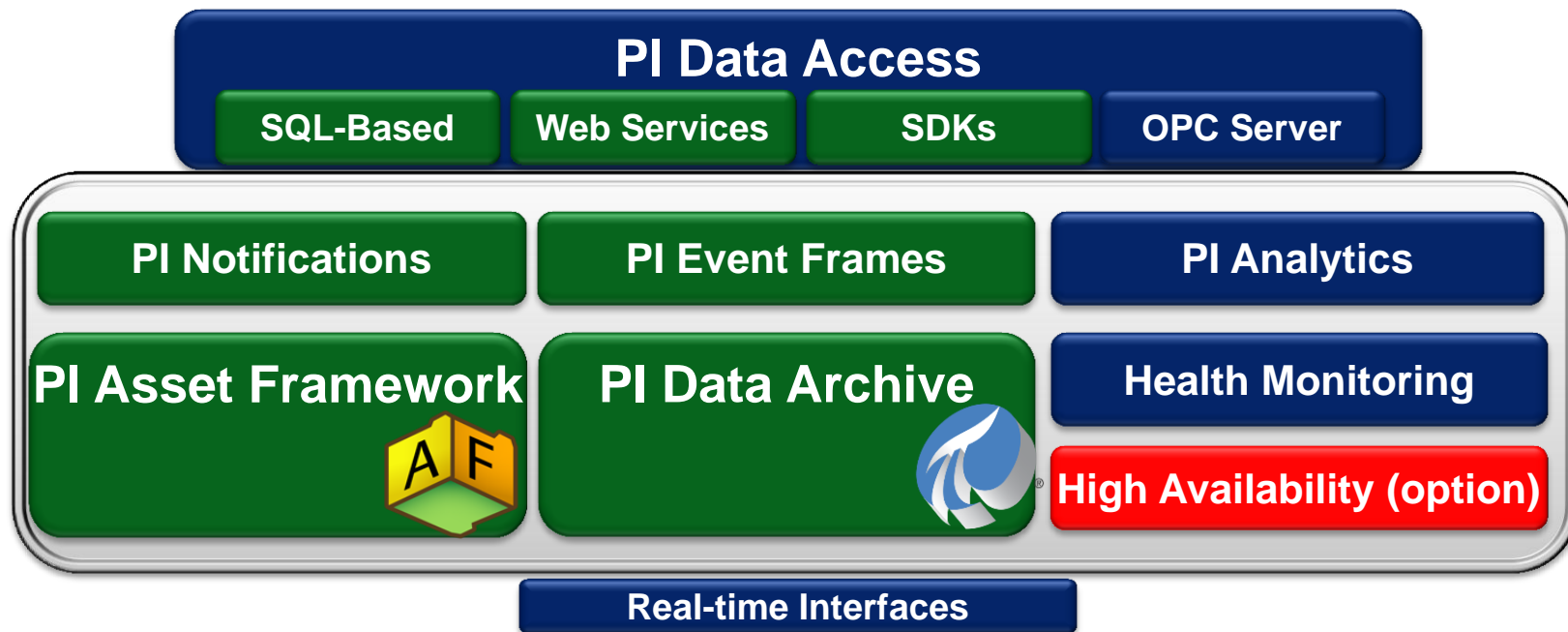
PI Server 2010 R2 (H1 2011)

- Enhancements to the infrastructure:
 - Faster, more scalable analytics and notifications
 - New PI for StreamInsight analytics tool
 - Asset-based data access

PI Server 2010 R3 (Q4 2011)

- Expanding the infrastructure for all:
 - New PI Event Frames
 - Improved data access performance
 - Extends PI HA with PI SDK Buffering

PI Server 2010 R3



Real-Time Data
DCS / PLC / SCADA / OPC
HISTORIANS /
INTERFACES

Custom Data
APIs / SDKs

IT Data
SNMP /
PerfMon /
XML

Relational Data
OLEDB / ODBC
SQL SERVER /
ORACLE

Web Services
SOA / EXTERNAL DATA
LEGACY APPS

What's New with PI Server 2010 R3

PI Buffer Subsystem

Support for PI SDK Buffering and [Windows security](#).

PI Manual Logger 2010 R2

[Writing to HA PI Collective](#).



COLLECT

COLLECT

PI Data Archive 2010 SP1

Most reliable, secure, and stable version. [All customers can upgrade](#) to latest release.

PI SDK 2010 R2

Higher overall data throughput, support for [buffered data writes](#), and [writing to HA PI Collective](#).



HISTORIZE

HISTORIZE

PI AF 2010 R3

Fixes and performance enhancements. Latest release to leverage an asset-centric PI System.



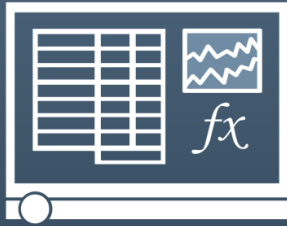
FIND

FIND

What's New with PI Server 2010 R3

PI Event Frames

New capability enables working with PI System data by events. First release, included with full PI Server package only.



ANALYZE

PI Notifications

Optimized to 1 data stream per notification.

PI Data Access

Improved performance and support for PI SDK Buffering.



DELIVER

PI Clients

Using PI Server 2010 R3, **get the most out of PI Clients** like PI Coresight, PI WebParts, PI ProcessBook, PI DataLink.



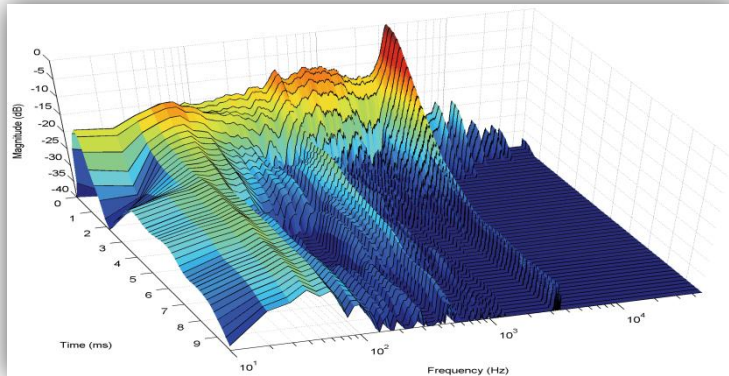
VISUALIZE

Security

- Windows Integrated Security
 - True single sign-on (SSO)
 - Easier to manage
 - User account in Windows AD Only
 - Leverage AD Tools and Policies
 - Upgrade experience
 - Backward compatible
 - PI SDK upgrade enables all clients
- Security Development Lifecycle
 - External testing, Idaho National Labs
 - Programming standards and policies



Large Scale PI Systems: 2 Scenarios



Synchrophasors

4,800 data streams at 60Hz

3 years online

Unique events: 27 Trillion

Estimated data size: 270TB

270TB



Automated Metering

150M data streams, 15 min

7 years online

Unique events: 16 Trillion

Estimated data size: 200TB

200TB



PI Server Future Direction: PI Server 2012

- Performance and Scalability:
 - Large point count PI Systems (e.g. AMI)
 - Bulk point change interfaces (e.g. AMI)
 - High performance PI Systems (e.g. WAMS, Discrete manufacturing)
 - Real-time, high scale analytics (e.g. VEE, PI for StreamInsight)
 - Expensive data access queries (e.g. BI, GIS, AMI, PI DataLink)
- Goals:
 - 20 million data streams in a Single PI Server
 - >250K events per second
 - Data In / Data Out – order of magnitude improvement
 - Significantly Faster Startup and Shutdown Time
 - Better Handling of Out of Order Events
 - Simplify Backfilling of data

Find



- Find all data by name, relationship, or usage
- Find important configurations such as analytics and displays
- Easily find work that you or colleagues have already completed
- Organize and Categorize data so it's easier to find next time
- Reference Data by **Assets** or **Events**

PI Asset Framework (PI AF)

“An information model to organize and structure all your data with context”



PI AF

- Asset centric view of your plant via elements and attributes – templates for standardization and reuse
- Build hierarchy, categories and connectivity models
- Data references to time series (PI Points) and other data
- Search across multiple PI Servers to find information
- Leverage PI Notifications
- Rich set of AF SDK functions to customize your applications
- Access your data via PI Web Services and PI OLEDB Enterprise



Asset Information / Metadata

PI Notifications

Relational / Non Time Series Data



PI Server



PI Server Collective

Time Series Data

Time Series Data

PI AF Asset Centric PI Example

Natural Gas Compressor

- RPM
- Fuel consumption rate
- Exhaust temperature
- Oxygen sensor

PI Tags

- Flow in
- Flow out
- Pressure differential

Calculations

- Last service date
- Service type
- Mfr documentation

External Database

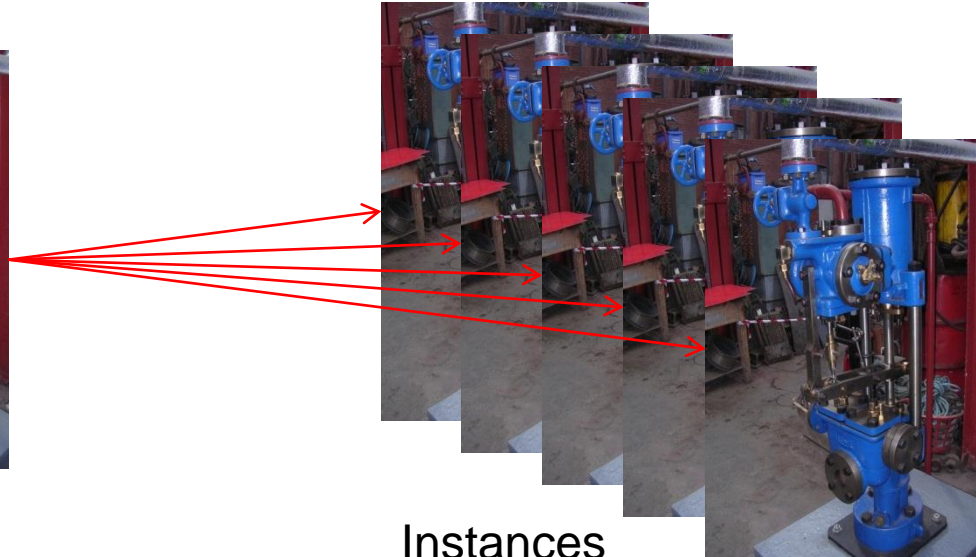


PI AF Elements and Attributes

- Element Templates can be created and reused for consistency – changes are propagated to each instance
- Elements can also be created without an Element Template for flexibility

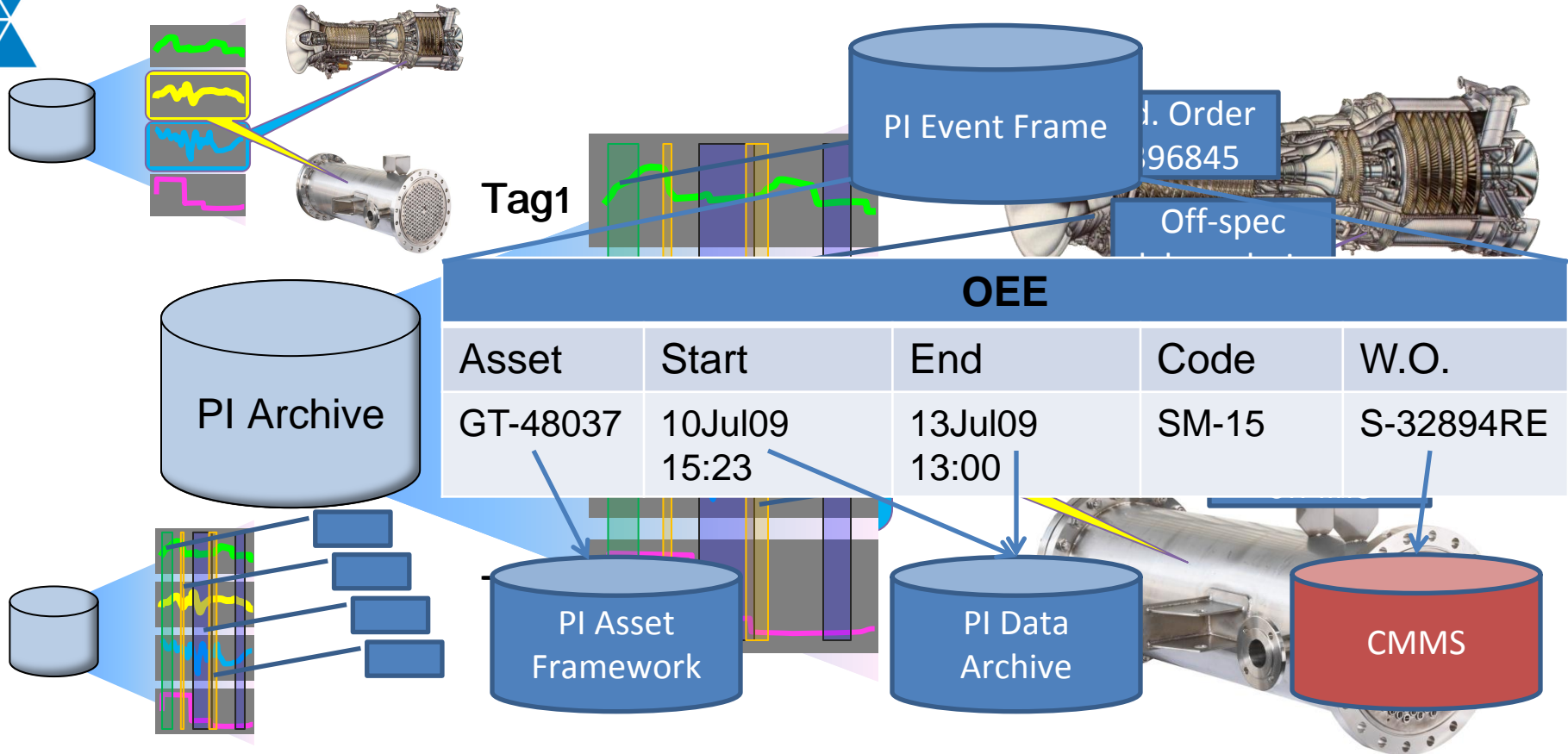


Pump Template



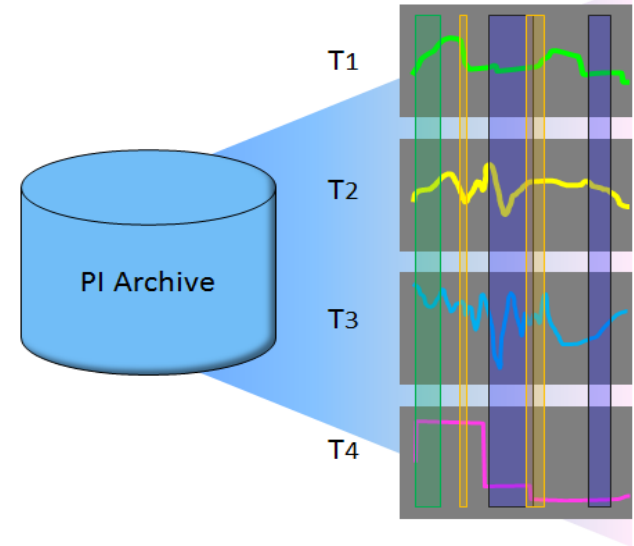
Instances

Assets For people, for applying intelligent systems



Event Frame Use Cases

- Any event in your process
 - Such as a downtime or incident
- Automatically identify important events
 - Based upon patterns in your PI System data
- Search these events
- Visualize and analyze them
 - To improve your process
- *Imagine:*
 - A simple downtime tracking tool
 - Configuration, no programming





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 Web Services
 - PI OLEDB Enterprise & PI JDBC
- Clients
 - PI DataLink
 - PI WebParts
 - PI ProcessBook
 - PI Coresight



Find through PI System Search

- Optimized Search Engine for the whole PI System
 - And perhaps related systems
- Indexed for high performance
- Weighted / Ranked Results
 - Helps you find things more easily
- Can crawl many PI Servers and machines
- Includes client artifacts
 - PI ProcessBook Displays, PI Coresight Displays
- Shared by all PI System products and subsystems
- Shared User Experience

Analyze



- Derive information from data
 - Combine data elements together
 - Aggregate totals and averages
 - Filter out irrelevant data
 - Includes both configured and programmed analytics
 - Enables organizations to continually improve by analyzing data and obtaining insight into their operations.

BATCH ID	PI MIN	PI AVG	PI MAX	PI RANGE	PI STDEV
MP_20090911_115632	147.1	172.6	205.6	58.5	13.6
MP_20090910_204531	266.7	316.9	366.9	100.2	26.5
MP_20090910_170536	32.8	102.5	230.0	197.2	36.4
MP_20090910_160842	141.8	188.3	220.1	78.4	21.6
MP_20090909_220449	230.0	328.4	426.3	196.3	56.2
MP_20090909_153813	201.5	256.4	289.0	87.5	18.2
MP_20090909_142545	264.1	291.1	327.9	63.8	14.7
MP_20090909_132727	295.4	338.1	377.1	81.7	25.4
MP_20090902_171845	32.3	129.7	292.8	260.5	88.1
MP_20090902_153523	108.6	184.5	251.6	143.0	35.2
MP_20090901_204325	311.9	363.5	409.4	97.4	23.4
MP_20090831_194329	340.6	361.8	396.0	55.4	13.2

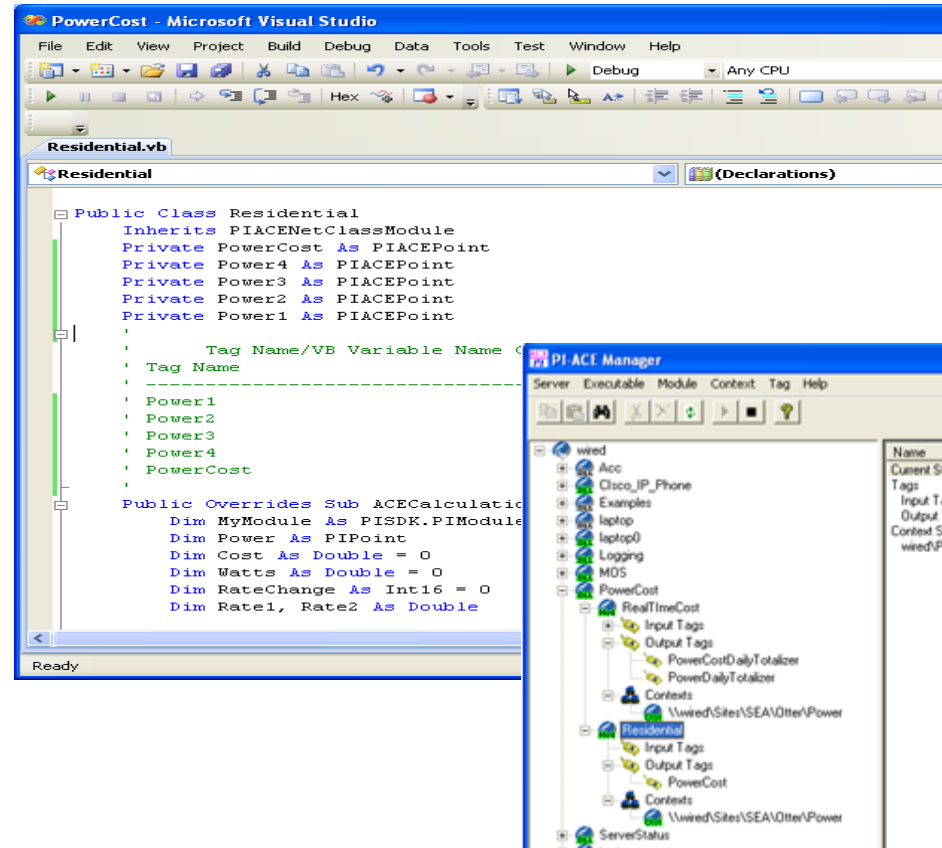
MIN	AVG	MAX	MAX	MAX
32.3	252.8	426.3	260.5	88.1

PI Analytics Landscape

PI Analytics	
Configuration	Programming
Performance Equations AF Configured Analytics	PI Advanced Computing Engine (PI ACE)
Totalizers	Microsoft StreamInsight & PI for StreamInsight
Statistical Quality Control	
PI AF formula data reference	PI AF custom data reference

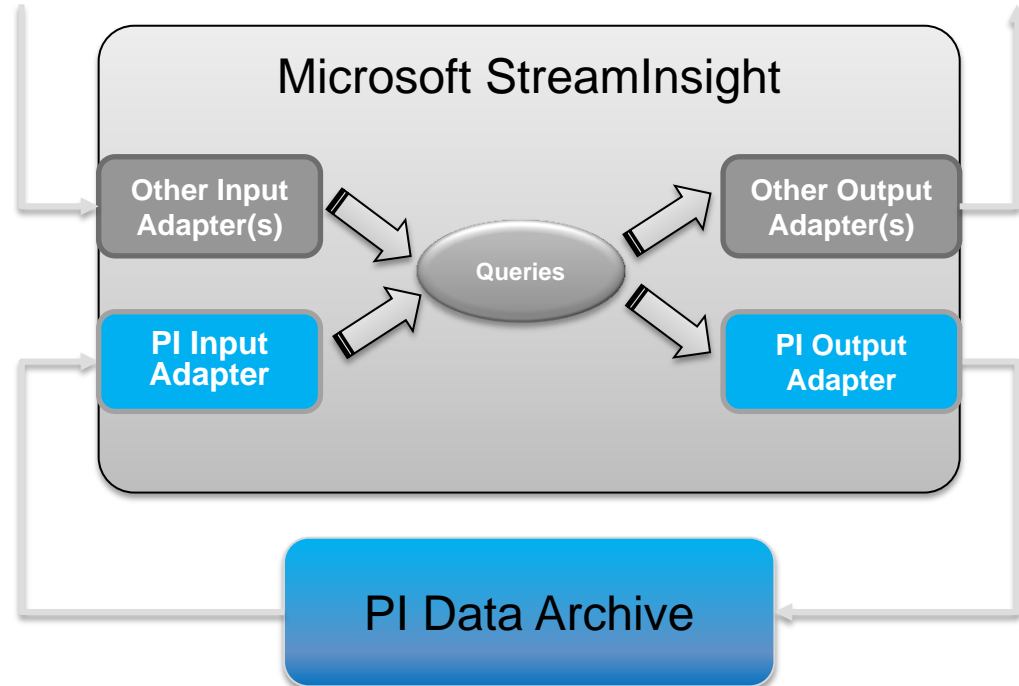
PI ACE 2010 R2

- Develop with Visual Studio
 - Wizard to simplify implementation
 - Flexibility of a programming environment
- Manage with configuration
 - Apply calculations to multiple assets
- Schedule
 - Scalability with multiple schedulers
- Examples
 - Condition based maintenance, KPI and roll-ups



PI for StreamInsight

- Complex Event Processing for the PI System
- Leverages Microsoft's CEP Engine
 - StreamInsight
- “Standing” queries in LINQ
- High performance
 - all in-memory



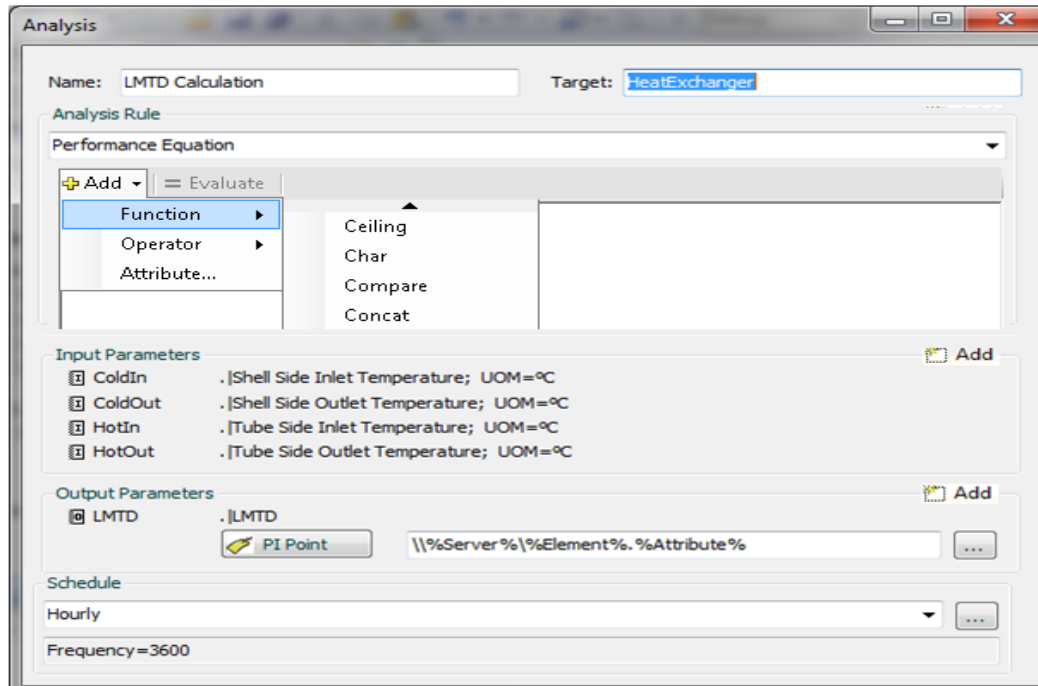


PI AF Configured Analytics - Goals

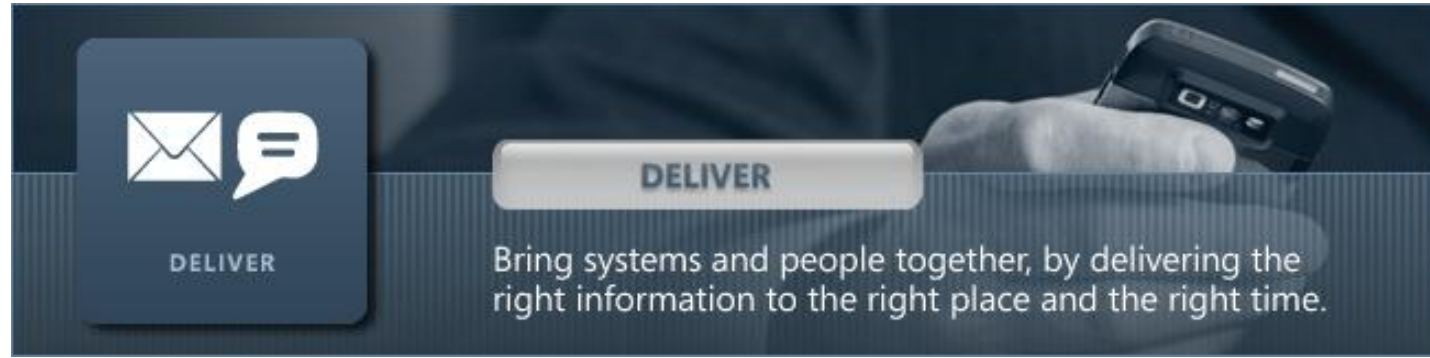
- Majority of your analytics through configuration
- Rich Configuration in PI AF
 - Merge of PE and Formula DR syntax
 - Configuring rollup calculations
- OSIsoft takes care of
 - Scheduling
 - Dependencies
 - Writing results to the PI System
- Very Large Scale
 - Improvements in data access
 - OSIsoft managed scale-out
 - Driven from Templates in PI AF – easy replication

Analytics – Simple Configuration

- Equation defined on an attribute or a template



Deliver

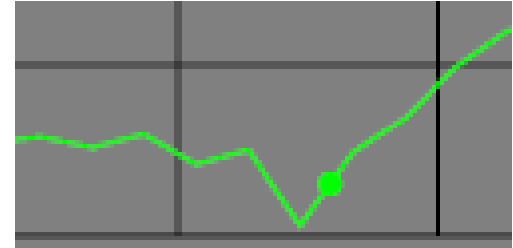


- PI Notifications – deliver exceptions to humans or push to other systems
- PI Data Access – enables development of custom PI System applications, as well as integration with business systems
 - SQL Services
 - Web Services
 - OPC Server
 - Software Development Kits (SDKs)



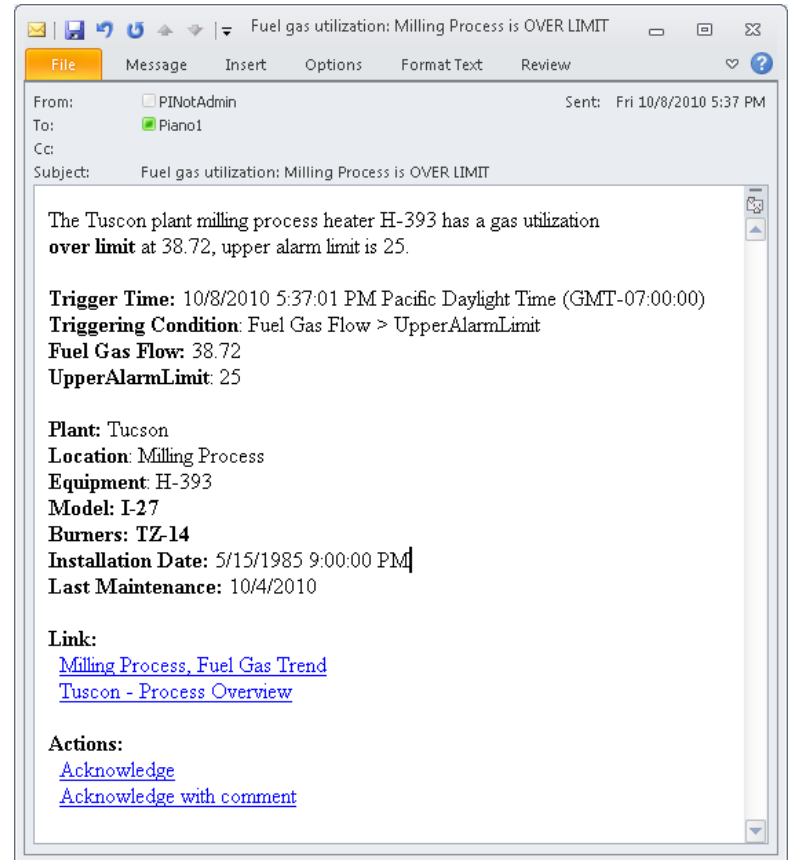
PI Notifications 2010 R2

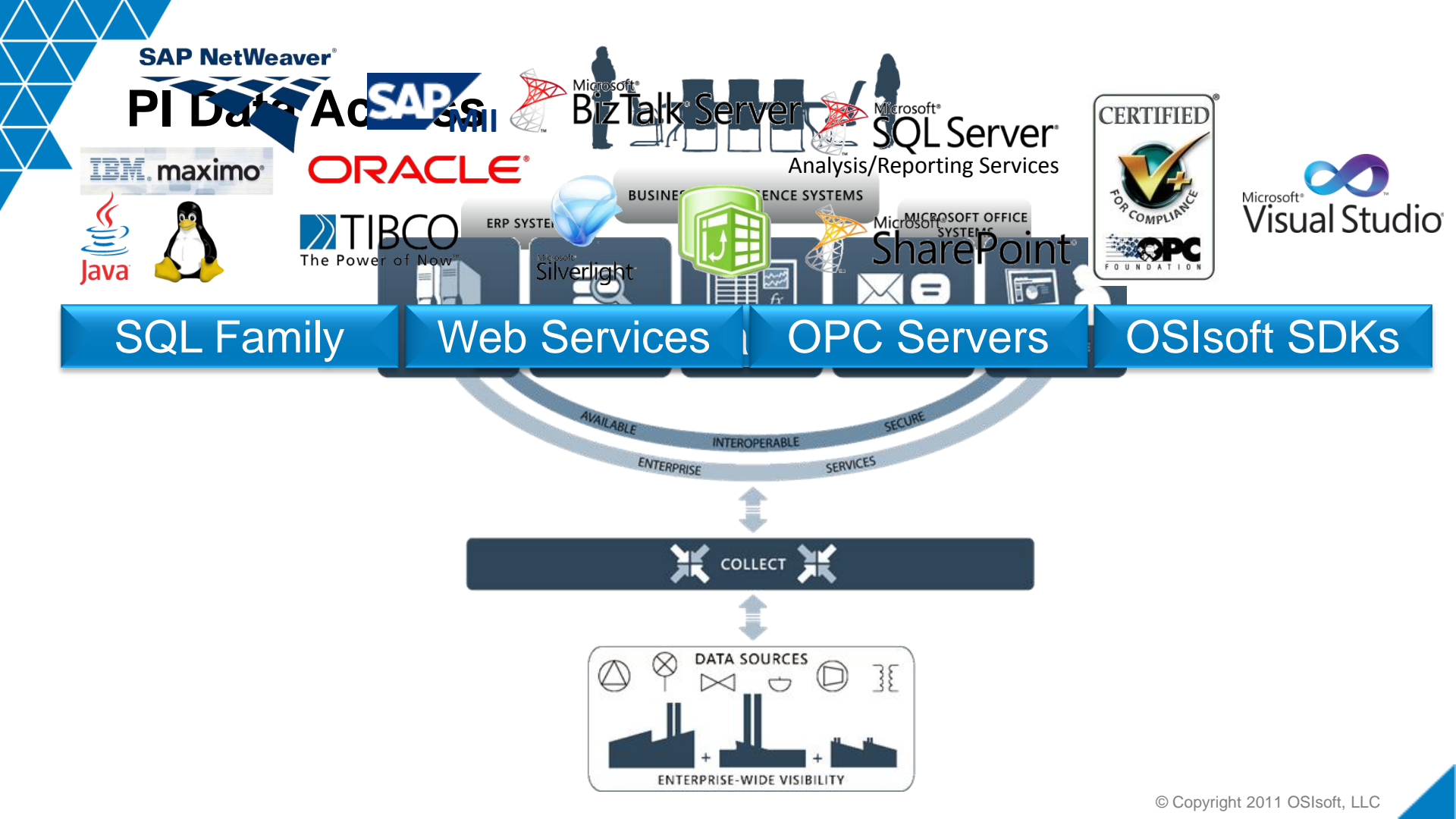
- Define rules to identify key events
 - Comparison, PE, SQC, PI ACE, sensor value
- Customize information to send
 - Values, trigger condition, links
 - Recipients from Active Directory
- Deliver the notification
 - Email, Instant Message, or Web Service - Extensible
- Make sure someone acts
 - Acknowledgement and escalation
- Simplify deployment with templates



Delivery Channels

- How a message is delivered
- Supported Delivery Channels:
 - Email
 - Web Service
 - Microsoft Office Communicator / Lync
- Extensible – write your own!
 - Helper classes available
- OSIsoft vCampus example
 - XML delivery channel







PI Data Access Futures → *PI Integration Services*

- Higher speed for all access methods and bulk queries – ability to query many data streams (millions) for values in a particular timeframe
- Event Frame support to PI OLEDB Enterprise, PI JDBC, and PI Web Services
- Single PI System SDK
- More focus on *integration* with many systems
 - ERP
 - BI
 - CMMS
- Asset Synchronization Services

Visualize



- PI ProcessBook
 - Easy to build process graphics and data analysis displays
- PI WebParts, PI DataLink
 - Collaborate, Share Information, KPIs
 - Build and Publish Drill Down Reports
 - Integrate with standard off the shelf tools
- PI Notifications
 - Deliver the visual

Shift	Energy Use
Shift 1	
Shift 2	
Shift 3	

DF PI Notifications
Fuel gas utilization: Milling Process is OVER LIMIT

Name: Fuel gas utilization: Milling Process
Server: DFPI2010RC
Database: NuGreen
Start Time: 4/16/2010 11:24:10 AM
Trigger Time: 4/16/2010 11:24:10 AM
Target: \\DFPI2010RC\NuGreen\NuGreen\tucson\Milling Process\Equipment\H-393
Value: High
Priority: Normal

Link:
[Milling Process, Fuel Gas Trend](#)
[Tucson - Process Overview](#)

Actions:
[Acknowledge](#)
[Acknowledge with Comment](#)

Visualization in PI System 2010

Microsoft Excel screenshot showing a notification message:

Chad Chisholm
DF PI Notifications

DF PI Notifications
 Fuel gas utilization: Milling Process is Over Limit

Name: Fuel gas utilization: Milling Process
Server: DFPI2010RC
Database: NuGreen
Start Time: 4/16/2010 11:24:10 AM
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Value: High
Priority: Normal

Link:
[Milling Process, Fuel Gas Trend](#)
[Tucson - Process Overview](#)

Actions:
[Acknowledge](#)
[Acknowledge with Comment](#)

Notification Delivery

Windows Internet Explorer screenshot showing the NUGREEN dashboard:

Navigation: en Operations Manufacturing Engineering Reports Marketing Sales Accounting

PI Trend

Equipment Documents

- Equipment Benchmarking Report
- Fuel Gas Ratio
- Fuel Gas Utilization Report

Dashboards

Target	Trend	Little Rock				Tucson			
		This Month	Today	Target	Trend	This Month	Today	Target	Trend
0	—	0	0	0	—	0	0	0	—
98.6	↗	98.6	99.0	98.6	↗	99.2	98.8	98.6	↗
111526	↗	111526	3646	111526	↗	101270	3378	101270	↗
97.3	↗	97.3	97.6	97.3	↗	97.6	97.8	97.3	↗
95.6	—	95.6	96.3	95.6	—	96.7	97.1	95.6	—

BI for Office 2010



- Productivity through familiar and intuitive tools
- End users to create their own BI solutions
- Improve sharing and discovery of insights

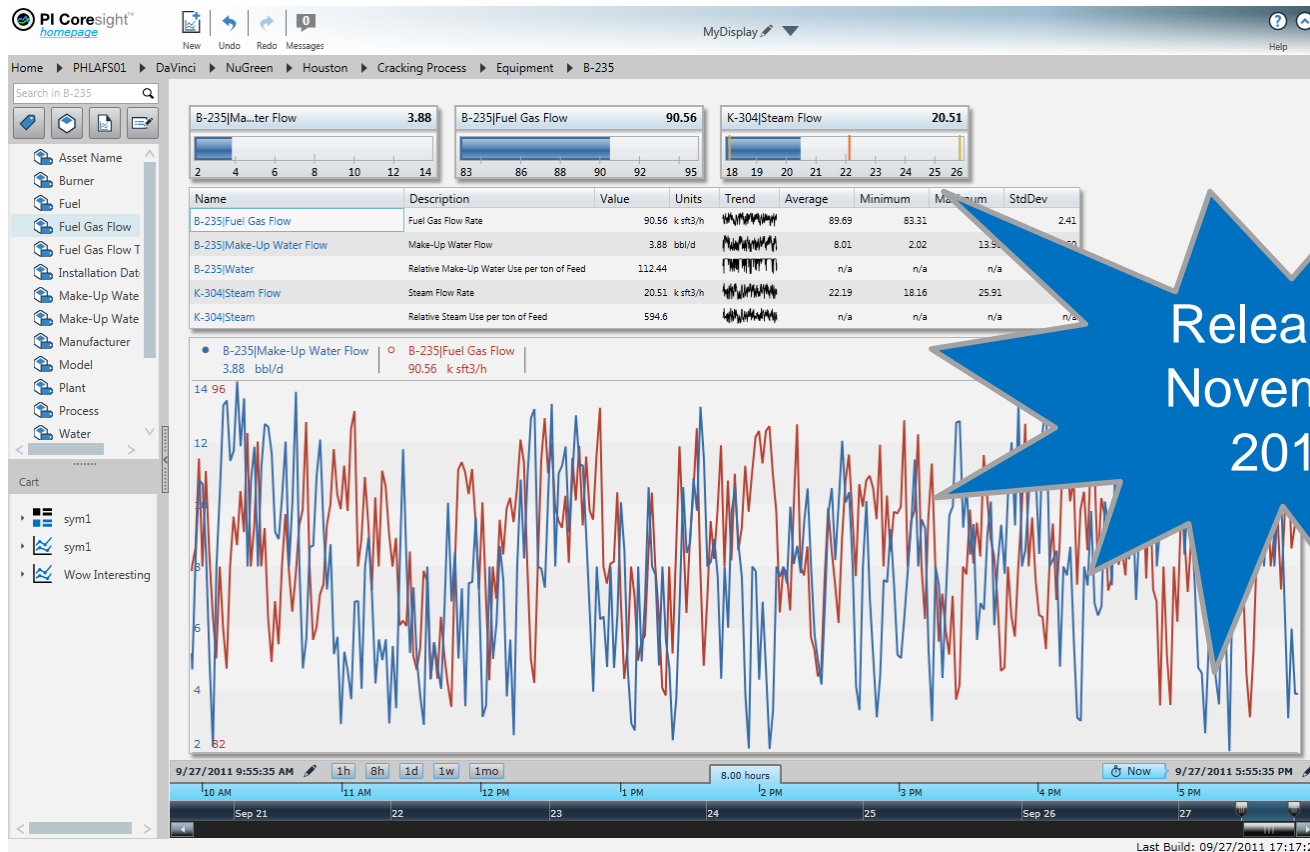
- Organizational productivity through dashboards
- Visibility into key team and organizational metrics
- Business user efficiency and collaboration



- Cut costs by leveraging existing IT investments
- Scale-out to support BI for all users
- Familiar and intuitive management tools

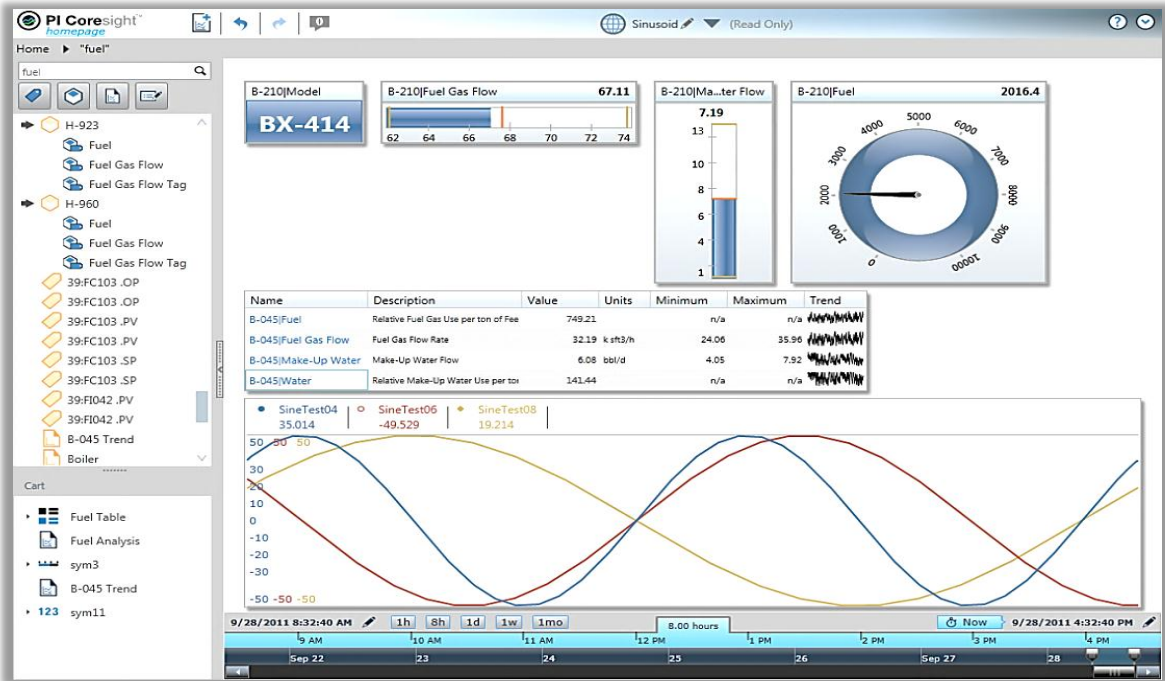


PI Coresight - The fastest, easiest way to visualize your PI System data



Releasing
November
2011

What is PI Coresight?



A web-based product for:

- Ad hoc analysis
- Quick investigation
- Collaboration
- Rapid deployment

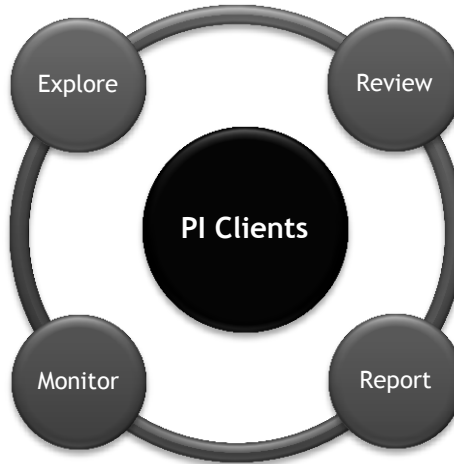
Key Features of PI Coresight

- **Search the PI System (including PI AF) and displays together**
 - No need to understand tag names
- **Very fast display creation**
 - Save time
- **Intuitive user interface**
 - Can be used by a wide range of users
- **Easily share displays**
 - Leverage insights across the organization
- **Easy to deploy and maintain**
 - IT-friendly - always have the current version
- **Anywhere, Anytime**
 - All you need is a web browser



Where Does PI Coresight Fit?

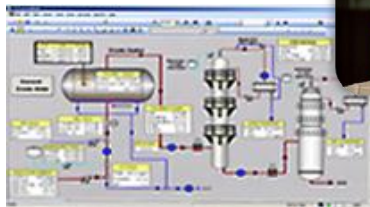
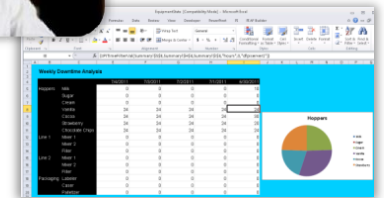
*PI Coresight:
Ad Hoc Analysis &
Collaboration*



PI WebParts: Composite applications in SharePoint



PI DataLink: Reporting and table based analytics in Microsoft Excel



PI ProcessBook: Display authoring and Process monitoring



PI Clients – the 2012 Wave

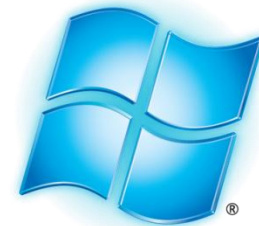
- PI ProcessBook 2012
- PI DataLink 2012
 - PI AF Support – use any Element->Attribute in appropriate functions
 - PI AF and Tag Search
 - 64-Bit Office support
- PI Coresight 2012 – likely multiple releases
- PI WebParts 2012
 - Adobe SVG Viewer replaced with Microsoft Silverlight
 - Nicer Graphics, Faster, Multiple Skins
 - PI AF Search and Browse
 - Allow separate SharePoint visualization server



Visualization / User Interaction – Future Directions

- PI Coresight – regular releases (~6 months)
 - Improved PI AF Integration – asset relative displays
 - Event Frame integration in search, timebar
 - More Built-In Trending Analytics
 - More graphics – XY Plot
- Continue to leverage Microsoft Office and SharePoint
- ***Mobility***
 - Notifications
 - Trend Visualization
 - Tables with Analytics

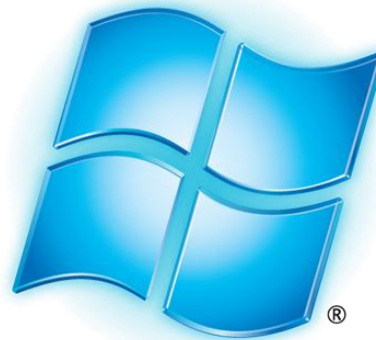
Evolution of Operating Systems



Windows Azure™

Windows Azure based PI System

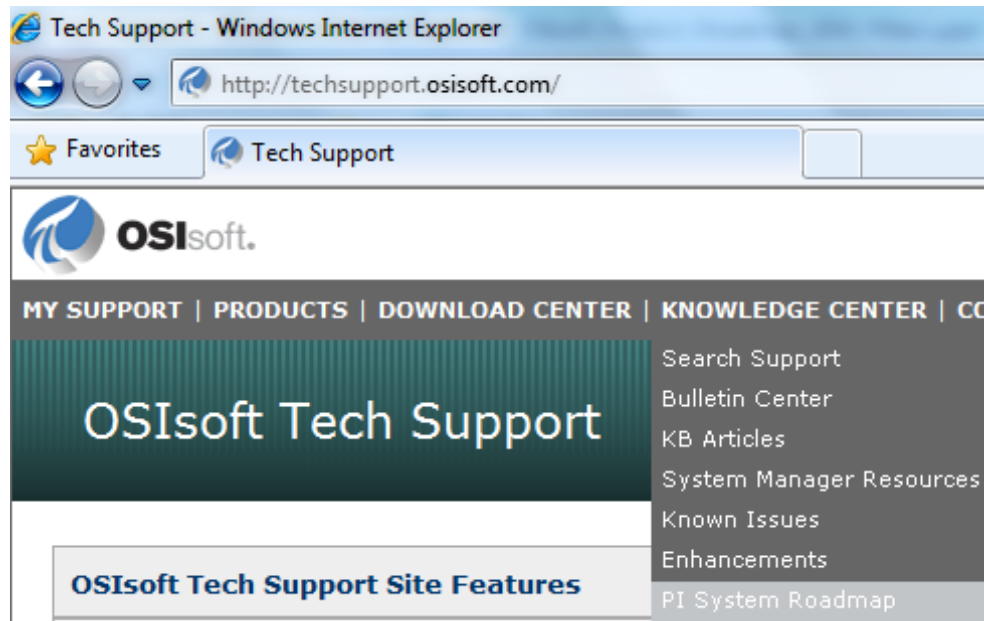
- Research Complete
- Early Development Phases Now
- Approach will include multiple steps



Windows Azure™

Stay Up-To-Date on the Web

- PI System Roadmap on OSIsoft Technical Support Site
<http://techsupport.osisoft.com/techsupport/NonTemplates/roadmap.aspx>





Thank you



OSIsoft.
**REGIONAL
SEMINAR**
A M E R I C A S

**TTT
2012**