





Presented by

Jay Lakumb Product Manager 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



Scaling

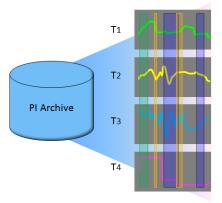
More data More updates More robust



Analytics

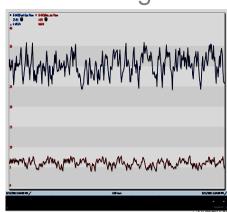
Manage large numbers of calculations

What are we working on?



Event Frames

Identify and user important events in your data

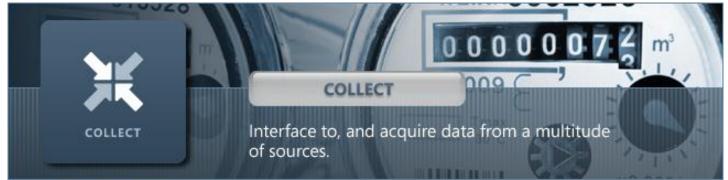


Visualization

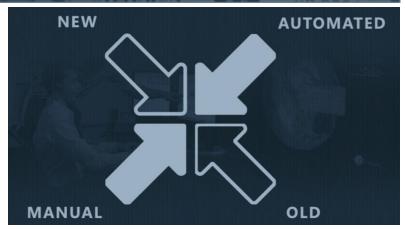
The fastest, easiest way to visualize PI data

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

Collect

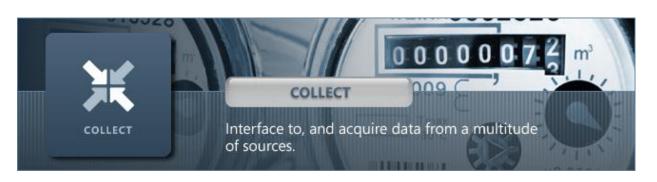


- Over 400 PI Interfaces getting data from:
 - Devices
 - Systems
 - Standards
 - Manually entered data
 - IT assets
 - Manufacturing assets
 - Databases
 - Internet



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

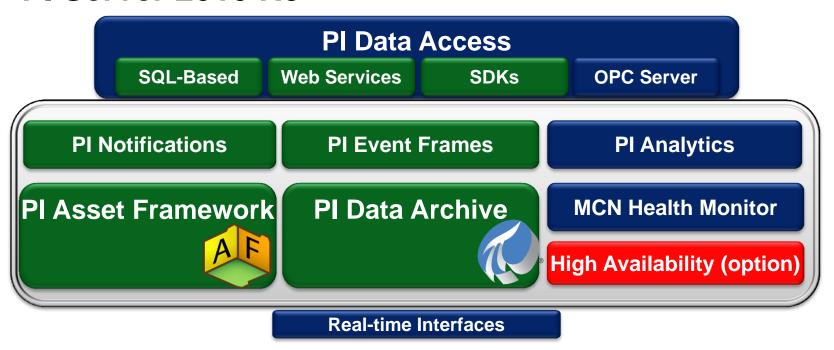
PI Server 2010 (Q3 2010) PI Server 2010 R2 (H1 2011) PI Server 2010 R3 (Q4 2011)

- Complete PI Server infrastructure including:
 - PI Data Archive 2010
 - PI AF 2010
 - PI Notifications 2010
 - PI ACE 2010
 - PI MCN Health Monitor
 - PI Data Access 2010

- Enhancements to the PI Server infrastructure:
- PI AF 2010 R2
- PI Notifications 2010 R2
- PI ACE 2010 R2
- PI for StreamInsight
- PI Data Access 2010 R2

- Expanding the PI Server infrastructure for Everyone:
 - PI Data Archive 2010 SP1
 - PLAF 2010 R3
 - PI Event Frames
 - PI SDK 2010 R2
 - PI Data Access 2010 R3

PI Server 2010 R3



Real-Time Data

DCS / PLC / SCADA / OPC

HISTORIANS /
INTERFACES

Custom Data APIs / SDKs **IT Data**IT MONITOR

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.



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.



PI AF 2010 R3

Fixes and performance enhancements. All customers can upgrade to latest release and leverage an asset-centric PI System.



HISTORIZE

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.



PI Notifications

Reduced licensing to 1 datastream per notification.

PI Data Access

Improved performance and support for PI SDK Buffering.



PI Clients

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



DELIVER

VISUALIZE

Security

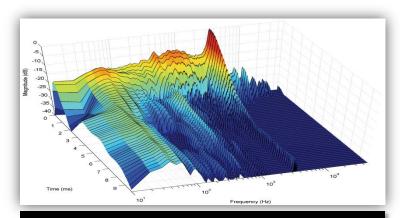
- Windows Integrated Security
 - True single sign-on (SSO)
 - Easier to manage
 - User account in Windows AD Only
 - Leverage AD Tools and Policies
 - Upgrade experience
 - · Backward compatible
 - PI SDK upgrade enables all clients
- Security Development Lifecycle
 - External testing, Idaho National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



Security: Critical Infrastructure Protection

- OSIsoft Values
 - Provide reliable data for your business
 - Minimize cyber risk
 - Ease compliance burden
- Proactive Actions
 - Security Development Lifecycle
 - Enable Built-In Defenses
 - Managed PI and First Responders
 - Dedicated Security Manager
- Verification
 - 2009 US Army NETCOM Certificate of Noteworthiness (CoN)
 - 2008 Windows Logo Certification Server 'Core'
 - 2006 National SCADA Test Bed Cyber Assessment
 - 2004 EPRI and Utility Partner Cyber Assessment

Large Scale PI Systems: 2 Scenarios



Synchrophasors

270TB

4,800 data streams at 60Hz

3 years online

Unique events: 27 Trillion

Estimated data size: 270TB



Automated Metering



150M data streams, 15 min

7 years online

Unique events: 16 Trillion

Estimated data size: 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



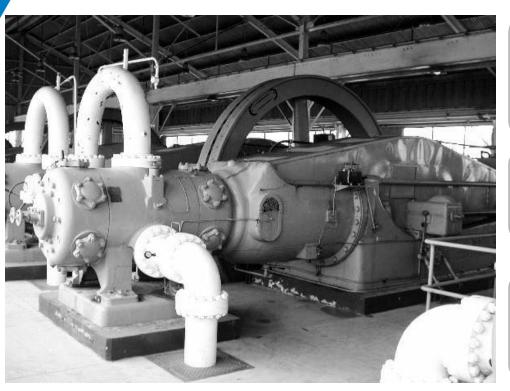
- Find all data by name, relationship, or usage
- Find important configurations such as analytics and displays
- · Easily find work that you or colleagues have already completed
- Organize and Categorize data so it's easier to find next time
- Reference Data by Assets or Events

PI Asset Framework (PI AF)

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



PI AF Asset Centric PI Example



Natural Gas Compressor

RPM

PI Tags

- Fuel consumption rate
- Exhaust temperature
- Oxygen sensor
- Flow in
- Flow out

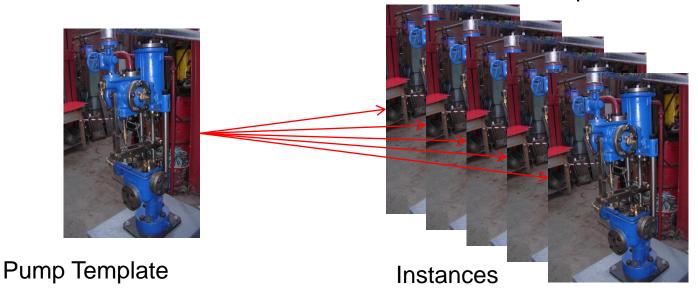
Calculations

- Pressure differential
- 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



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



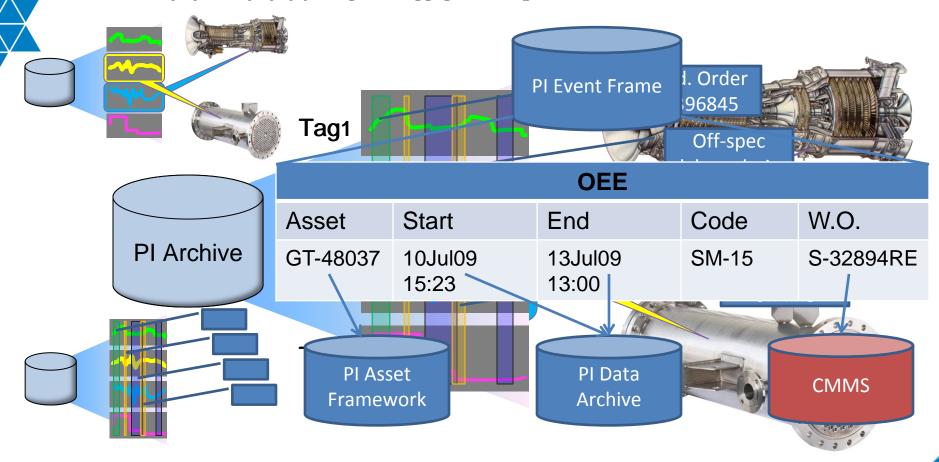




Time Series Data

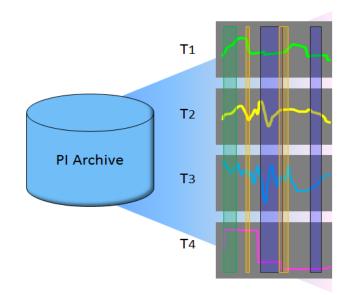
Time Series Data

PLEOETS Fleetprojech edigosylique for aight in Edigosylique for aight



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 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

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	PIMIN	PLAVG	PI MAX	PIRANGE	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

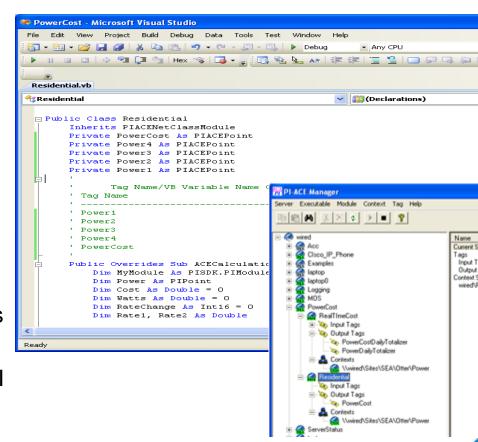
MIN	AVG	MAX	MAX	MAX
32.3	252.8	426.3	260.5	88.1

PI Analytics Landscape

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

PI ACE 2010 R2

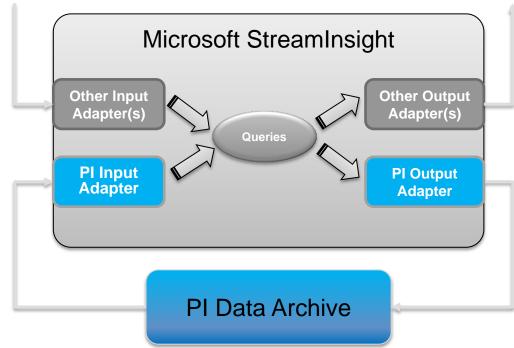
- Develop with Visual Studio
 - Wizard to simplify implementation
 - Flexibility of a programming environment
- Manage with configuration
 - Apply calculations to multiple assets
- Schedule
 - Scalability with multiple schedulers
- Examples
 - Condition based maintenance, KPI and roll-ups



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

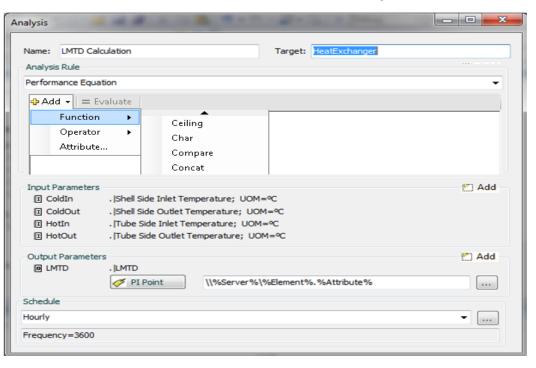


PI AF Configured Analytics - Goals

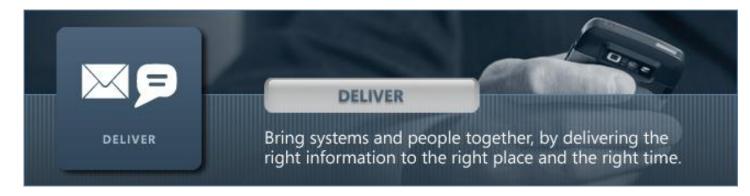
- Majority of your analytics through configuration
- Rich Configuration in PI AF
 - Merge of PE and Formula DR syntax
 - Configuring rollup calculations
- OSIsoft takes care of
 - Scheduling
 - Dependencies
 - Writing results to the PI System
- Very Large Scale
 - Improvements in data access
 - OSIsoft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

Analytics – Simple Configuration

Equation defined on an attribute or a template



Deliver

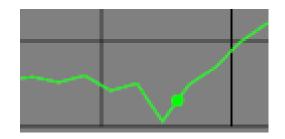


- PI Notifications deliver exceptions to humans or push to other systems
- PI Data Access enables development of custom PI System applications, as well as integration with business systems
 - SQL Services
 - Web Services
 - OPC Server
 - Software Development Kits (SDKs)



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



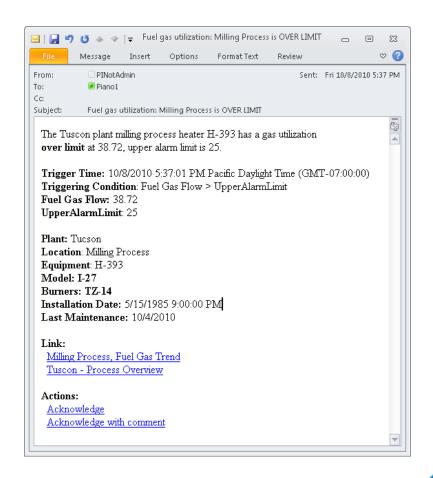






Delivery Channels

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





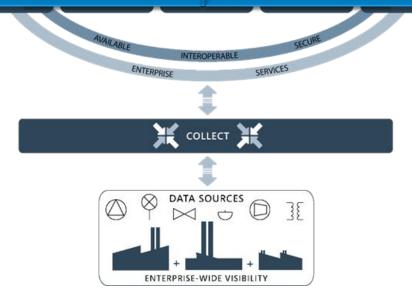




SQL Family

Web Services | OPC Servers

OSIsoft SDKs



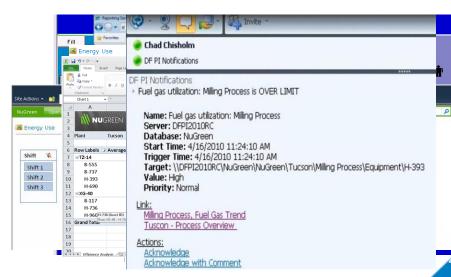
PI Data Access Futures → PI Integration Services

- 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

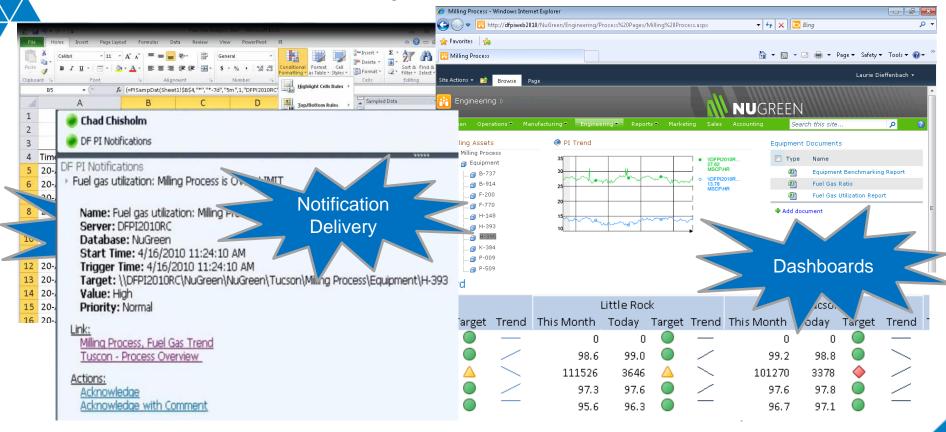
Visualize



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



Visualization in PI System 2010



PI for Office 2010



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



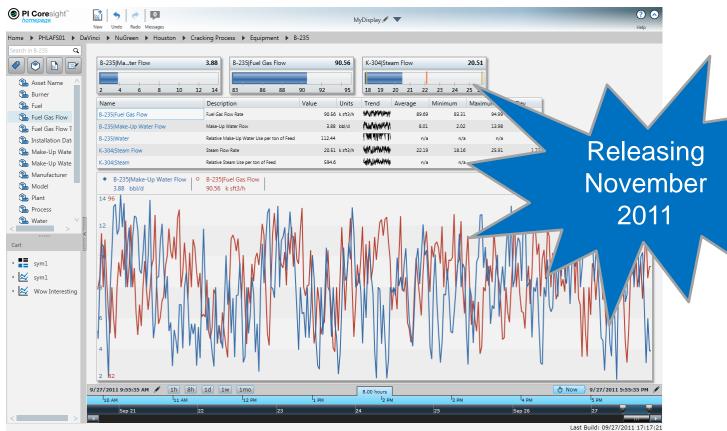
- Visibility into key team and organizational metrics
- Business user efficiency and collaboration





- 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



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

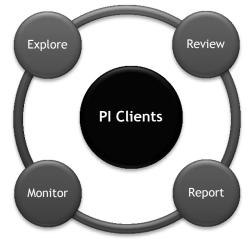


Where Does PI Coresight Fit?

PI Coresight:

Ad Hoc Analysis & Collaboration







PI ProcessBook:
Display authoring and
Process monitoring

PI WebParts: Composite applications in SharePoint





Reporting and table based analytics in Microsoft Excel



PI Clients – the 2012 Wave

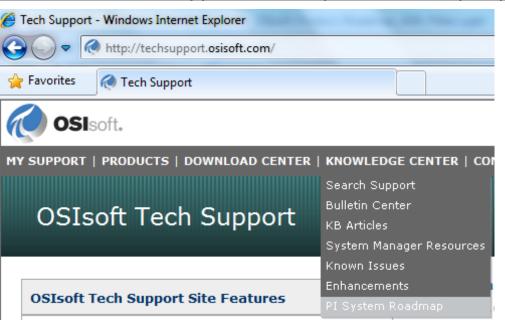
- PI ProcessBook 2012
- PI DataLink 2012
 - PI AF Support use any Element->Attribute in appropriate functions
 - PI AF and Tag Search
 - 64-Bit Office support
- PI Coresight 2012 likely multiple releases
- PI WebParts 2012
 - Adobe SVG Viewer replaced with Microsoft Silverlight
 - Nicer Graphics, Faster,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

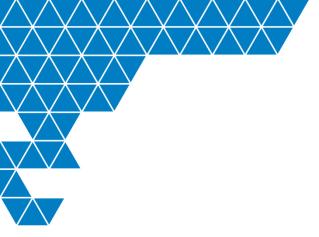
Visualization / User Interaction – Future Directions

- 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
 - Health Monitoring / Diagnostics

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



