OSIsoft®
vCAMPUS LIVE! 2010

Where PI geeks meet… to turn challenges into solutions

Welcome

Presented By:

John Baier & Steve Pilon, OSIsoft

Thank You!

OSIsoft

OSIsoft vCampus Ecosystem

You, customers & partners

Product Managers

vCAMPUS LIVE! 2010 September 13-14

Where PI geeks meet… to turn challenges into solutions | Palace Hotel, San Francisco, CA

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Where PI Geeks Meet…
to turn challenges into solutions

Asset management and integration

Tr...ms

An...(BI)

P...ystem administration and optimization

PI Development

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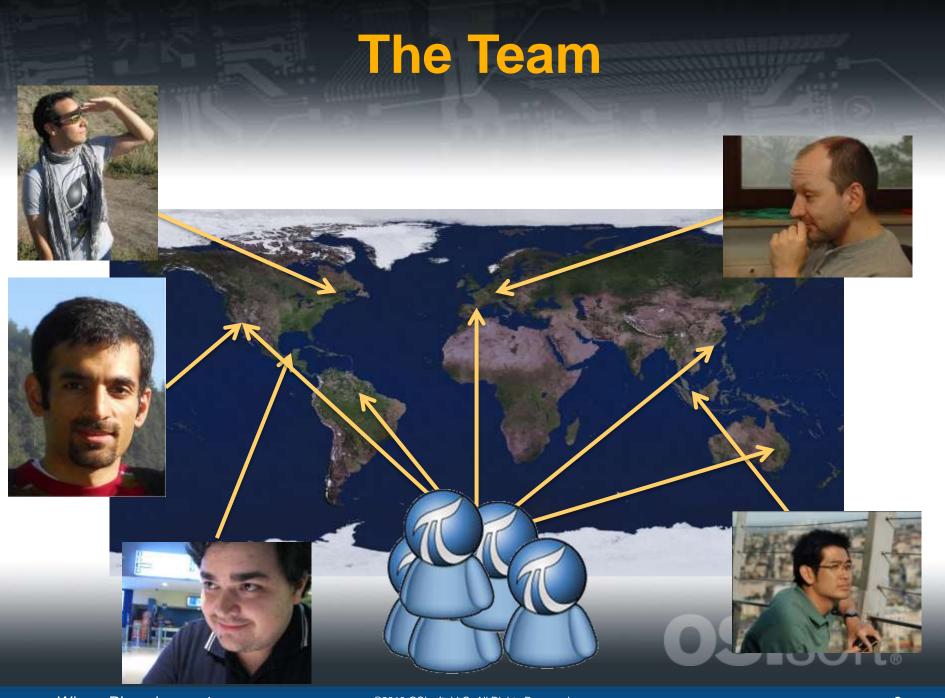
It's your conference...

The Team

24 Technical Sessions, 2 Tracks

Integration & Config Track

Programming Track

Technology Roundtables

Tomorrow morning at 8am
(breakfast starts at 7am)

Gold Ballroom

Product Expo

Tonight at 6pm, in Gold Ballroom

14 Pods

Breaks & Meals

Breaks in Foyer area

Meals in Gold Ballroom

Live! Pub

Tomorrow at 6:20pm, in Gold Ballroom

Lots of fun!

Vox Pop Open Session

5 tracks, not 2

Decided by you, live

Hands-On Learning Labs

Bring your own laptop
Full PI virtual environment

12's of labs with step-by-step instructions
Staff to help

2 sessions tomorrow (1 AM, 1 PM)
In this room

Room available
Register at reg. desk (extra cost)

Geekdad

- Haven't received your copy of Geekdad last night?

- Grab it at the registration desk!

Recordings and Presentations

- Available under the Live! tab at http://vCampus.osisoft.com

Oh, and please allow us a couple weeks… ☺

Evaluation Form ➲ Drawing

amazon.com®
$125

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Thank You!

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PI System 2010

Presented By:

Jay Lakumb, Laurie Dieffenbach,
Steve Pilon
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PI Server 2010
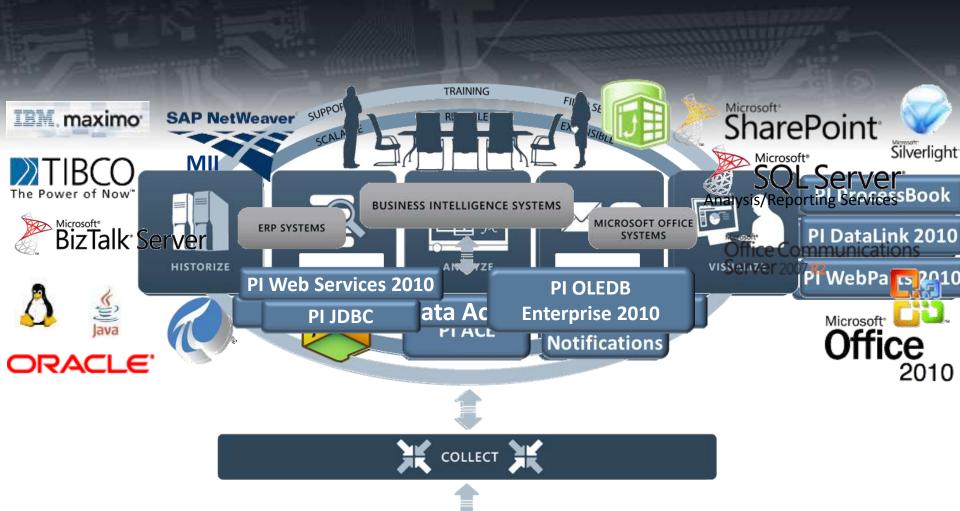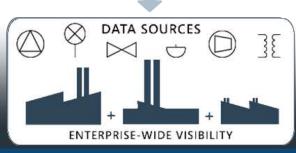
Data Access Services

SQL-Based	Web Services	OPC	SDKs

PI Notifications	PI Analytics	MCN Health Monitor
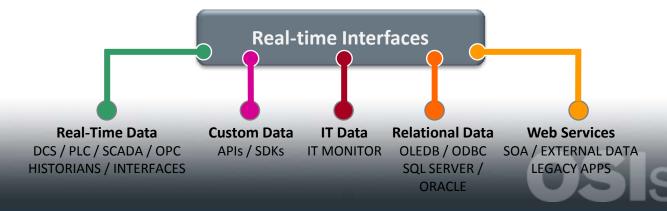
PI Asset Framework

AF Database

PI Data Archive

Point Database

Windows Security

High Availability

Real-time Interfaces

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

Monitor the PI System

IT Dashboard
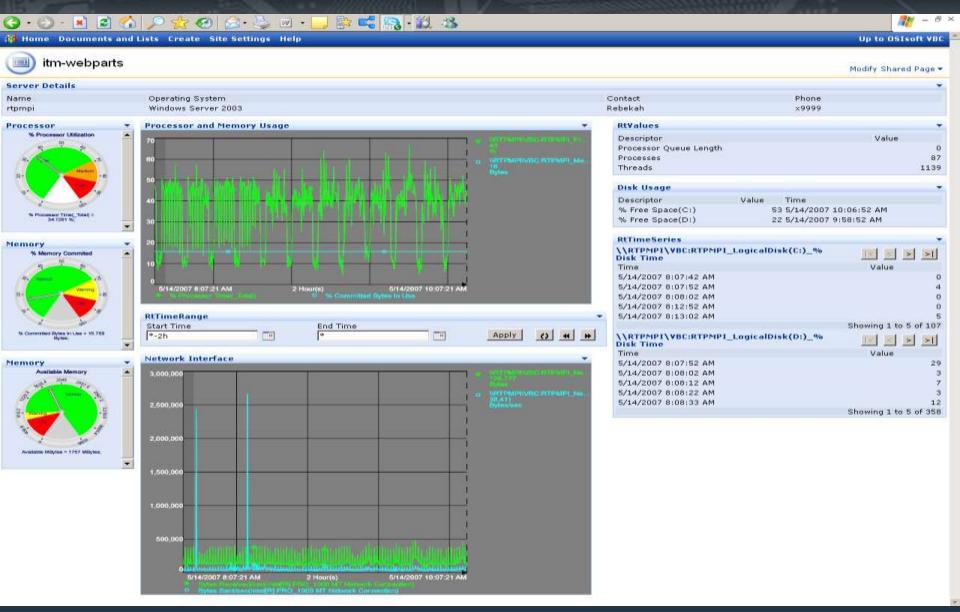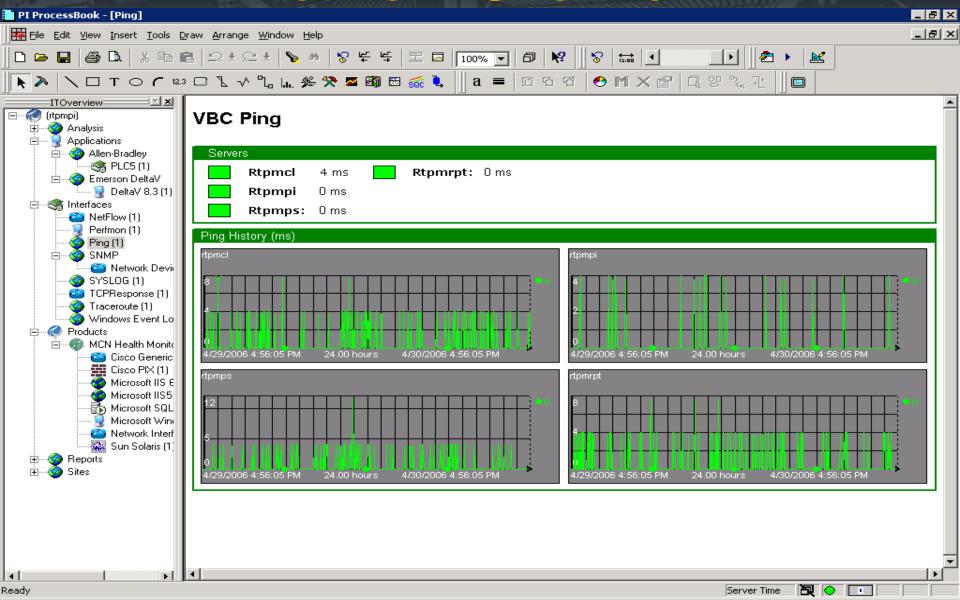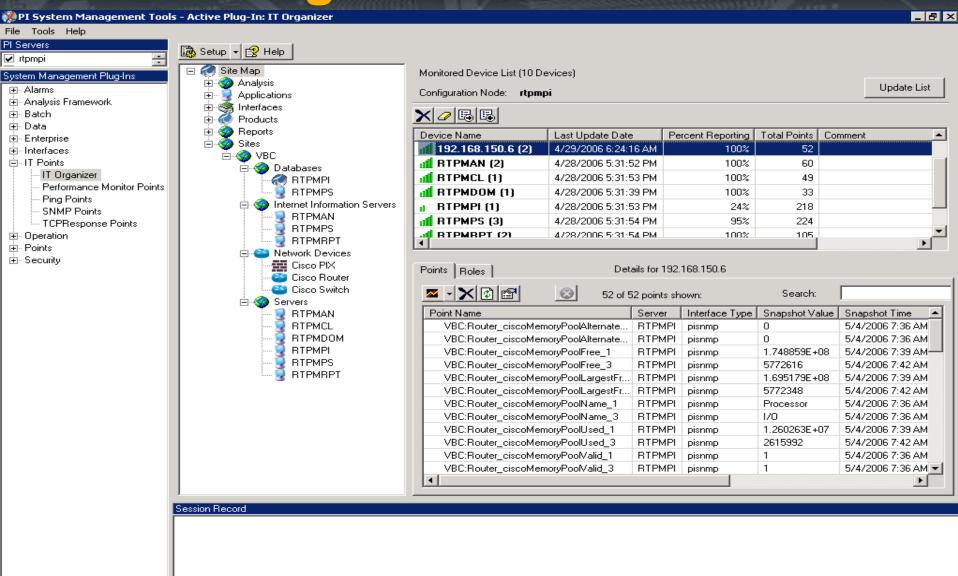
Organize IT Assets

Tools used to Monitor the PI System

- PI MCN Health Monitor

- PI System Management Tools

- PI ProcessBook

- PI WebParts 2010

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More Details

- PI System Tuning and Optimization

Commission a new Asset
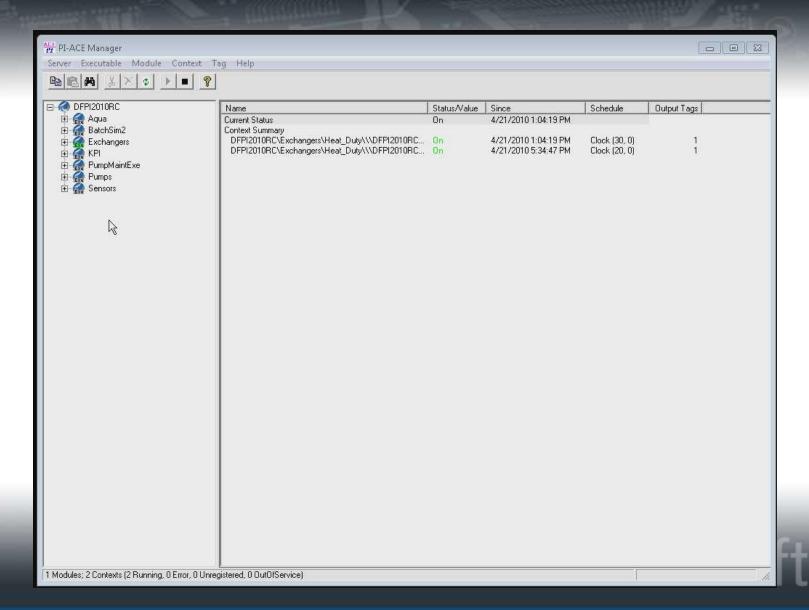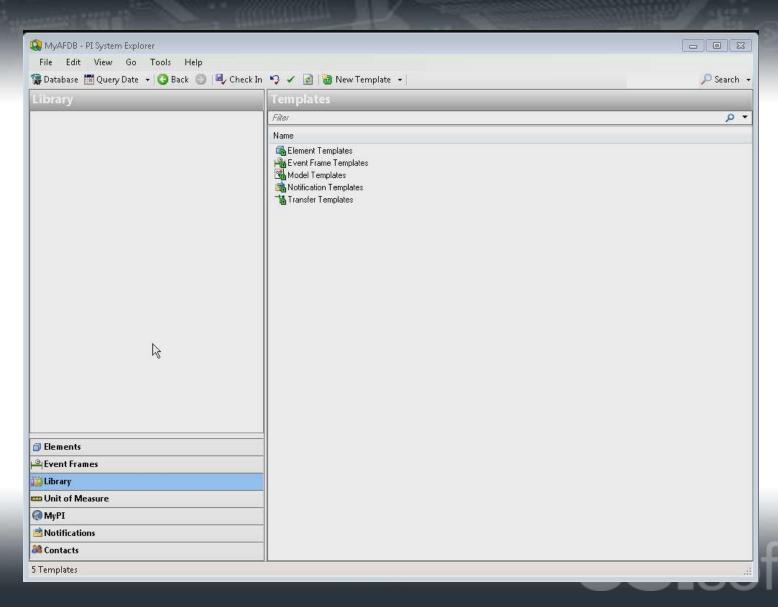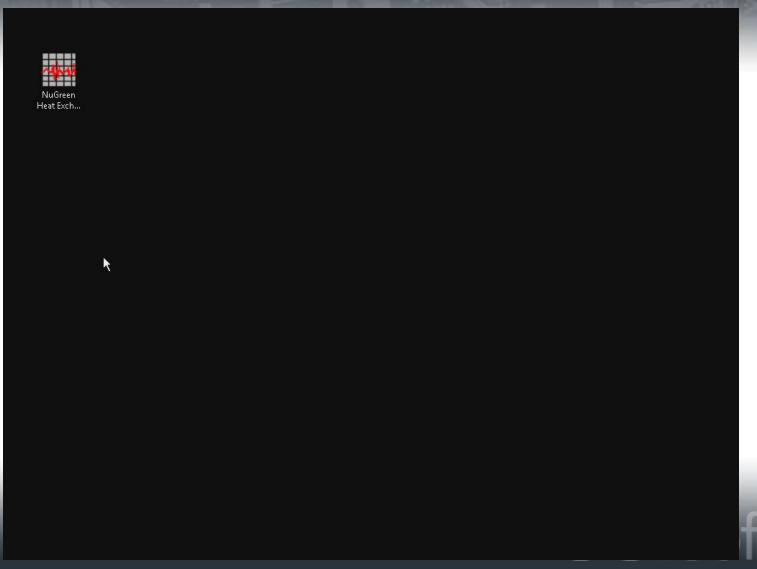
KPI Calculation

Model a new Asset

Monitor the Asset

Tools used to Commission an Asset

- PI Server 2010

- PI Asset Framework

- PI ACE

- PI Notifications

- PI ProcessBook

- Microsoft Office Communications Server

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More Details

- PI Server 2010: AF Inside

- PI Asset Framework Speeds Up Time to Solution

- Delivering PI ACE Applications in .NET

Creating a Report

Creating the Report

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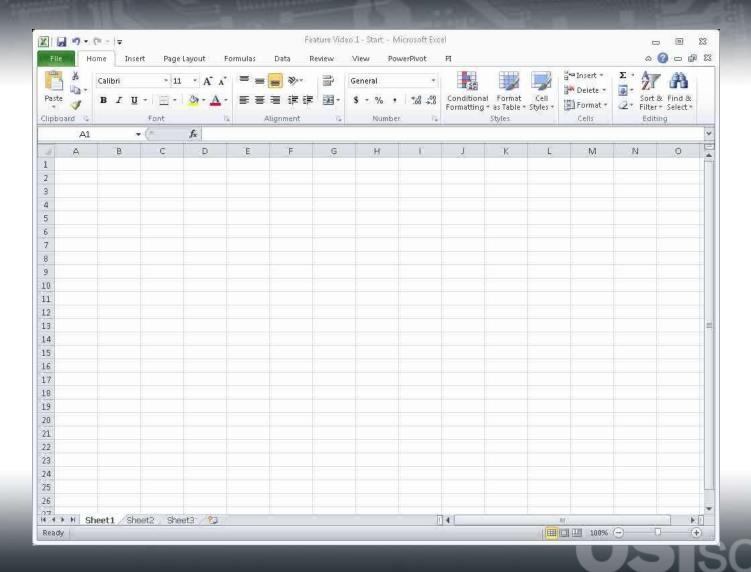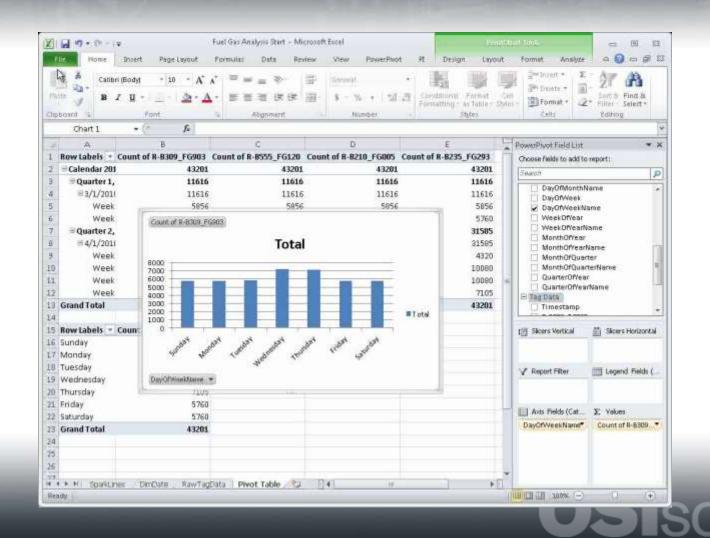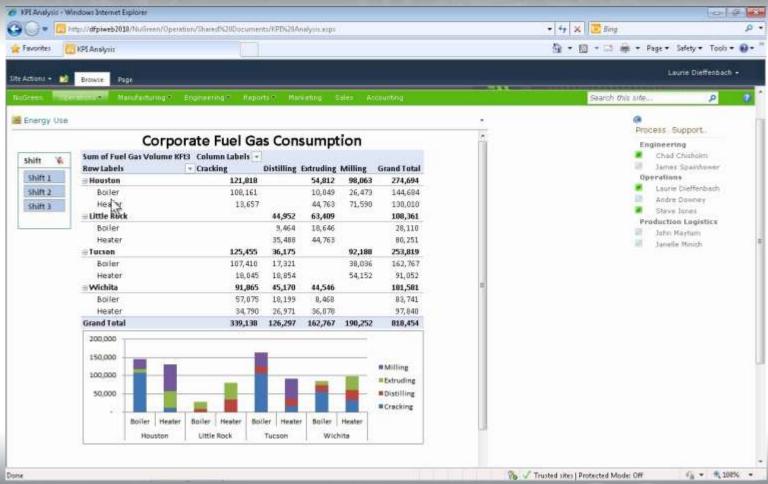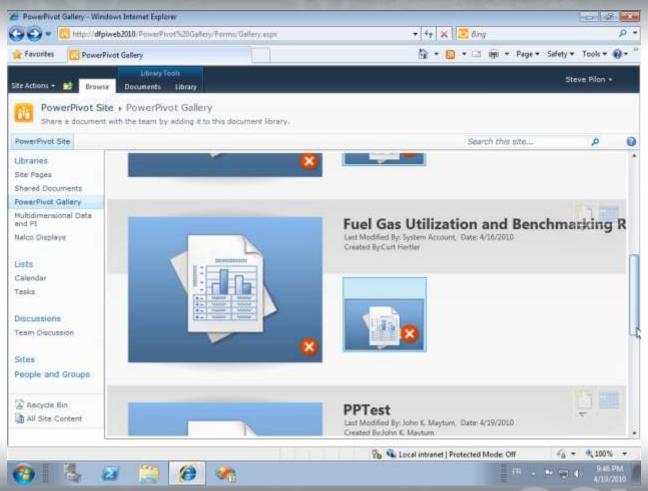
Publishing to SharePoint
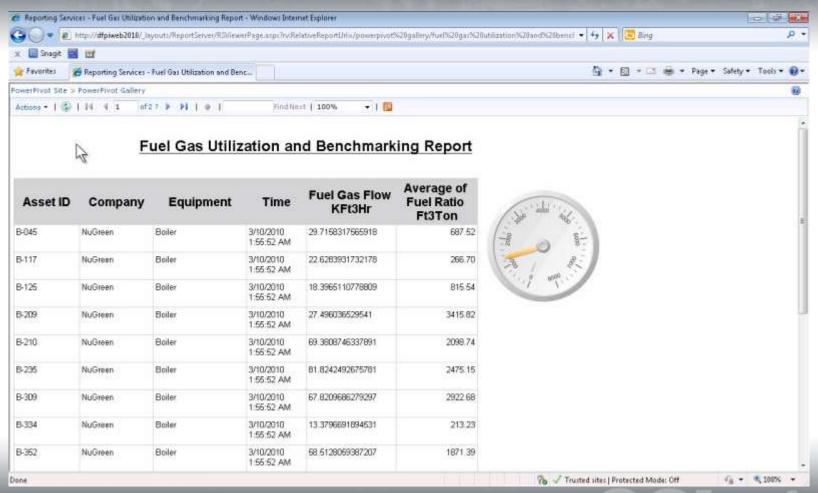
Using the Report

Making an SSRS Report

Scheduling an SSRS Report

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Tools used in Report Creation

- PI OLEDB Enterprise
- Microsoft Excel 2010
- Microsoft PowerPivot
- SharePoint 2010
- SharePoint Excel Web Access 2010
- SQL Server Reporting Services 2008 R2

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More Details

See the "Building a BI Infrastructure" talks:

- Part 1: Warehousing, ETL, and Cube
- Part 2: Visualization, Analysis, and Personalization

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Respond to an Alert
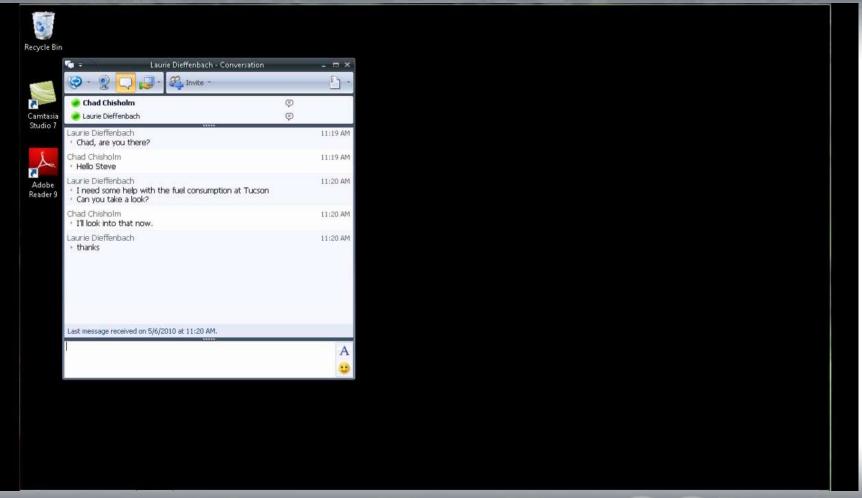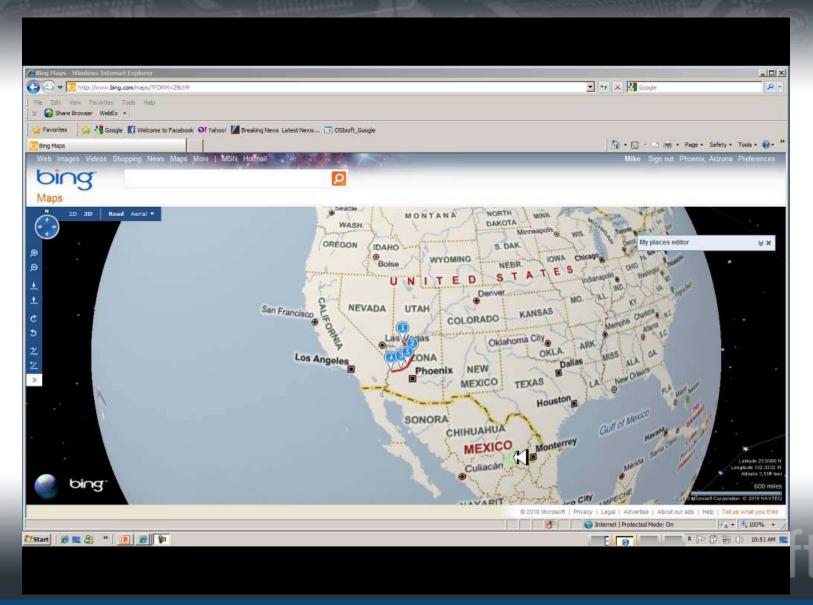
Notification

Bing map navigation

Write Data to Reset Condition

Tools used in Notification

- PI Notifications
- Microsoft Office Communications Server 2007 R2
- Microsoft SharePoint 2010
- PI WebParts 2010 and PI DataLink Server 2010
- PI OLEDB Enterprise 2010
- Microsoft InfoPath Forms Services
- PI Web Services 2010

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More Details

- Exposing Data in Microsoft Office 2010 and SharePoint 2010

- PI Notifications: Powerful and Extensible

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PI Data in External Web Applications

PI Web Services 2010
PI JDBC

PI OLEDB Enterprise 2010

BUSINESS INTELLIGENCE SYSTEMS

ERP SYSTEMS

MICROSOFT OFFICE SYSTEMS

HISTORIZE FIND ANALYZE DELIVER VISUALIZE

PI ACE

PI Notifications

COLLECT

DATA SOURCES

ENTERPRISE-WIDE VISIBILITY

PI ProcessBook
PI DataLink 2010
PI WebParts 2010

Analysis/Reporting Services
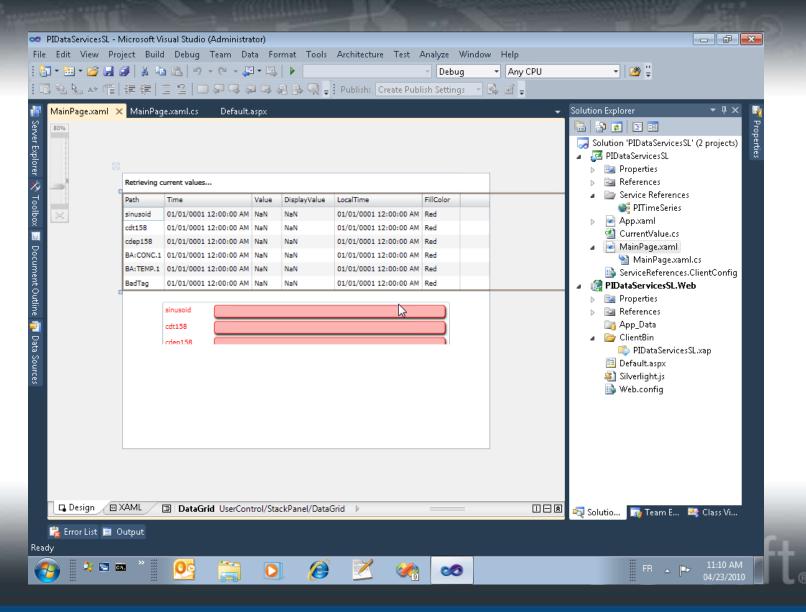
PI Data in External Web Applications

Tools used in PI data on the Web

- PI Web Services
- Microsoft Silverlight

- PI JDBC
- Apache Tomcat/Java

More Details

- PI Web Services Embraces New Technologies

- Broadening Web Service Access through REST and OData?

- OSIsoft's SQL Data Access Family

- Using Web Technologies To Connect and Enrich Data from Heterogeneous Sources

- Using PI Web Services and PI WebParts with Silverlight for Creative Solutions

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Line-of-Business Integration

IBM maximo

SAP NetWeaver

MII

TIBCO
The Power of Now™

Microsoft
BizTalk Server

ERP SYSTEMS

BUSINESS INTELLIGENCE SYSTEMS

Microsoft
SharePoint

Microsoft
Silverlight

Microsoft
SQL Server
Analysis/Reporting Services

Microsoft
Office Communications
Server 2007 R2

MICROSOFT OFFICE
SYSTEMS

Java

ORACLE

PI Web Services 2010

PI JDBC

**PI OLEDB
Enterprise 2010**

Microsoft
Office 2010

HISTORIZE

FIND

ANALYZE

DELIVER

VISUALIZE

PI ProcessBook

PI DataLink 2010

PI WebParts 2010

AF

PI ACE

PI Notifications

COLLECT

DATA SOURCES

ENTERPRISE-WIDE VISIBILITY

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Line-of-Business Integration

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Data Orchestration

Tools used in LoB Integration

- PI Web Services

- Microsoft SharePoint and BizTalk
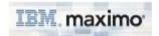
- SAP MII and Business Objects

- IBM MMT

More Details

- Integration with Enterprise Business Systems Using PI Data Access

- "Real-time Enabling" Your Enterprise Business Systems

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Thank You!

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Technology Roadmap

Presented By:

Ray Hall and Ray Verhoeff

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Outline

- Building Applications on the PI System

- How OSIsoft extends the PI System

- Past Development Efforts

- Current Development Efforts

- Summary

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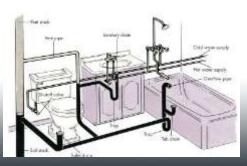
Applications

- What is an Application?
  - Embedded domain specific…
    - Logic, Workflow, Visualization
  - Typically, to achieve a business value in an industry
- The PI System enables Applications
  - By providing easy to use tools to domain experts
  - But, the OSIsoft Infrastructure is not an application

Infrastructure	Applications

Why Trust the PI System?

- We go to extreme lengths to carry you forward
- For example, with few exceptions
  - All client products work with all server versions
  - This is a hard technical and logistical problem
  - But, this makes your job easier
- Did you know?
  - There are still early PI3 systems at customer sites
    - First version of PI3, Circa 1995
  - the PISDK works with all versions of PI3 Server
  - We are the right people to solve that problem

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Why Trust the PI System?

- We solve very difficult problems for you
  - High Availability
  - Security
  - Scalability
  - Manageability
  - Product Support
  - Quality
- We take these infrastructure problems very seriously
- Did you know?
  - 97% of PI Server support calls are handled by front line support?
  - AF can return 8000 rows per second in a search

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How OSIsoft extends the PI System

- The PI System is comprised of many parts

Interfaces and Framework	UNIINT and 400+ interfaces
Server	PI, AF, Notifications
Analytics	ACE, AF, StreamInsight
Data Access	PISDK, AFSDK, OLEDB, Web Services, OLEDB Enterprise
Clients	DataLink, ProcessBook, WebParts

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How OSIsoft extends the PI System

- We extend in two ways
  - Individual product features
  - Platform-wide efforts

- We work on these synchronously
  - Individual products have _release dates_
  - Platform-wide efforts have _timeframes_

- Our challenge
  - Individual products must balance these
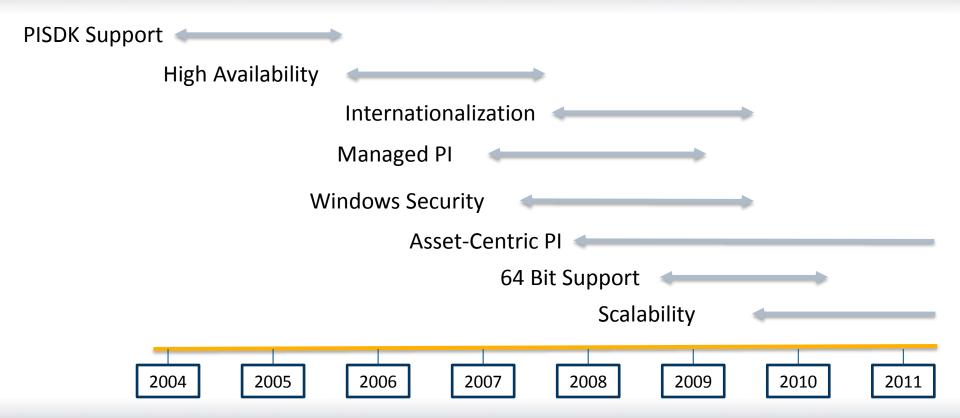
Examples

- Individual product features:
  - PI Notifications: message formatting
  - PI Web Parts: moving to Silverlight
  - PI ProcessBook: Playback
- Platform-wide efforts
  - 64 bit support
  - Internationalization
  - High availability

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2009 Value Themes

What did OSIsoft accomplish in 2009 to help you?

Security

Critical Facilities are Safe
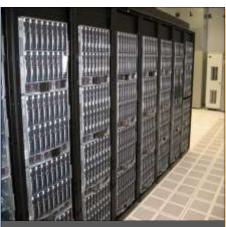
Localization

Use Worldwide

Asset Centric PI
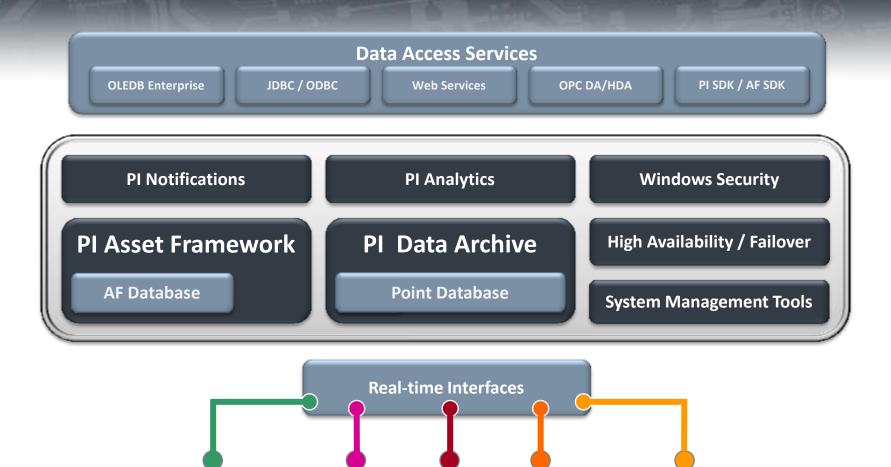
Define Once Use Over and Over

Scaling, 64 bit

Use PI for more data

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PI Server 2010

Data Access Services

| OLEDB Enterprise | JDBC / ODBC | Web Services | OPC DA/HDA | PI SDK / AF SDK |

PI Notifications   **PI Analytics**   **Windows Security**

PI Asset Framework   **PI Data Archive**   **High Availability / Failover**

AF Database   Point Database   **System Management Tools**

Real-time Interfaces

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

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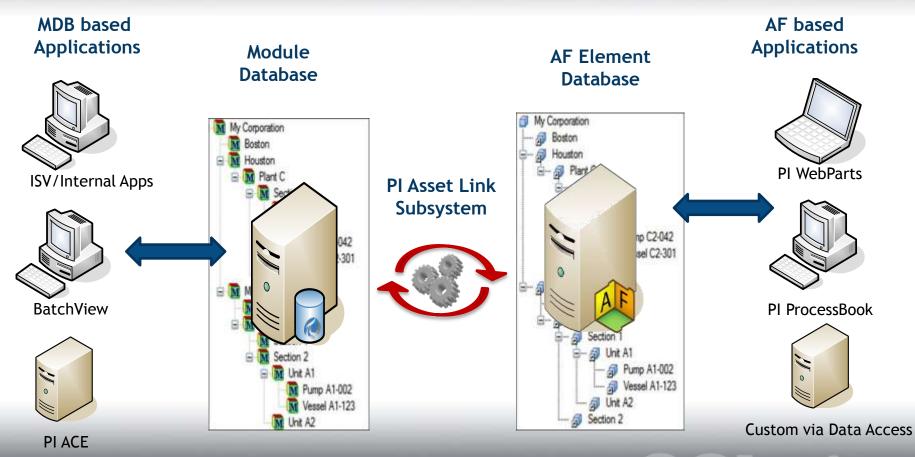
Migrating Module DB to Asset Framework (AF)
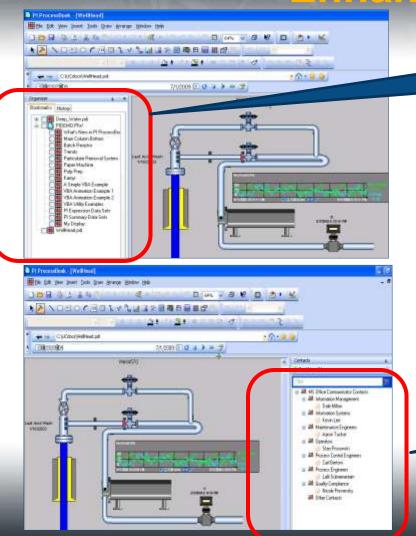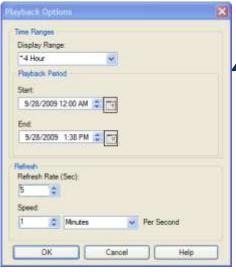
ProcessBook 3.2: Productivity Enhancements

Browsing forward and backwards
Permanent books mark of favorites

Playback

Troubleshoot problems by re-playing a display

Communicator
IM, Email Contacts
Easily send a PB screenshot

Go See: Recent Productivity Enhancements to PI ProcessBook

2010 Value Themes

Asset Centric PI

Define Once
Use Over and
Over
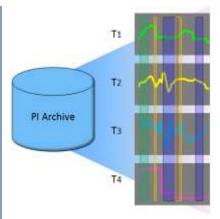
Scalability

Use PI for
more data

Analytics

Easily use PI
Data in
calculations

Event Frame

Save
timeframes
to find,
analyze data

Value Theme - Asset Centric PI

- Provide alternate naming for PI Data
  - Common object names
  - Accessible for users unfamiliar with tag naming
- Allows:
  - Re-use with Templates
  - Browsing and Searching
  - Adding in other data
    - Relational, Calculations, Fixed Values
- Requires some effort to build the assets

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Asset-Centric PI - Timeline

	2007	2008	2009	2010	2011
Servers	AF 2.0 Merge AF and MDB features		AF 2.1 HA	PI Server 2010	
Data Access	AF SDK			PI OLEDB Web Services	Web Services
Clients	ProcessBook Add-In		Web Parts ERD	Web Parts AF Builder	DataLink

Year

2007	2008	2009	2010	2011

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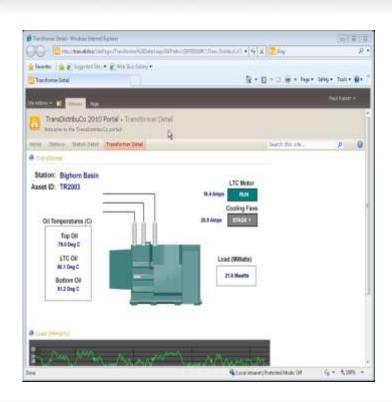
Asset-Centric PI - PI WebParts

- Improved access to asset data
- PI System Search
- Deployment architecture
  - Performance, Scale, Manageability
- Improve User Interaction
- Replace Adobe with…

Microsoft® Silverlight™

Asset-Centric PI - DataLink
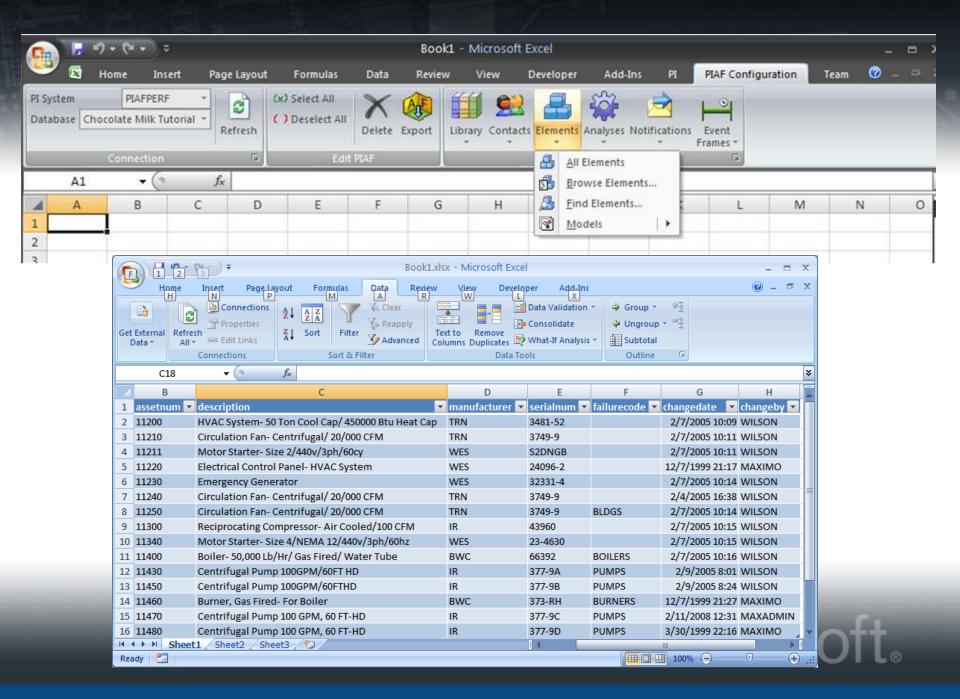
- Accept AF attributes as equals to tags
- AF Specific Enhancements
- Integrated Search
- 64-bit Support
- Integrated Search User Defined Function

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Asset-Centric PI – AF Builder

- Excel add-in to manage all structures:
  - Elements
  - Notifications
  - Analyses
  - Event Frames
  - Templates
  - Categories
  - Enumeration Sets

Value Theme - Scalability

- AF 2.2
  - Significant improvements
  - Paged collections
- ACE
  - Improvements in start-up time, throughput
- Event Frames
  - Optimizing the backend architecture
- Making PI work well on a large scale
  - Increased point count
  - Increased data rates
  - Ability to sign up for events on many tags
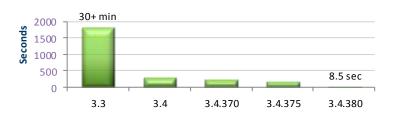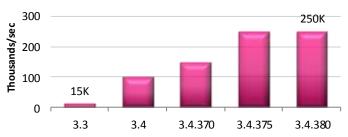
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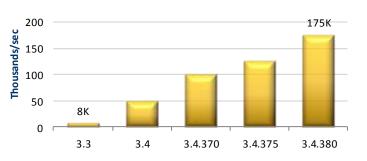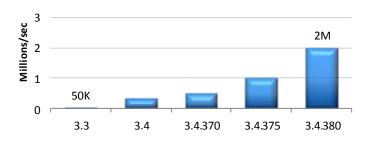
Value Theme - Analytics

- Analytics is a core PI System function
- Now is the right time to work on analytics
    - Point count and data rates have progressed
    - Asset-Centric PI
    - Stream Processing

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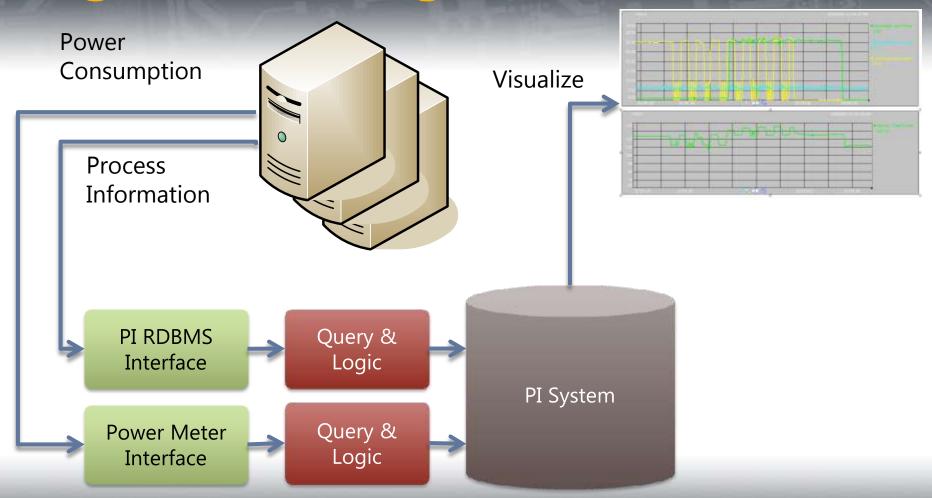
PI Analytics

Configured Analytics		Programmed Analytics	
Adhoc	*Time or event schedule based*		*Custom application*
Asset Framework Formula Data Reference	Performance Equations	PI Advanced Calculation Engine	Software Development Kits (SDKs)
ProcessBook Datasets	Totalizers		PI for StreamInsight
DataLink	Statistical Quality Control		
	AF Analytics		

- Release later this year
- Future product

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Edge Processing

Power
Consumption

Process
Information

Visualize

PI RDBMS
Interface

Query &
Logic

Power Meter
Interface

Query &
Logic

PI System
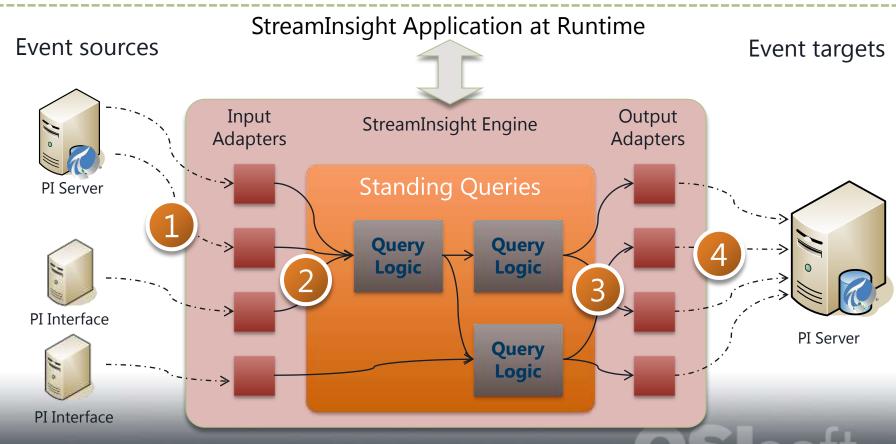
A Complete StreamInsight Application

```csharp
static void Main(string[] args)
{
    // Define the input tag(s)
    string[] InputTags = { "sinusoid" };

    // Define the output tags
    string outTag = "test:sinusoid";
    string summaryTag = "test:sinusoid-count";

    // Configure a PI Input Adapter
    var inputConfig = new SnapshotInputConfig();
    inputConfig.PointsQuery = InputTags;

    // Create the Event Stream, of type PIEventBasic<double>
    var inputDataStream =
        CepStream<PIEventBasic<double>>.Create("input", typeof(SnapshotInputFactory), inputConfig, EventShape.Point);

    // Simple pass-through query, copies the input to the output
    var passThroughStream = from e in inputDataStream
                            select new PIEventBasic<double>
                            {
                                Path = outTag,
                                Value = e.Value,
                                Status = e.Status,
                                Id = 0
                            };

    // Count the events over a 30 second window
    var countStream = from window in inputDataStream.TumblingWindow(TimeSpan.FromMinutes(0.5), DateTime.Today,
HoppingWindowOutputPolicy.ClipToWindowEnd)
                      select new PIEventBasic<double>
                      {
                          Path = summaryTag,
                          Value = window.Count(),
                          Status = 0,
                          Id = 0
                      };
    // Combine (union) the two output streams
    var outputDataStream = passThroughStream.Union(countStream);

    // Turn the stream into a functional query and start the query
    var query = outputDataStream.ToQuery(app, "sample", "", typeof(PIOutputAdapterFactory),
        new PIOutputAdapterConfig(), EventShape.Point, StreamEventOrder.FullyOrdered);
    query.Start();

    Console.ReadLine();
    query.Stop();
}
```

```csharp
static void Main(string[] args)
{
    // Define the input tag(s)
    string[] InputTags = { "sinusoid" };

    // Define the output tags
    string outTag = "test:sinusoid";
    string summaryTag = "test:sinusoid-count";

    // Configure a PI Input Adapter
    var inputConfig = new SnapshotInputConfig();
    inputConfig.PointsQuery = InputTags;
```

Define tags and configure an input adapter

```csharp
// Create the Event Stream, of type PIEventBasic<double>
var inputDataStream =
    CepStream<PIEventBasic<double>>.Create("input", typeof(SnapshotInputFactory), inputConfig, EventShape.Point);
```

Create an input stream

```csharp
// Simple pass-through query, copies the input to the output
var passThroughStream = from e in inputDataStream
                        select new PIEventBasic<double>
                        {
                            Path = outTag,
                            Value = e.Value,
                            Status = e.Status,
                            Id = 0
                        };
```

Use Linq to create the output stream

```csharp
// Count the events over a 30 second window
var countStream = from window in inputDataStream.TumblingWindow(TimeSpan.FromMinutes(0.5), DateTime.Today,
HoppingWindowOutputPolicy.ClipToWindowEnd)
                  select new PIEventBasic<double>
                  {
                      Path = summaryTag,
                      Value = window.Count(),
                      Status = 0,
                      Id = 0
                  };
// Combine (union) the two output streams
var outputDataStream = passThroughStream.Union(countStream);
```

Start the StreamInsight query

```
// Turn the stream into a functional query and start the query
var query = outputDataStream.ToQuery(app, "sample", "", typeof(PIOutputAdapterFactory),
    new PIOutputAdapterConfig(), EventShape.Point, StreamEventOrder.FullyOrdered);
query.Start();

Console.ReadLine();
query.Stop();
}
```

AF Configured Analytics

- Philosophy
  - User configures the equation in AF
  - OSIsoft takes care of the rest
- Rich Configuration
  - Merge of PE and Formula DR syntax
  - Capability of doing "rollup" calculations
- Very Large Scale
  - Improvements in our data access
  - New cache mechanism
  - OSIsoft managed scale-out

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AF Analytics

- Leverage AF Elements and AF Element Templates
- GUI configuration experience
- Outputs written back to PI
- Same PE Library as in PI Notifications
- No change to existing AF Data References
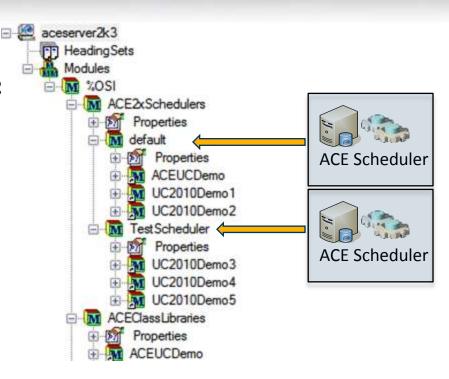
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AF Analytics

PI ACE

- Visual Studio 2010 support

- Native support for 64-bit Windows

- Upgrade to .NET code base

- Multiple PI ACE Schedulers

- Startup optimization

- Cache enhancements

ACE Scheduler

ACE Scheduler

Distribute heavy-duty calculations across multiple schedulers.

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Programmed Analytics on AF

- Current Status
  - OSIsoft is committed to supporting ACE on MDB
  - No current plans to AF-enable ACE
  - AF Link subsystem enables MDB/AF replication
  - This was an important use case for PI Server 2010
- The first step is configured AF analytics
- Next step is programmed AF analytics

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Value Theme – Event Frames

- There is a real need to store
  - Structure events   downtime
  - Timeframes   shifts
  - Hierarchical events   batches
- PI Batch is great for batch processes
- Event Frames is the generalization of this for all industries
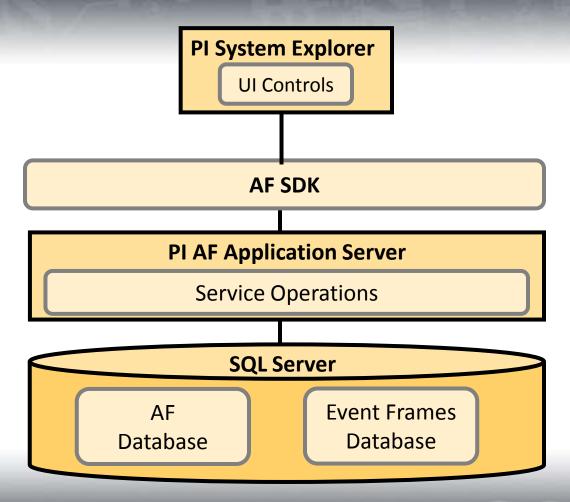
Event Frame Definition

- A time series data type defined by two times and optionally accompanied by supporting data

- Any event in your process:
  - downtime event
  - incident event
  - material transfer event
  - equipment maintenance
  - batch processing step
  - specific investigation
  - electrical power outage
  - safety incident

- Any time range or repeatable set of time ranges:
  - shifts
  - day
  - week
  - month
  - year to date
  - etc.

- Aspects: HA, Secure, Scalable, Performant, Searchable

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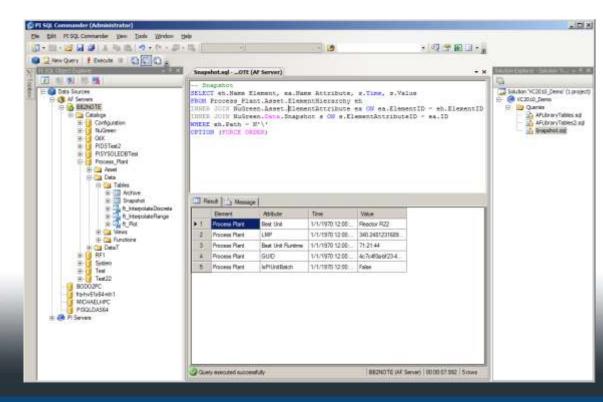
PI AF and Event Frames Architecture

Event Frames

- Release the functionality that CTP today
- Support within PI OLEDB Enterprise

  - Reports
  - Integration
  - SQL-based apps

PI Notifications 2010

- Message Formatting
  - More control over the appearance of the subject and body
- Performance
  - **History retrieval** is improved by an order of magnitude
  - Native 64-bit operating system support
- Internationalization
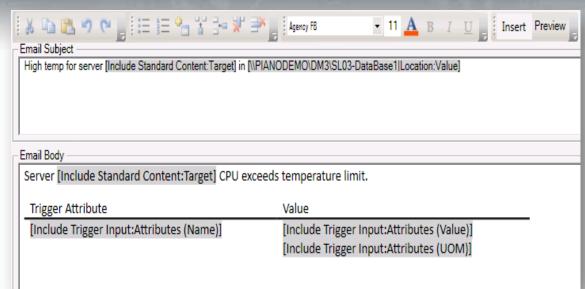
PI Notifications 2010
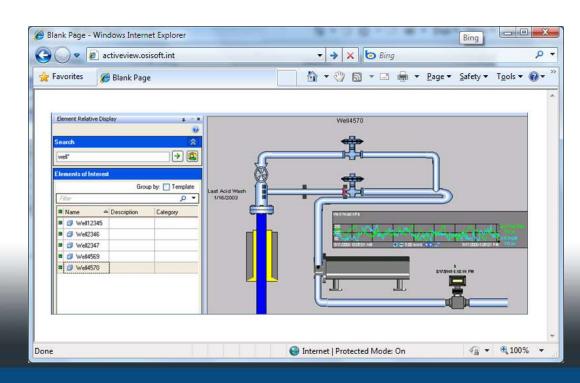
ProcessBook and ActiveView

- Docking Windows in ActiveView

- Enhanced Time Range Interface

- Important defects and enhancements

- Multi-Language Improvements

Data Access

- Web Services
  - Simplified snapshot call
  - Support for any AF data reference
- PISDK
  - Ability to fan data adds and inserts
  - Ability to buffer data adds and inserts
- OLEDB Enterprise
  - Support for Event Frames

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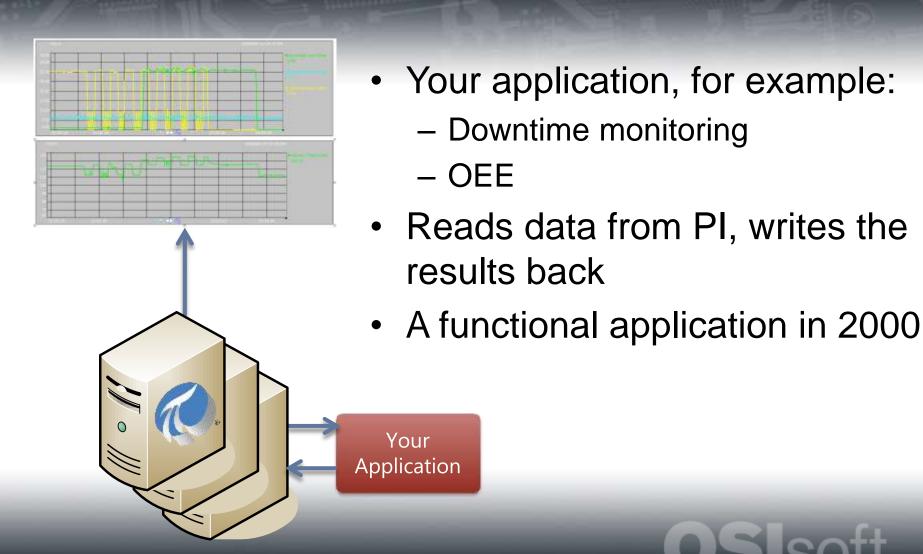
Interfaces: Ongoing

- OSIsoft commitment:
  - 440 interfaces
  - 20 developers in 6 locations
  - Over 150 effort-years of development expertise
- Other Interface Development
  - SAFER Systems Weather Station
  - Thermotron 8800 Controller
  - XML Interface (Phase II failover)
  - Cibectec SNP (Phase II failover)
  - Performix xMES Batch Interface
  - Werum PAS-X Batch Interface
- AMI Head-End Development
  - Grid Net PolicyNet
  - Elster EnergyAxis Meter Automation Server (MAS)

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The 10 year old application

- Your application, for example:
  - Downtime monitoring
  - OEE
- Reads data from PI, writes the results back
- A functional application in 2000

Your Application

Evolution of your PI Application

Year	New capabilities	Your effort
2002	Your results available through OLEDB	-
2004	Higher Performance (PI 3.4)	-
2005	Your results viewable through Web Parts	Some
2007	Highly Available	-
2007	Managed by OSIsoft	EA
2008	Viewable through assets (AF, clients)	Some
2009	Windows Security (PI 3.4.380)	-
2010	Your results available through Web Services	-
all	Connects to many additional systems (PI Interfaces)	-

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Summary

- We continually improve the PI System
- Currently, we are focused on
  - Scalability, Analytics, Event Frames
- Our hope for vCampus Live 2010:
  - You will see new OSIsoft tools, infrastructure that makes your job easier
  - We hear from you about what you need

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Thank You!

OSIsoft®

OSIsoft Virtual Campus

Drive **value**
by fostering a **community**
to cause greater and better
adoption of PI as an **infrastructure**

Do more with PI

Get PI done right

OSIsoft vCampus

Software + Resources + Collaboration

Development and integration

Online, community-oriented program

Partners, customers and OSIsoft

Exclusive contents

Where are we at?

- Launched in November 2008
- 1000 active subscribers
- 6500+ posts on 1000+ threads
- 14 blogs
- 20 monthly webinars and counting
- 5 online courses
- 158 tweets (@OSIsoftvCampus)
- Exclusive content on the Library and the Download Center

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All over the place!

United States	Spain	Hungary	Luxembourg
Unknown	Finland	Malaysia	Kuwait
European country	Mexico	Uruguay	Taiwan
Canada	South Korea	Brunei Darussalam	Ukraine
Germany	Italy	Ireland	Pakistan
Australia	Morocco	Egypt	Romania
Great Britain	Saudi Arabia	Israel	Kenya
Singapore	India	Jamaica	Lithuania
Netherlands	Chile	Portugal	Nigeria
Austria	Yugoslavia	Indonesia	Venezuela
France	Puerto Rico	Argentina	Netherlands Antilles
Japan	Hong Kong	Ghana	Ecuador
Denmark	Switzerland	Greece	Papua New Guinea
China	Bahrain	Oman	Latvia
Norway	Philippines	Poland	Croatia
Russian Federation	New Zealand	Lebanon	Qatar
Brazil	United Arab Emirates	Thailand	Iran
Belgium	Czech Republic	Slovak Republic	
South Africa	Colombia	Panama	
Sweden	Peru	Turkey	

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Community Projects

Hosting 4 Community Projects

- AF Symbol Drop

- LinqToPI

- Smart Table Lookup

- PDI Preview Handle

2 more coming soon

- PI for StreamInsight
- PI data mining for preemptive maintenance

Be the first to know!
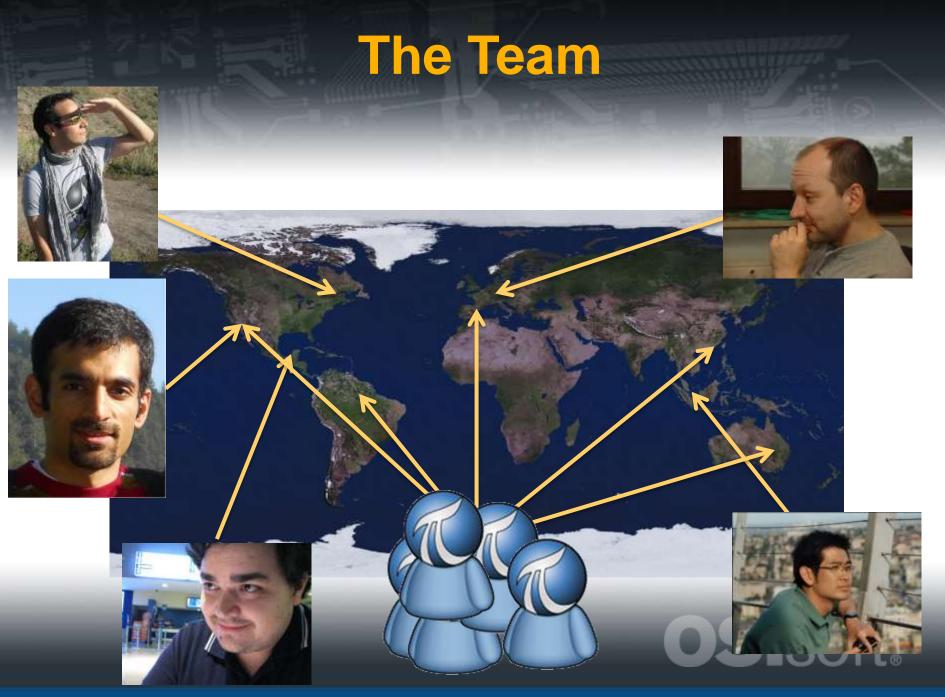
Preview of new products

- PI for StreamInsight
- Event Frames
- PI Web Services (now released)
- PI OLEDB Enterprise (now released)
- PI JDBC (now released)
- AF Builder Excel Add-in

New versions of existing products

- PI System 2010 (now released)
- PI ACE 2010

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The Team

Website upgrade!

Telligent Community 5.5

Supporting more browsers

Syntax highlighting

Bug fixes and improved usability

All-Star Program

Recognition of best contributors

- Nominated by the community

Privileges

- Personal vCampus blog
- Moderate vCampus forums
- Voluntary participation to team meetings
- Free admissions for the year to come
  - OSIsoft vCampus & OSIsoft vCampus Live!
  - Users Conference
- A few more surprises…

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2010 All-Stars!

3 **ALL-STAR** members for the first year!

Recognized for their positive influence and highly effective participation in the community

Michael van der Veeken
Atos Origin
Member since Dec. 2008
397 posts

- **_Specialty_**: Silverlight, Webservices
- **_Features would like to see in PI_**: Future data support Silverlight applications for PI
- **_Favorite quote_**: "Once a new technology rolls over you, if you're not part of the steamroller, you're part of the road. " – Stewart Brand
- **_Bio_**: Michael van der Veeken is a Software Engineer at Atos Origin in the Netherlands. Besides hanging out on vCampus, he creates innovative software for the PI system.

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Asle Frantzen

Amitec
Member since Dec. 2008
241 posts

- **_Specialty_**: Software development with different PI technologies and SharePoint solutions.
- **_Features would like to see in PI_**: Future data, PI ProcessBook-to-Silverlight
- **_Favorite quote_**: "It's a 106 miles to Chicago. We've got a full tank of gas, half a pack of cigarettes, it's dark, and we're wearing sunglasses. Hit it!!!" –The Blues Brothers
- **_Bio_**: Asle Frantzen is a Software Engineer at Amitec in Norway, and an MCTS in Microsoft Office SharePoint Server application development. He has six years of experience in the field of industrial IT, and has been with Amitec since 2008.
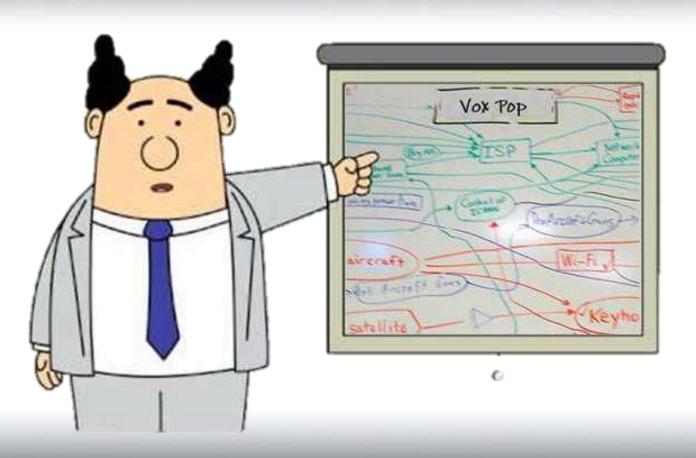
Rhys (Ethan!) Kirk

RJK Solutions

Member since Nov. 2008

608 posts

- ***Specialty:*** PI SDK and AF SDK, ability to solve pretty much any problem with PI!
- ***Features would like to see in PI****:* Event Frames and future data support in PI
- ***Favorite quote****:* "Dada!" –Ethan Kirk
- ***Bio****:* Having worked with PI since 2001 he has been involved in everything from PI-API applications to investigating Event Frames. Even though he is currently working at an architectural level, he is a developer at heart.

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Break + Vox Pop Topics

Thank You!

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