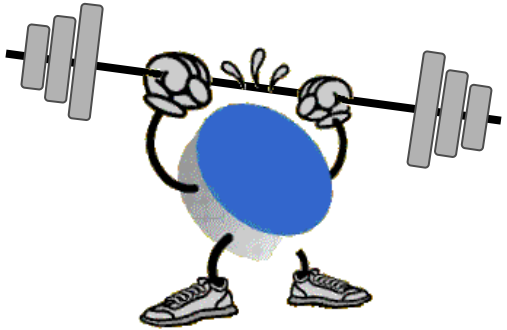
OSIsoft.

REGIONAL SEMINARS 2013

The Power of Data

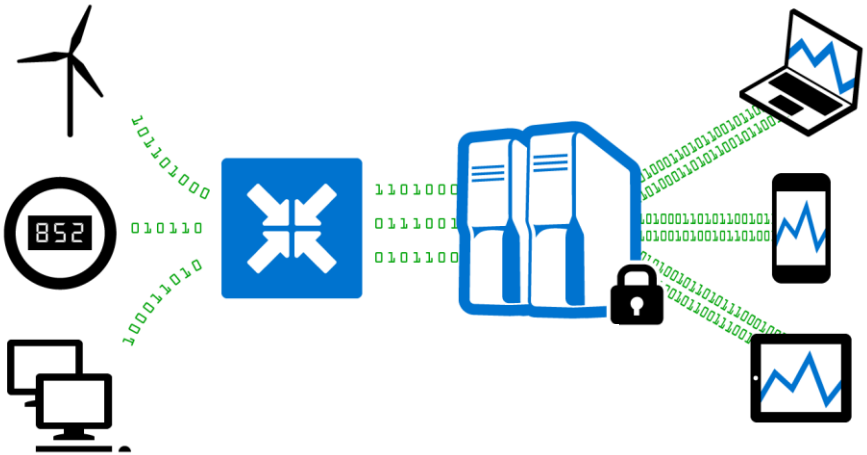
Rank order the following

- Telephone (voice)
- Water
- Gas
- Electricity
- Internet (Broadband)
- Transportation

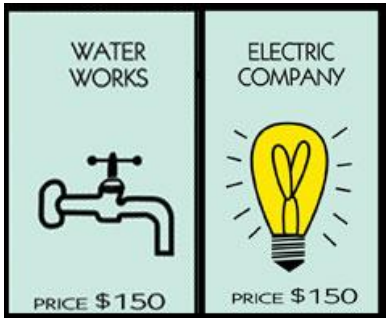


Was Internet last?

1. Water
2. Electricity
3. Internet (Broadband)
4. Transportation
5. Gas
6. Telephone (voice)



Data as a Utility



In 2012 it is a general expectation that data about almost anything will be available without a lot of friction

Characteristics of an Infrastructure

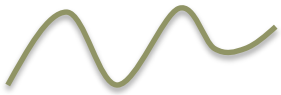
Challenge 1

Information necessary to solve problem is located in many systems which are not compatible with one another.

Challenge: Heterogeneous Data Landscape

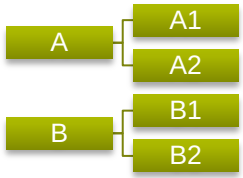
Data Types

Time Series



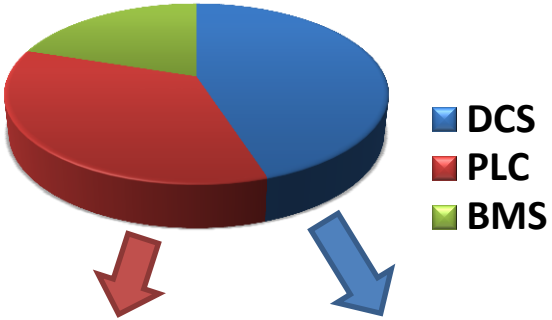
Relational

Hierarchical

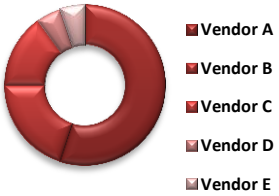


Unstructured

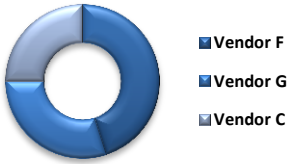
Process Control Systems



PLC Vendors



DCS Vendors

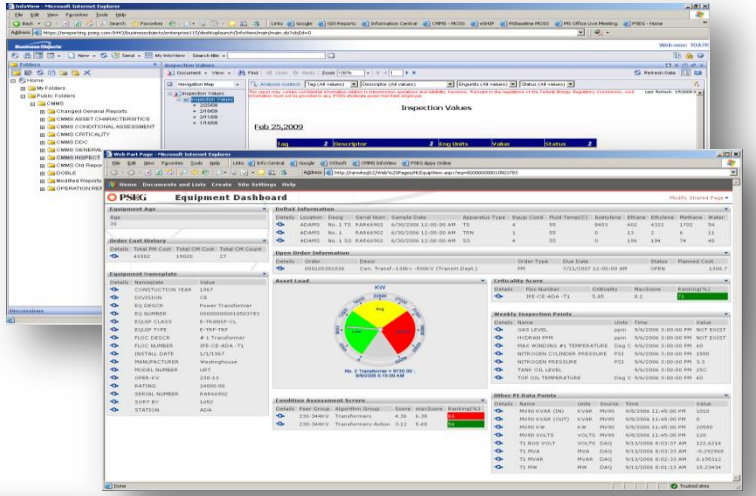


Geography

PSE&G: Condition Based Maintenance

"We get a detailed breakdown on equipment costs and man/hours to service that gives us important business benefits. Without the use of the PI System, it would have taken us several months to gather and analyze the information."

Angela Rothweiler Principal Engineer



PSEG

Customer Business Challenge

- Providing the highest reliability Power Distribution is requirement
- Minimize Maintenance Costs
- Combine financial with operational data

Solution

- Implemented automatic data collection and notifications to SAP PM
- Set up standard business rules for condition based maintenance using the PI System Analytics
- Provided focused view into equipment

Customer Results / Benefits

- Holds Reliability award for Mid Atlantic States for last 7 years
- Named most reliable Power Company in America
- Focused maintenance expenditures on needed targets

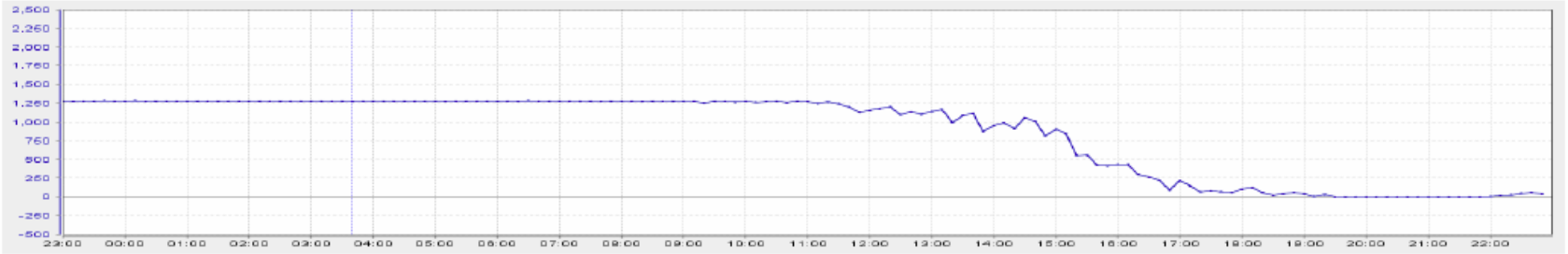
Challenge 2

Solving problems without a data infrastructure often means having to compromise on several fronts – fidelity of data, sampling rate, behaviors, scaling, stability etc.

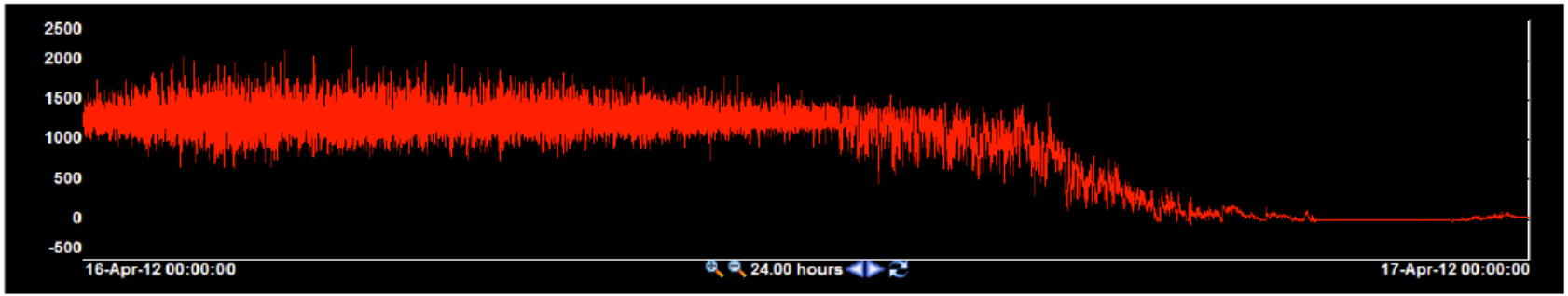
What could you be missing?

Active Power - 10 minute vs 1 second sampling

SCADA



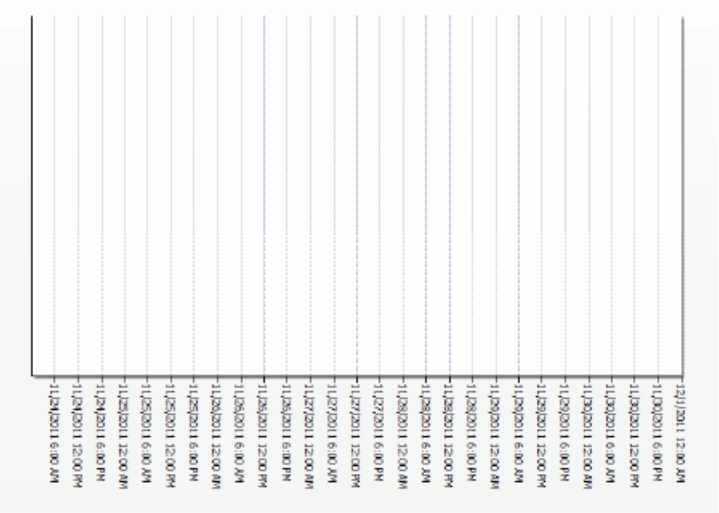
PI



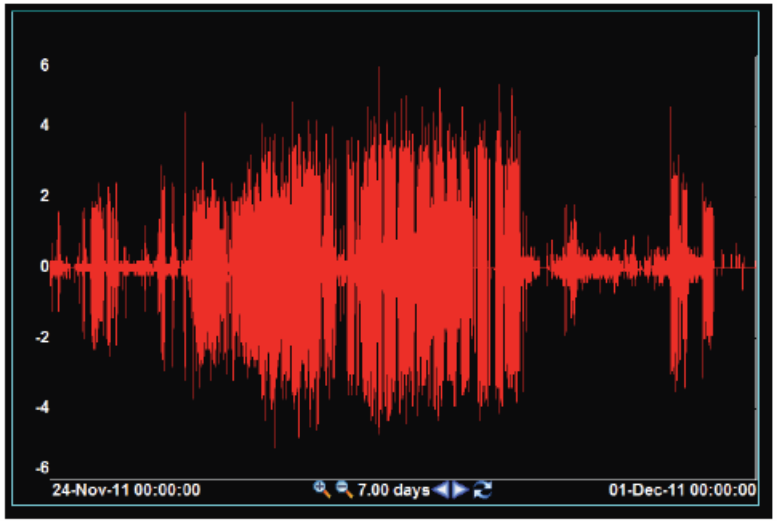
Even better …

10 minute drive train vibration data vs. 1 second data…

SCADA:



PI System:



Suzlon: Direct to Controller Integration Using OPC

SUZLON
POWERING A GREENER TOMORROW

"Having all analog values, digital states, fault states, user info, controller KPIs, and parameter settings adds a significant amount of value to a PI System."

Chris Wozniak – Senior SCADA Engineer, Suzlon

Customer Business Challenge

- Park visibility was limited.
- System of processing event and statistical logs was difficult to work with disconnected systems for reporting limited to only 10 minute average data and pre-canned reports
- Faults and warnings required manually created notifications

Solution

- Implemented a PI System to store and report using high fidelity data
- Created custom dashboards and reports and shared them enterprise wide using SharePoint and PI Clients
- Create automatic fault notifications with custom content

Customer Results / Benefits

- Reduced manpower needed to resolve alerts freeing them up for higher value functions
- Ability to visualize and respond to new types of events and alerts
- Switched to Proactive modes using KPIs and ACE calculation vs only reactive modes

Challenge 3

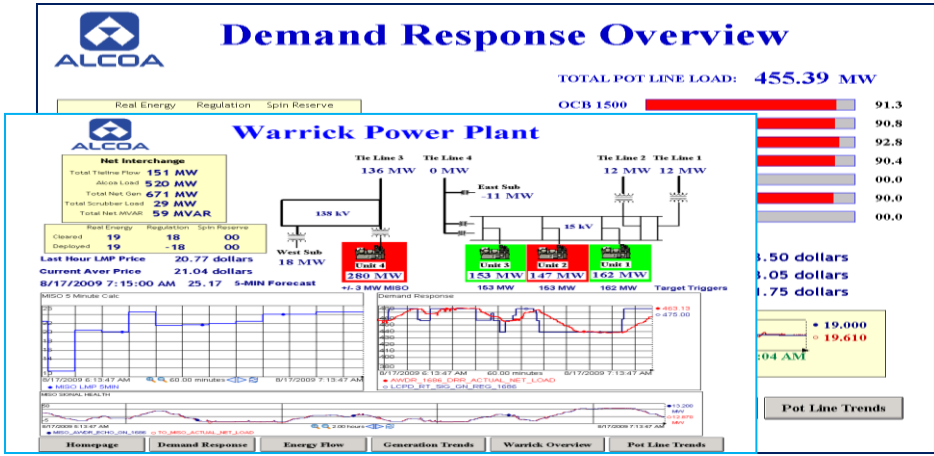
Business evolves over time. Change arrives in the form of expansion, acquisition, people, leadership, market, and passing knowledge from one generation to the next.

POWER & UTILITIES

Alcoa: Industrial Scale Demand Response

Warrick is Alcoa's Largest Operating US Aluminum Smelter

- 330,000 MT capacity/year
- Energy is 30-40% of Aluminum Production Costs
- Generate power for Smelter & Rigid Packaging



Brian Helms
Power Markets Coordinator
Alcoa Power Generation

ALCOA

Customer Business Challenge

- Worldwide commodities price competition
- Older (1960s) facility
- Business took a major hit due to economic downturn
- Needed to find a way to sustain the business & keep from going under

Solution

- Use PI for energy regulation – Sell generated electricity back into Midwest ISO (MISO)
- Monitor MISO for energy demand notifications, and respond accordingly
- Submit forecasted load data from PI
- Focused on selling regulation (20MW) and spinning reserve (40MW)

Customer Results / Benefits

- Total project cost was $700,000
- Project payback was in 4 months
- System runs efficiently
- Gets a weekly check from MISO for the power they generate in the grid
- Use this money to sustain their Aluminum business
- Revenue now above competition

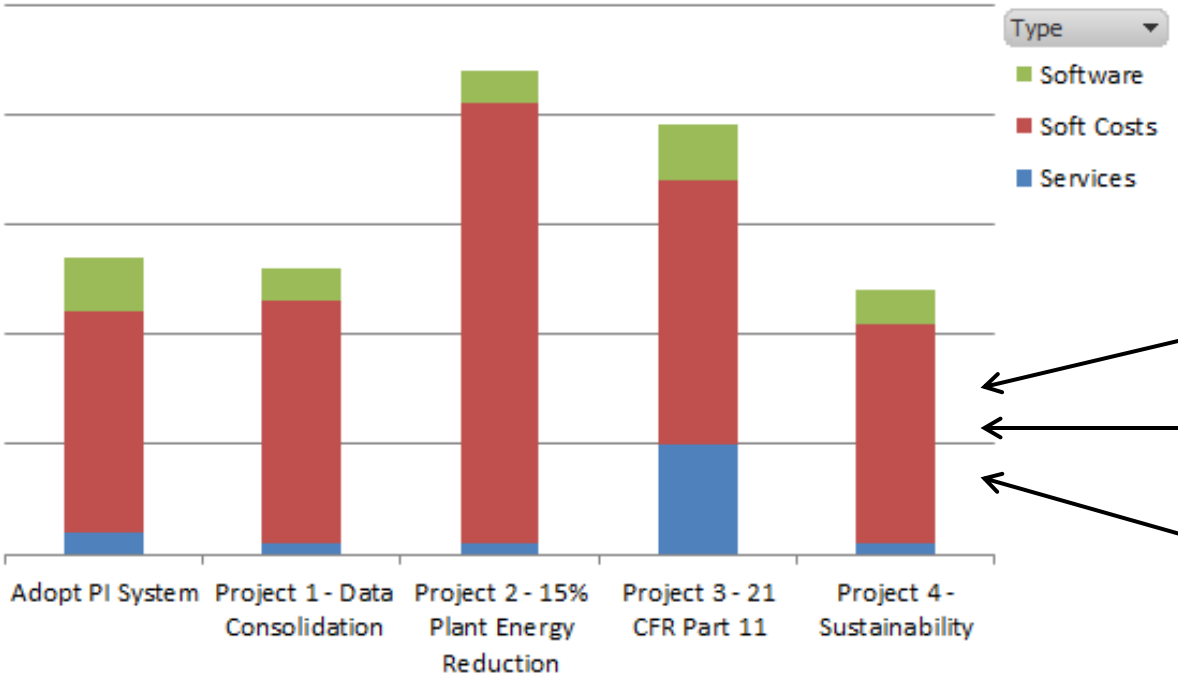
Challenge 4

Procurement costs and change costs for software are expensive -- money and time -- and the probability of success decreases with each additional system. N+1.

"Small agile beats big slow--big agile beats everything."

Information Week 2011, Top 10 CIO Priorities http://www.informationweek.com/global-cio/interviews/top-10-cio-priorities/

Beware of Soft (not Software) Costs



x 4

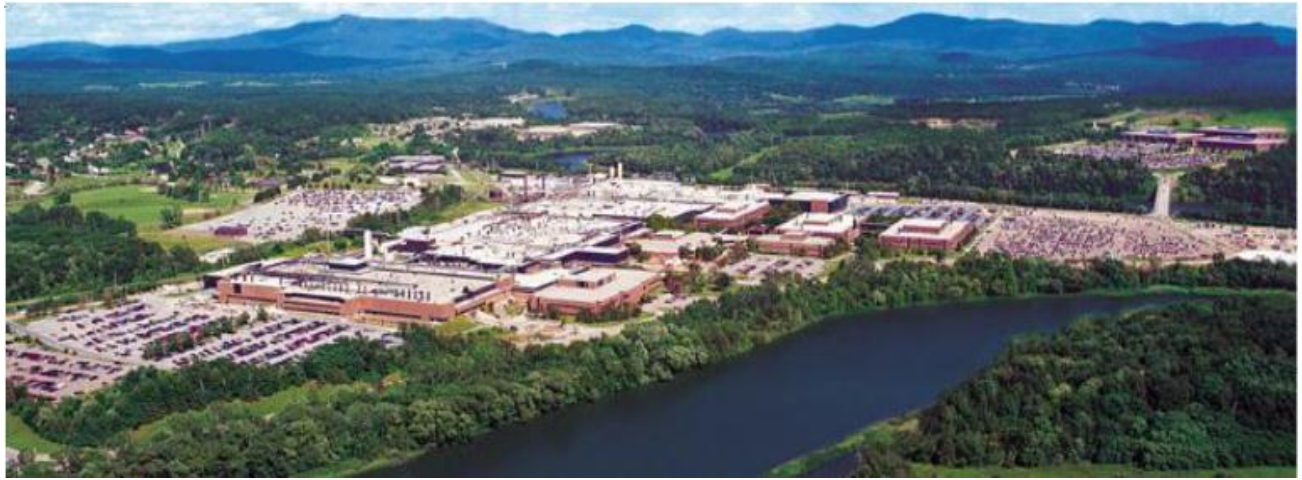
Employee Education

Procurement

Process Changes

IBM Vermont “A Smart Enterprise”

Water Use
- Fed from regional High Service Mains
- 3.2 MGD (similar to the City of Burlington)
- 2 MGD Ultra Pure Water
- 3 MGD Waste water treatment



Electrical Use
- Transmission Line Fed
- Own and operate Electrical Grid (similar to a Utility)
- Peak 65 Mega Watts (larger than Burlington)
- 60 miles high voltage lines
- 136 substations

SMART Attributes
- 60,000 field pts
- 700 PLCs
- 75 Work stations
- 5 servers
- Advance data analysis
- Load management
- Cost Control
- Quality

IBM (200 nm Water Fabricator Burlington, Vermont)
Advanced Water Management

"IBM has achieve over $3.6MM in annual savings, reduced water usage by 27% while increasing manufacturing capability over 30%

Customer Business Challenge	Solution	Customer Results / Benefits
• Reduce water consumption (and associated need for energy, chemicals, maintenance, and labor to reduce operating cost and minimize environmental impacts • Monitor water usage and improve efficiency	• Implement Data Collection and Storage infrastructure (sensors, servers, and PI) • Apply statistical process control techniques to operational data • Change behavior via 6 sigma methodology and KPI dashboards	• Identified process improvements to reduce electrical and water usage. • Increased production capacity and reduced overall costs.

Challenge 5

Preserving and enhancing knowledge is key to success. Infrastructure is forever, people and spot solutions are not.

More Data Challenges

Harder to Search & Find Information

Speaking Different Languages

External Data Sources

Homosapien Spreadsheet Data Integration

Multiple Versions of the Truth

Nalco's Value Proposal

"This solution allows us to offer our customers high-quality performance data, and allows them and our service engineers to optimize treatment programs for maximum cost/performance and sustainability credits, as well as benchmark their operations ."

- Visibility Across Customer Chain
- Software + Services
- Enabling People to Provide Value-Add

The Result: Dynamic Access to Real-Time Data

- Integration of Nalco and Customer data to provide the whole picture
- Condition-based maintenance and performance optimization
- Role-based visibility into plant operations and performance
- Summary and KPI information to customers and Nalco management
- Client-based tools to provide plant engineers with additional customized information analysis

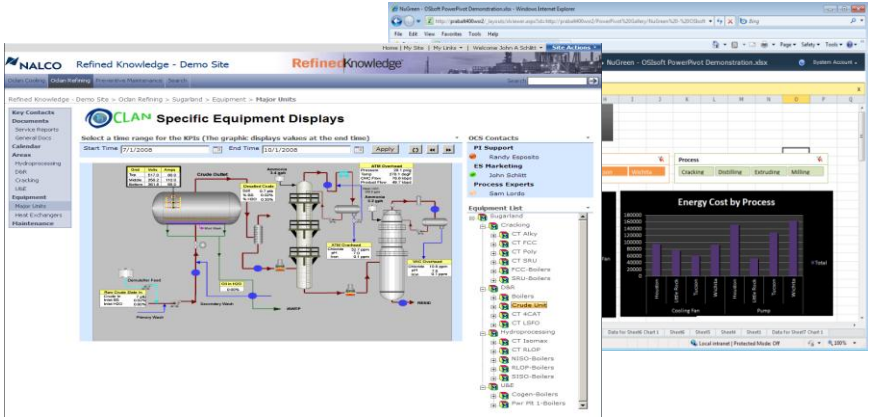
Put the results in customers hands to bring greater value to the service Nalco provides

The Nalco Refined Knowledge offering combines the best of the three industry leaders:

- OSIsoft's Operational Infrastructure
- SharePoint and PI System
- Nalco as the Solutions Provider

John Schlitt - Business Manager

Automation COE, Nalco



Customer Business Challenge

- Process data held in various "islands of information"
- Performance data was collected manually
- Personal Service Reports (PSRs) were time-consuming
- The goal: centralize data collection to bring greater value to the service Nalco provides

Solution

Used OSIsoft's Operational Infrastructure

- Central Data Collection
- Tech View & Analysis
- Calculation Engine
- Value Generation Tool
- PI Notifications & OCS = real-time alerting

Customer Results / Benefits

- Centralized data collection
- Condition based maintenance and performance optimization
- Role-based visibility into plant operations and performance
- On-demand Summary and KPI info to customers and Nalco
- Actionable data now at customer's fingertips

Challenge 6

Regulatory evolution and sustainability initiatives are driving the need for data for reporting and accountability.

What has changed

- Clean Air Act
- FERC
- NERC CIP
- Sarbanes Oxley
- 21CFR Part 11
- OSHA Cal/OSHA

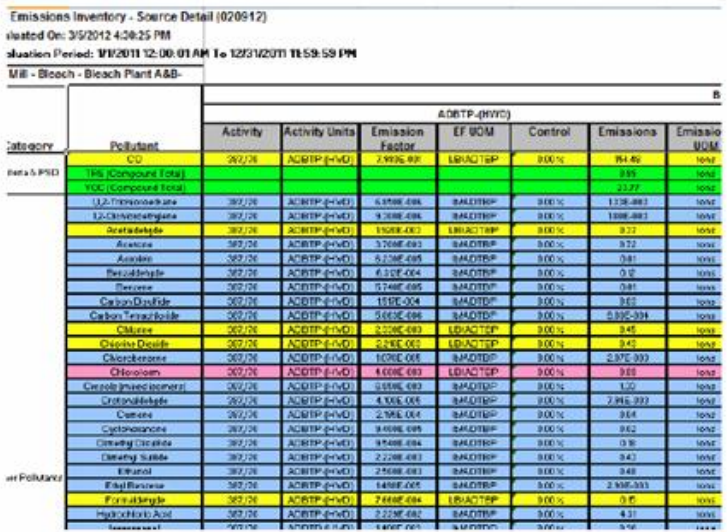
PULP & PAPER

International Paper

Environmental Monitor: Automation Journey

"The CEMR system allowed us 30 days to analyze data before (Information Collection Request) deadline."

INTERNATIONAL PAPER



Customer Business Challenge	Solution	Customer Results / Benefits
• Consolidate environmental reporting using live process measurements	• Built solution around the PI System installed in the 1990's	• Achieved cross report consistency • Gained ability to respond to "Impossible" data requests • Enabled sustainability goals by providing a common data source

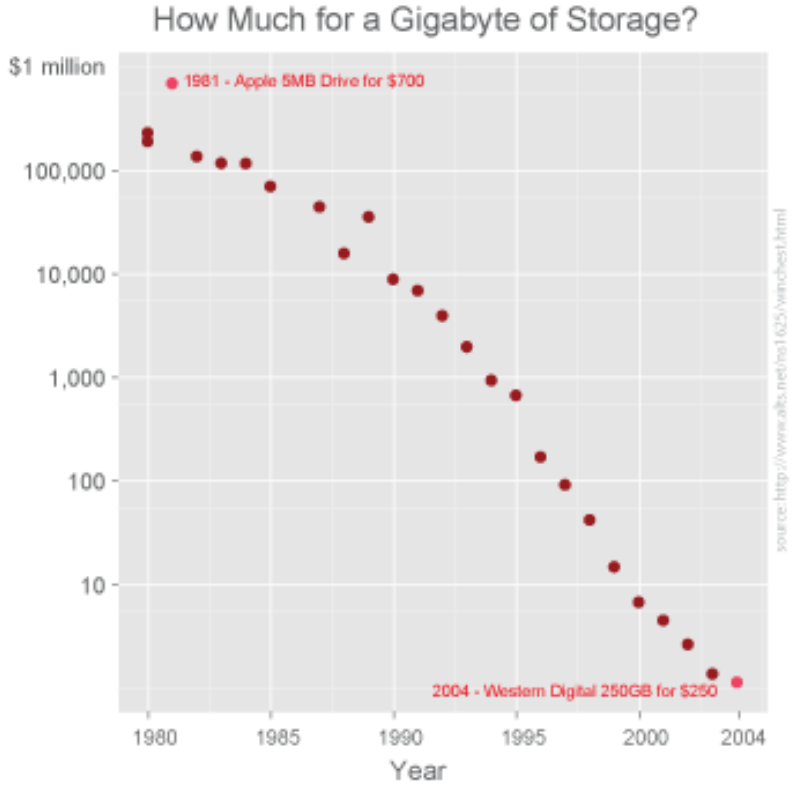
Why Infrastructure is Better?

(and by extension PI System)

Going beyond data collection

- Cost of storing data is quickly approaching the cost of the electricity to keep it online.

- It's more than just collecting it. How it is found, accessed, and consumed matters



Neutral Vendor

- One of only two pure-play vendors left. (Industry consolidation, not selling)

- Unique capabilities
  - Asset centric capabilities
  - Event Management
  - Industry leader in data security
  - Highest performing and best scaling total solution

Solutions vs Infrastructure

- Cost curves (Capital vs Operational)
- Support Lifecycles
- Where does the knowledge end up
- Probability of Success
- Evolution of requirements over time
- Project N+1 costs less
  - Faster delivery of value
  - Start when people are ready (Yay RFPs)

For the skeptics

- World class technical support
- CoE
- Partner Solution Showcase
- vCampus
- Professional ecosystem

PI System Roadmap – Evolving the PI System

Presented by **Michael Moore, Center of Excellence Engineer**

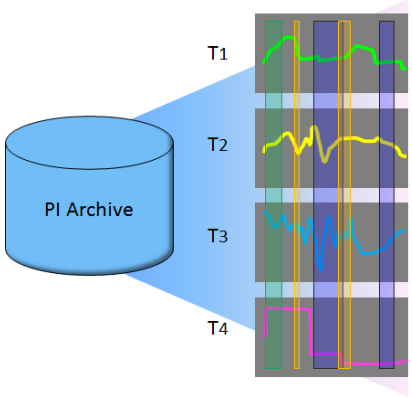
Agenda and Expectations

- This talk assumes:
  - You know the PI System basics
  - You have heard about the PI System 2012 wave of products
  - You want to hear about what is coming to the PI System in the 6-18 month horizon
- Very few specific dates
- All information is subject to change
- We want your feedback and suggestions!

PI System Themes - Future

Asset-Centric PI

Manage data via Asset context – Reuse many times



Event Frames

Identify and use important events and related data

Mobile

Many Devices
Touch Centric
Role Focused

Cloud

More Data
Access Anywhere
Trans-Enterprise

Asset Centric PI - Scorecard

In Progress, On Road to Completion

					PI Coresight Asset Relative
				AF SDK Rich Data	PI DataLink
Smart Interfaces	PI AF Sync	Indexed Search	Programmed Analytics	PI OLEDB Enterprise	PI Coresight
AMI Interfaces	MDB Sync Support	PI OLEDB Enterprise	Configured Analytics	PI Web Services	PI WebParts
Batch Interfaces	PI AF Server	Simple Searches	On-Demand Analytics	AF SDK	PI ProcessBook
COLLECT	HISTORIZE	FIND	ANALYZE	DELIVER	VISUALIZE

Project Abacus

Configured and Programmed Calculations for PI AF

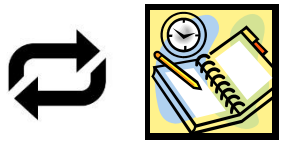
Project Abacus Use Case

Extruding Process

Boiler Efficiency = AVG(B1..Bn)

Boiler1

- Flow Out
- Fuel Flow Rate
- Efficiency = (Flow Out / Fuel Flow Rate * 3.14)



Boiler Template

Or myProgrammedCalc (Flow Out, Fuel Flow Rate)

Boiler2

- Flow Out
- Fuel Flow Rate
- Efficiency

Boiler3

- Flow Out
- Fuel Flow Rate
- Efficiency

Event Generation in Abacus

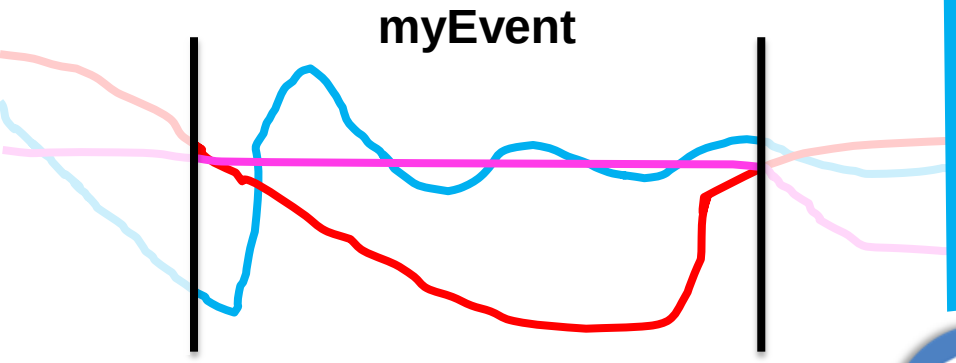
|Efficiency
|Fuel Flow Rate
|Flow Out

myEF
|Efficiency

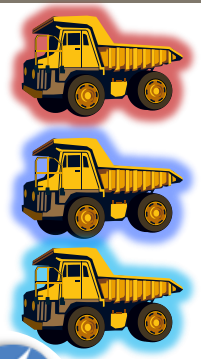
Efficiency = (**Flow Out** / **Fuel Flow Rate** * 3.14)

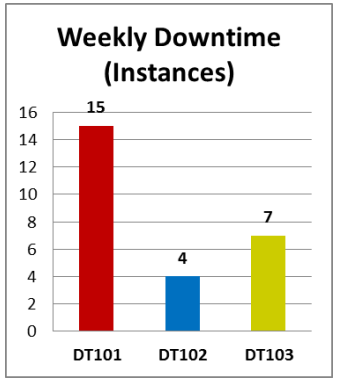
myEF.Start = (**Efficiency** > LIMIT)
myEF.End = (**Efficiency** < LIMIT) AND (**Fuel Flow Rate** > 80)

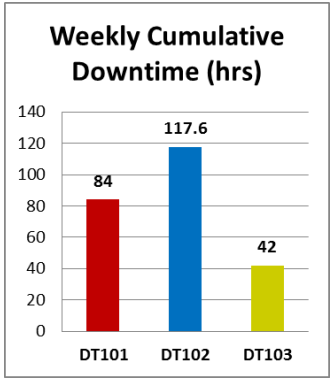
Simplify Data Analysis



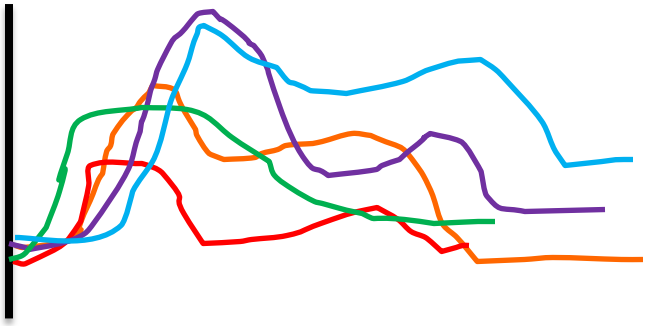
Perform Asset Comparisons







Event Overlay Trend (Temp)

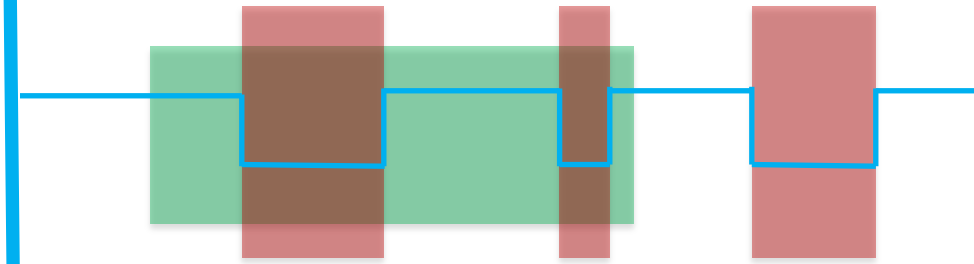


Name	Temp.Max
EF1	122.47
EF2	109.34
EF3	112.73
EF4	98.61
EF5	125.24

Downtime Events for Product XYZ

Product XYZ (1)

Downtime (2)



Perform Event Comparisons

Discover Event Interrelationships

EVENT FILTERS

Duration

Longer Than — Shorter Than

0 m — 200 m

Category

All | None

- ✓ Excursions (4)
- ✓ Downtime (3)
- ✓ Product XYZ (1)

Template

All | None

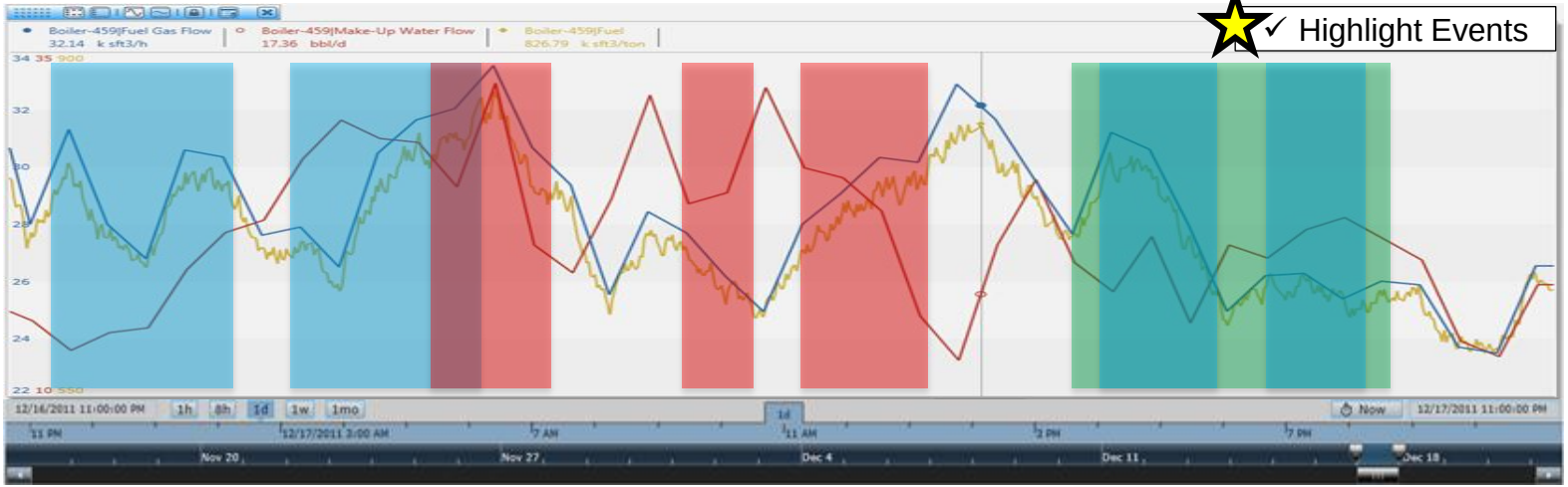
- ✓ Boiler Downtime (3)
- ✓ Boiler KPI Excursion (4)
- ✓ PIUnitBatch (1)

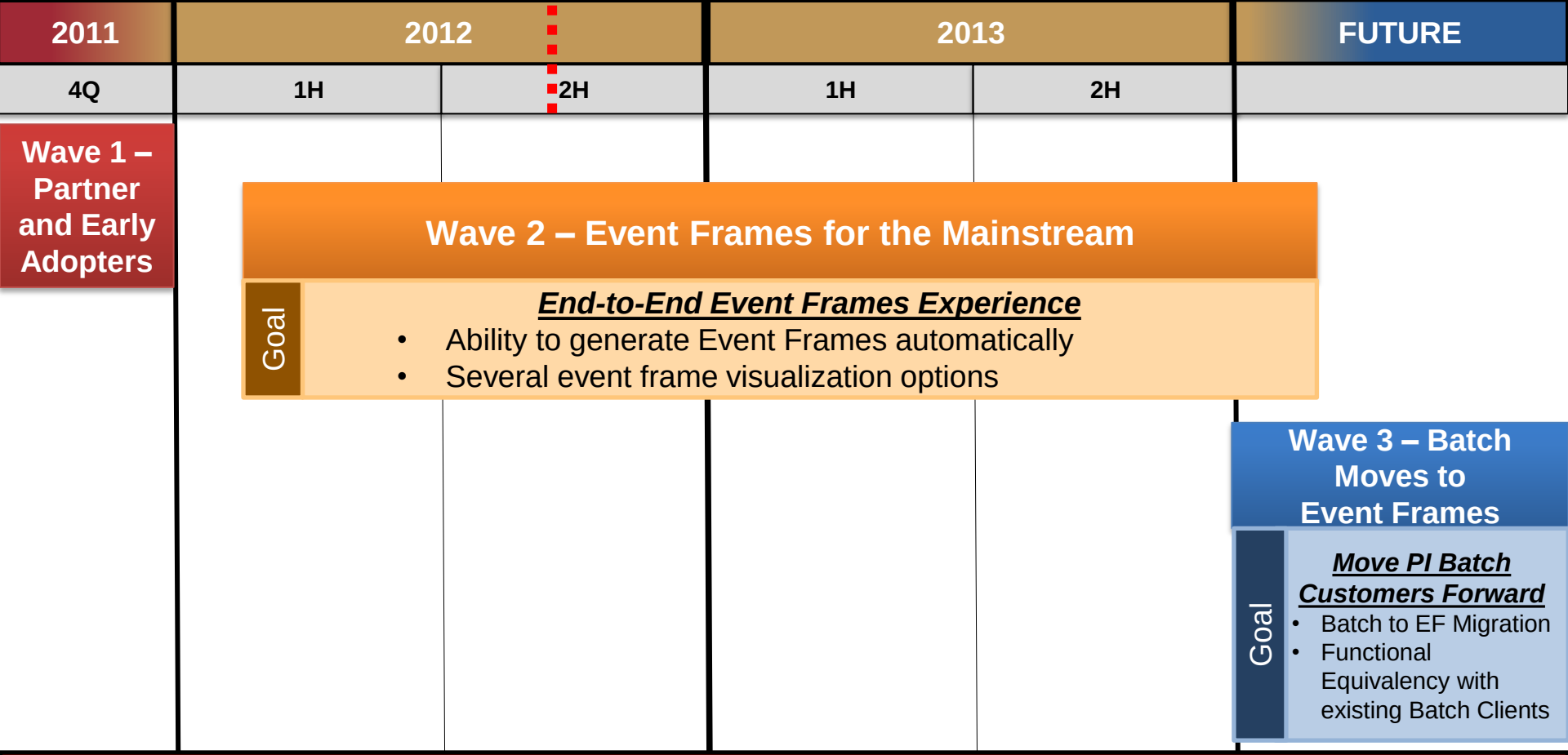
Temp.Max

Greater Than — Less Than

0 C — 100 C

Name	Start	End	Duration	Element	Category	Template	Reason Code	Temp.Max
Ex01	16-Dec-2011 23:05:48	17-Dec-2011 00:25:24	01:19:36	B-459	Excursions	Boiler KPI Excursion	High Temp	91.2
Ex02	17-Dec-2011 02:37:19	17-Dec-2011 04:12:07	01:34:48	B-459	Excursions	Boiler KPI Excursion	Low Pressure	54.1
DT45	17-Dec-2011 04:31:22	17-Dec-2011 05:20:34	00:49:12	B-459	Downtime	Boiler Downtime	Broken Thermo	32.4
DT46	17-Dec-2011 07:56:58	17-Dec-2011 08:19:46	00:22:48	B-459	Downtime	Boiler Downtime	Broken Thermo	31.7
DT47	17-Dec-2011 09:41:22	17-Dec-2011 10:52:58	01:11:36	B-459	Downtime	Boiler Downtime	Safety Shutdown	87.2
XYZ146	17-Dec-2011 13:12:34	17-Dec-2011 16:29:22	03:16:48	B-459	Product XYZ	PIUnitBatch	n/a	48.9
Ex03	17-Dec-2011 19:28:58	17-Dec-2011 20:41:22	01:12:24	B-459	Excursions	Boiler KPI Excursion	High Temp	95.3
Ex04	17-Dec-2011 21:44:58	17-Dec-2011 22:45:46	01:00:48	B-459	Excursions	Boiler KPI Excursion	Low Temp	20.4

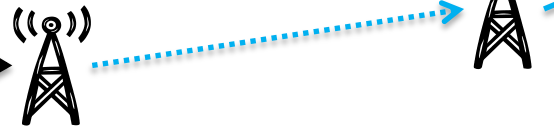




NOTE: Future dates are subject to change. *Last Updated: 04-2012*

Smart Interfaces

PI Interface



PI System

Tags

Assets

Data

Events

Automatically
discover your data,
send it to your PI System, and
keep it in sync.

PI Interface

Events

Events

AF to AF Scenarios

- Implement corporate standards
- Ensure commonality across enterprise
- Configuration changes, updates
- Event Frames and data to support analysis and KPIs

Templates

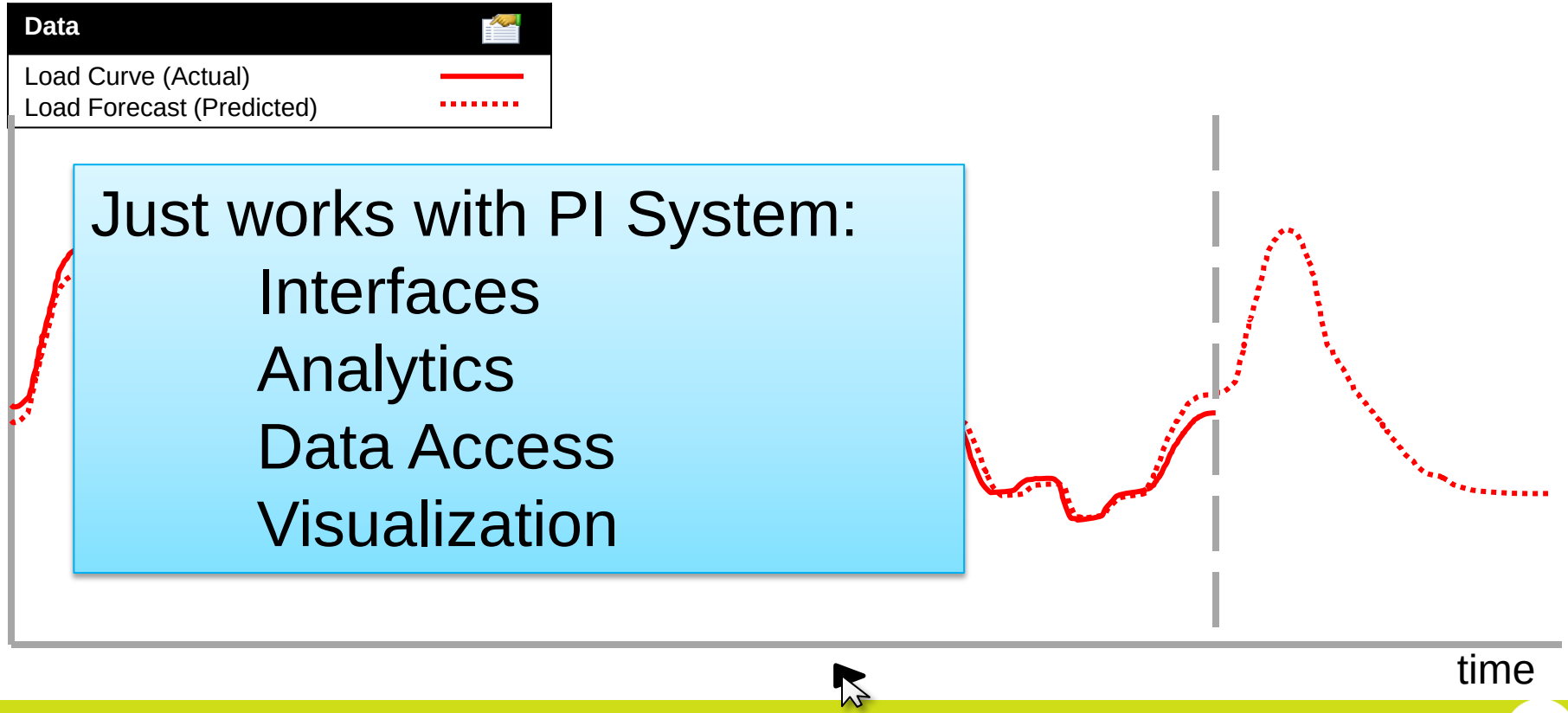
More to search than ever…

Visualization	• Displays, captions, text • PI Points, AF Elements & Attributes
Data Access	• Frequently accessed Data Streams • Related Data Streams • Workstation data sources
Analysis	• Performance Equations / Totalizers / Alarms • ACE Calculations / Notifications / Event Frames
Directory	• AF Element Attributes / AF Elements • AF Element Templates
Server	• Data Streams, PI Properties, By Value (> 75)
Interfaces	• Data sources • Non-PI data

Find - PI System Search

- Optimized Search Engine for the whole PI System
- Indexed for scale and high performance
- Can crawl many PI Servers*
- Ranked and Related Results
- Includes client artifacts:
  - PI ProcessBook Displays, PI Coresight Displays
- Shared User Experience

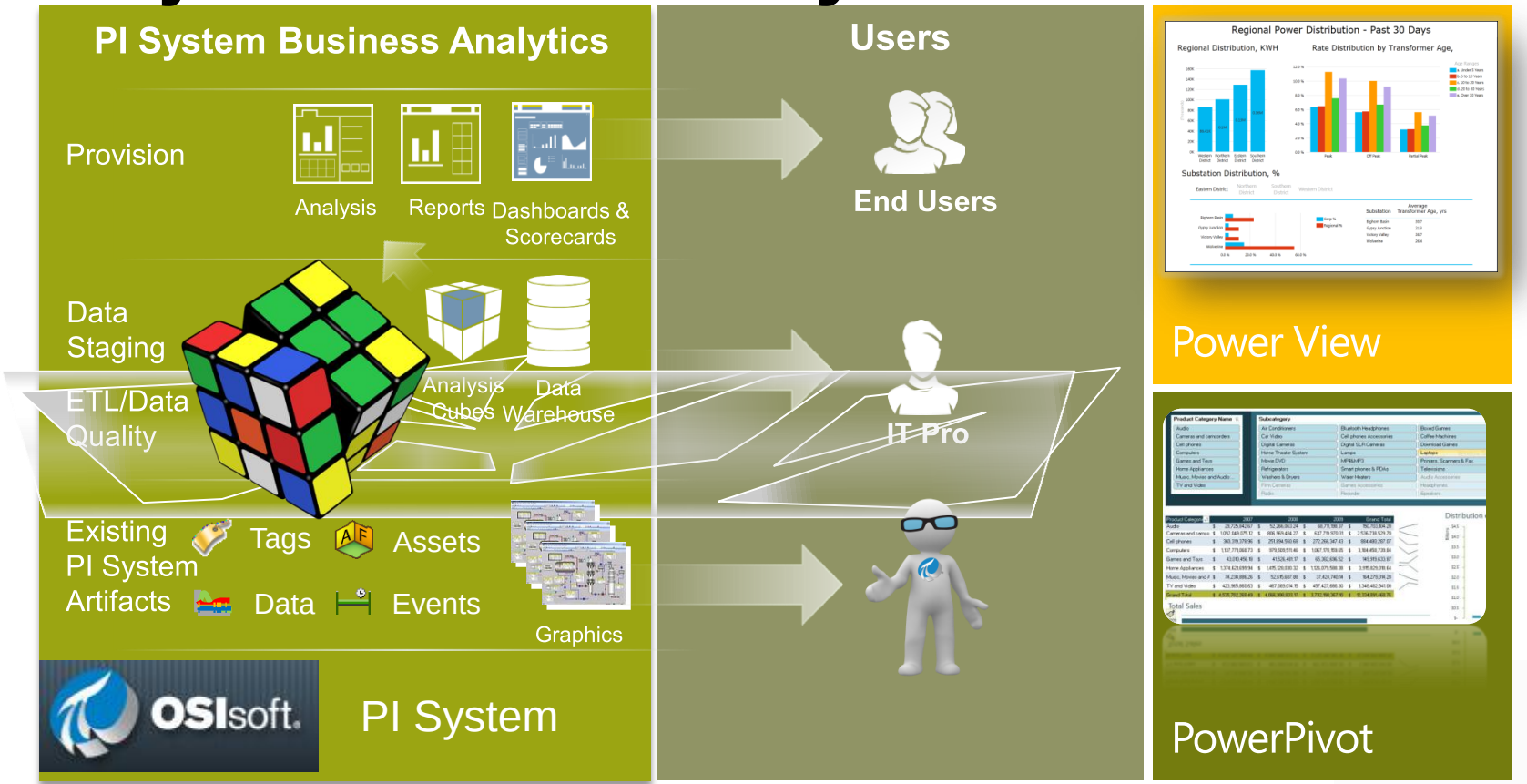
Future Data Coming – Next PI Server



PI Data Access, longer-term

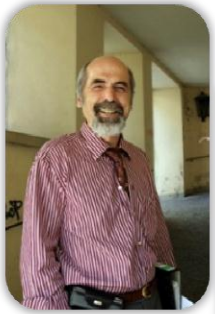
PI System SDK	A single high performance SDK that allows you to access all PI System data
RESTful Web Services	Emerging web service standard, ideally suited for mobile and cloud
Integration Services	Makes business system integration easy, not just possible (ERP, BI)

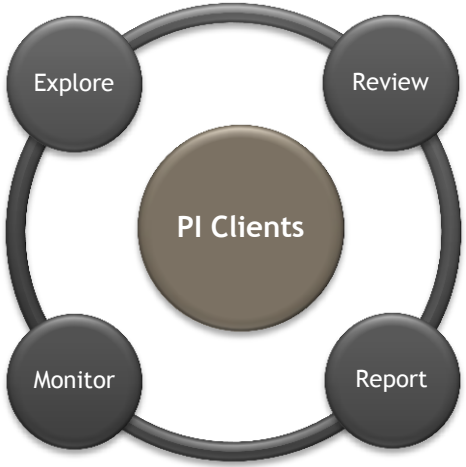
Project Rubik – Why?



Visualization Landscape

PI Coresight:
Ad Hoc Analysis & Collaboration

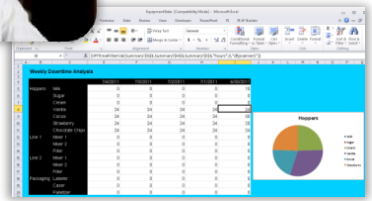




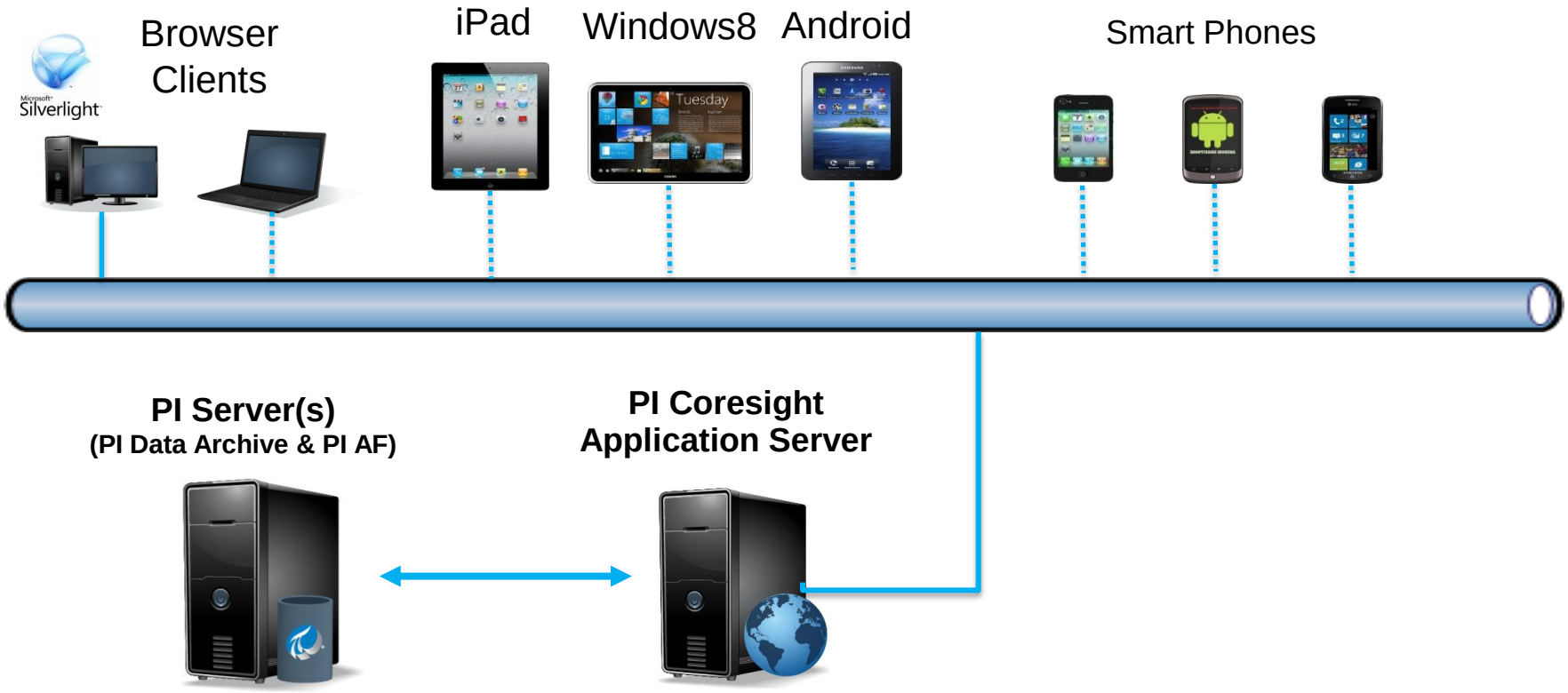
PI WebParts: Composite Apps, Shared broadly

PI ProcessBook:
Display authoring and Process monitoring

PI DataLink:
Reporting and table based analytics in Microsoft Excel



PI Coresight with Mobile Clients



PI Coresight Tablet Edition – Target Audience

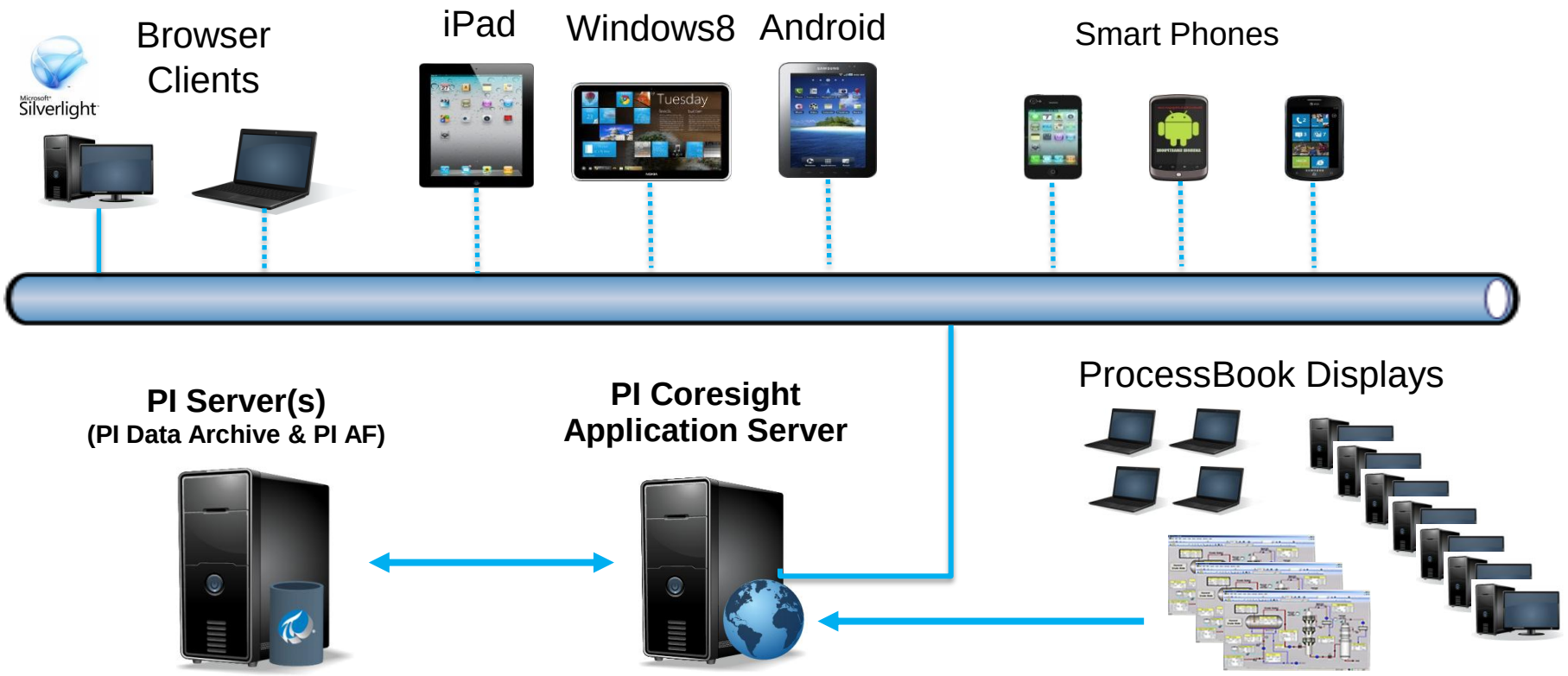
- Plant / Operations Management
  - Most likely to have iPad or similar device
  - Overview of how the plant/utility is running
  - Failures, Efficiency, KPIs, Actual vs Forecast
- Process Engineers / Corporate Planners
  - Identifying problems
  - Optimize processes – plant to plant
  - Create Content / Displays for management
- Maintenance
  - Manual Data Entry / Problem Recording
  - Troubleshooting – documents and real-time
  - Calibration




PI Coresight Phone Edition – Target Audience

- Check in with Plant from Home / Road
- Tell me if something is wrong!
- Focus on Notifications, Acknowledge, Dispatch, and Escalation
- Give me some basic data related to notification
- Outside of plant - 3G, 4G, or public WiFi
- Personalization

PI Coresight – ProcessBook Display Viewer



PI WebParts 2013

Support for SharePoint 2010 and SharePoint 2013
Become a better SharePoint corporate citizen
Become a more “IT” friendly product
Replace obsolete technology
Set the stage for OS and Browser independence, Mobile

Remote Data Services
WSP Installs
Can leverage Adobe SVG Viewer if needed
Support for IE 8 and Firefox
Support for IE9/10 with Master Page Edit

Remote Data Services
WSP Installs
Visualization using Web Standards
Support for IE9, IE10, Firefox, and Chrome
Mobile Device Support – Ios, Android, WP

Evolution of Operating Systems

Tru64™ UNIX®

IBM AIX

Windows Azure™

PI Cloud Initiatives

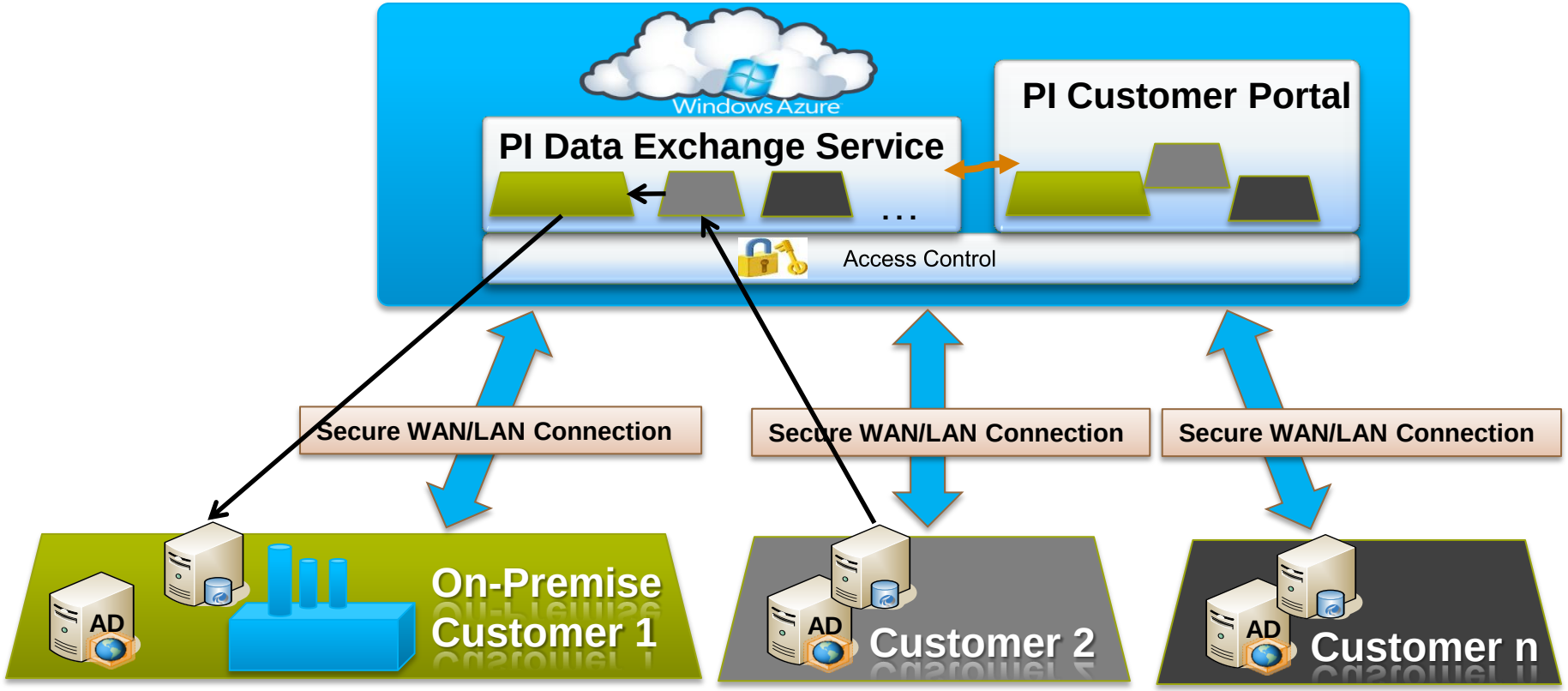
Add to existing PI Systems

- PI System Management
- PI Data Exchange
- PI Coresight Service
- Data, Visualization and other services for Partner and Custom Apps

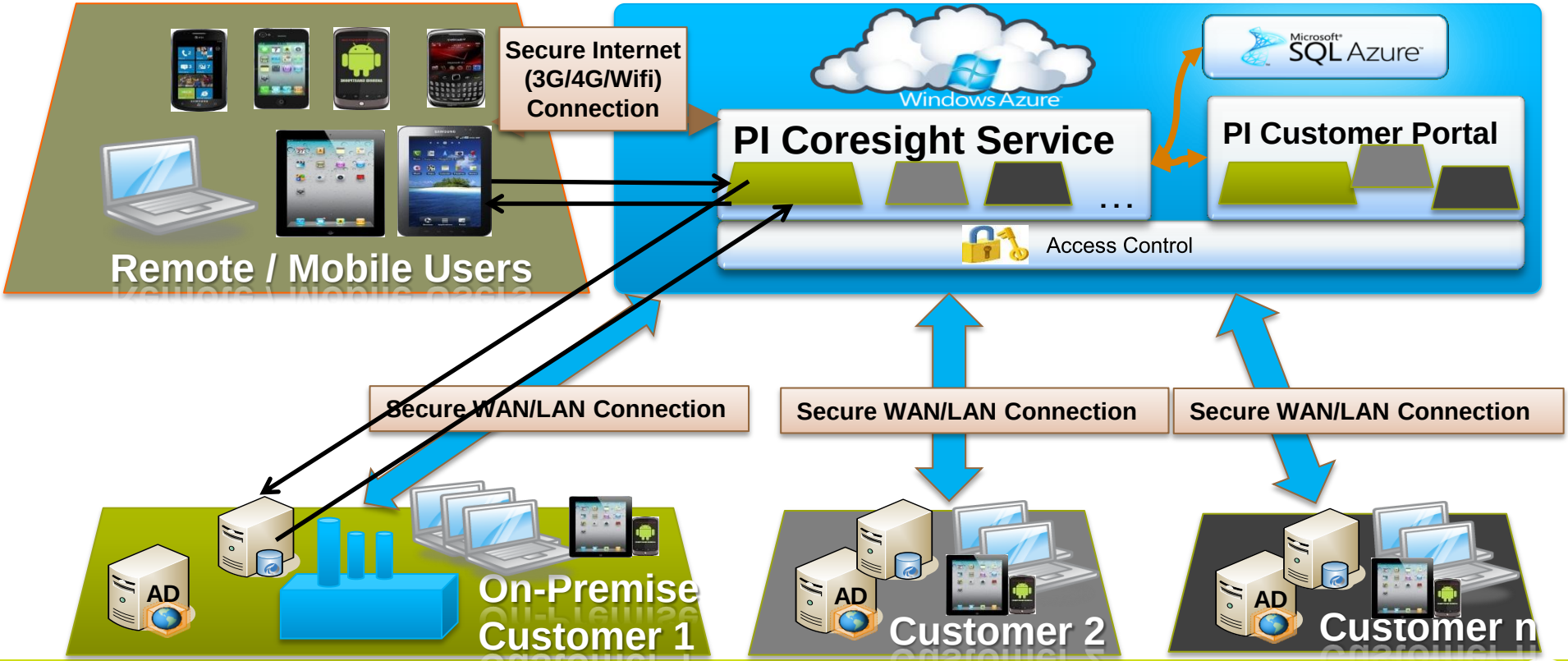
Full PI Deployment in the Cloud

- Simplified Deployment and Management
- Take advantage of Azure Platform (PaaS)
- Functionality you know in PI today plus much more
- Highly efficient and elastic

PI Data Exchange Service



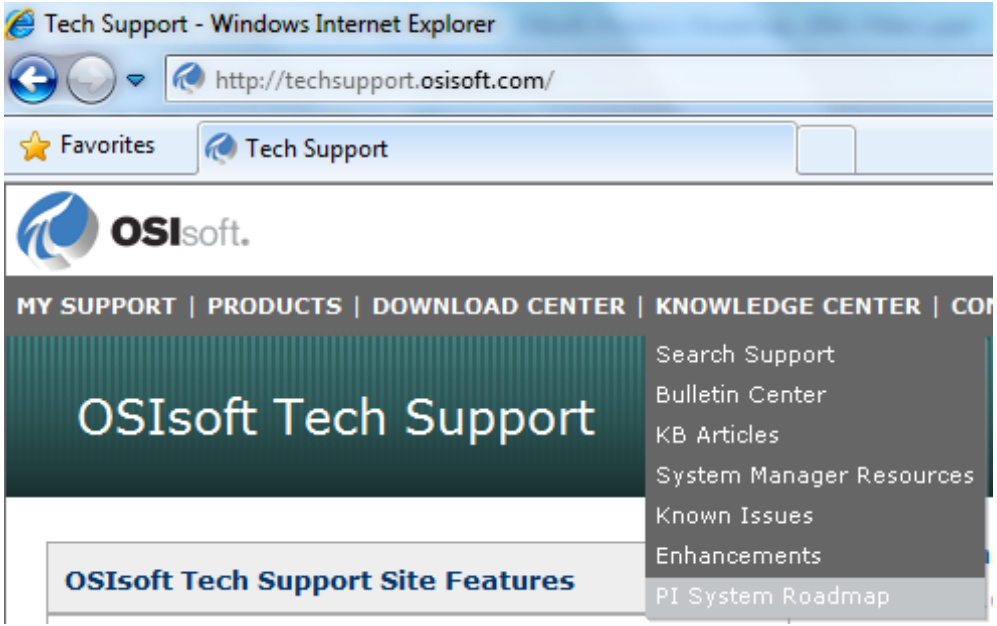
PI Coresight Service with Mobility



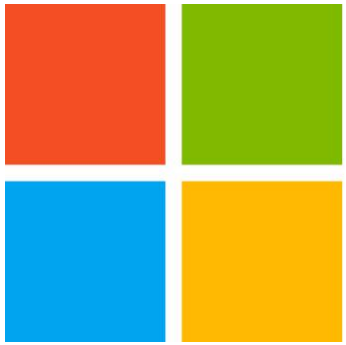
Stay Up-To-Date on the Web

- PI System Roadmap on OSIsoft Technical Support Site

http://techsupport.osisoft.com/techsupport/NonTemplates/roadmap.aspx



Diamond Sponsor



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OSIsoft, LLC

THANK YOU

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