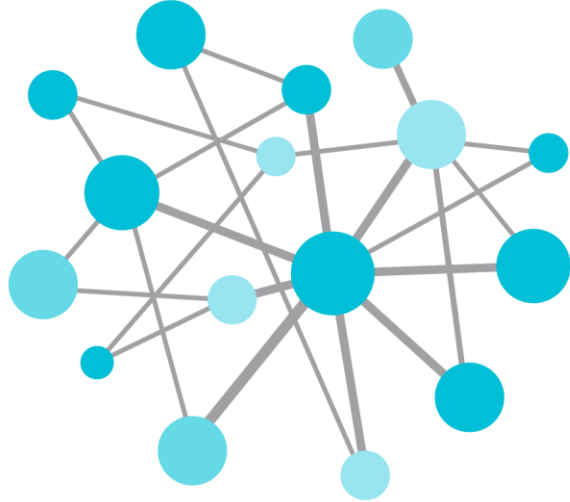


# Advance Your Investment in the PI Infrastructure – PI Server 2014

Presented by **Yves Gauthier, Senior Systems Engineer**  
**Stephen Kwan, Product Manager**



OSIsoft®

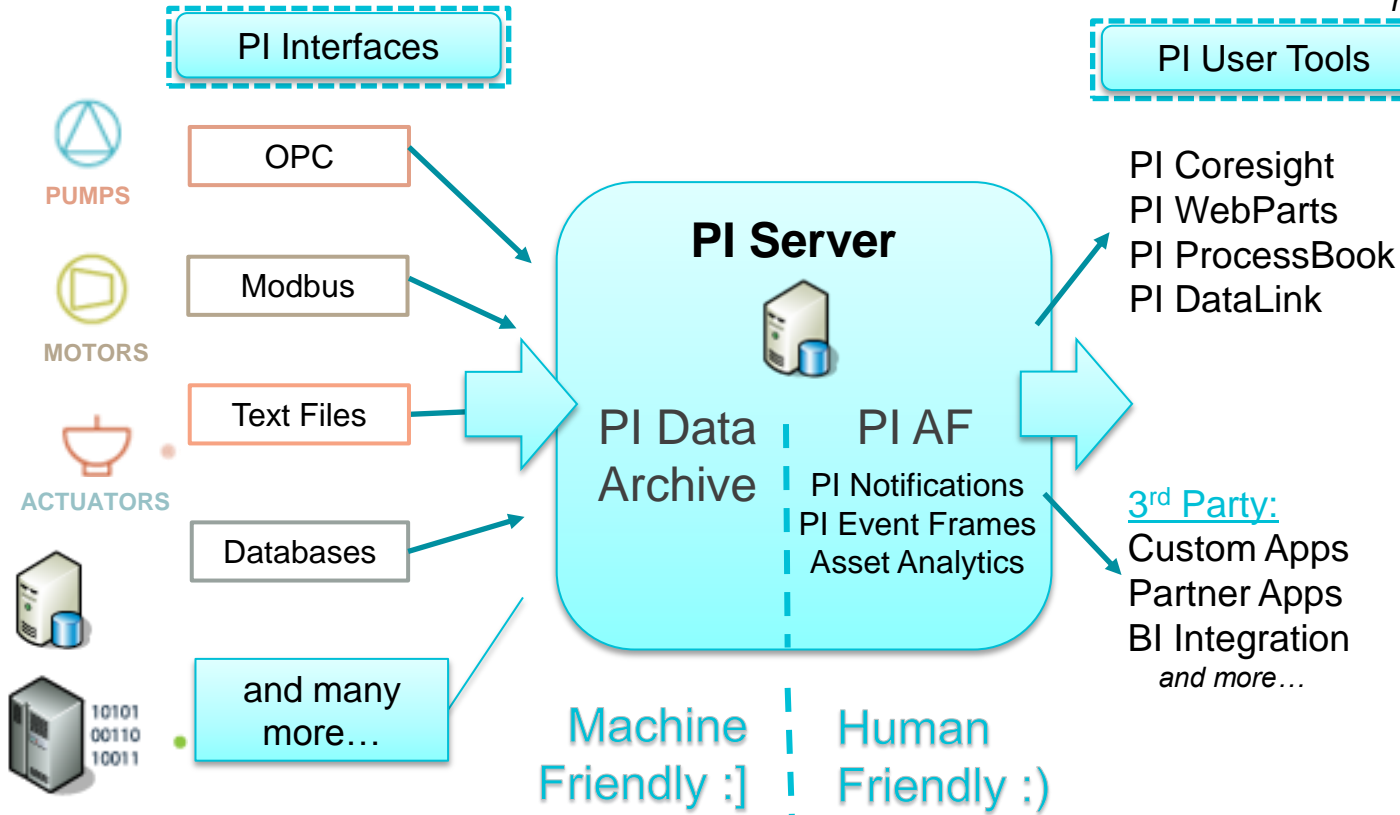
# USERS 2014 CONFERENCE

The **Power** of **Data**

**E M E A**

DECISION READY IN REAL-TIME

# What is part of our Infrastructure...



'The pump is down - what's happening?'

Real Time Troubleshooting

Keep the Process Healthy

Report on data quickly

Avoid breakdowns

# What's included in PI Server 2014

- **Time Series Data Storage**
  - PI Data Archive
- **Contextual, Organize and Find**
  - PI Asset Framework (PI AF)



- **Mark Important Events**
  - PI Event Frames
- **Notify Based on Conditions**
  - PI Notifications



- **Analytics and Event Generation**
  - Asset Based Analytics
  - PI Advanced Computing Engine (ACE)
  - PI Performance Equations
  - PI Totalizers



- **System Management**
  - PI System Management Tool
  - PI Interfaces for System Management



# PI Asset Framework (AF)

- **Infrastructure for the Infrastructure**
  - PI Event Frames
  - PI Notifications
  - PI Integrator for Esri ArcGIS
  - Asset Based Analytics



# Added Value

- **Organize by Asset**
- **Get More Value from Existing Data**

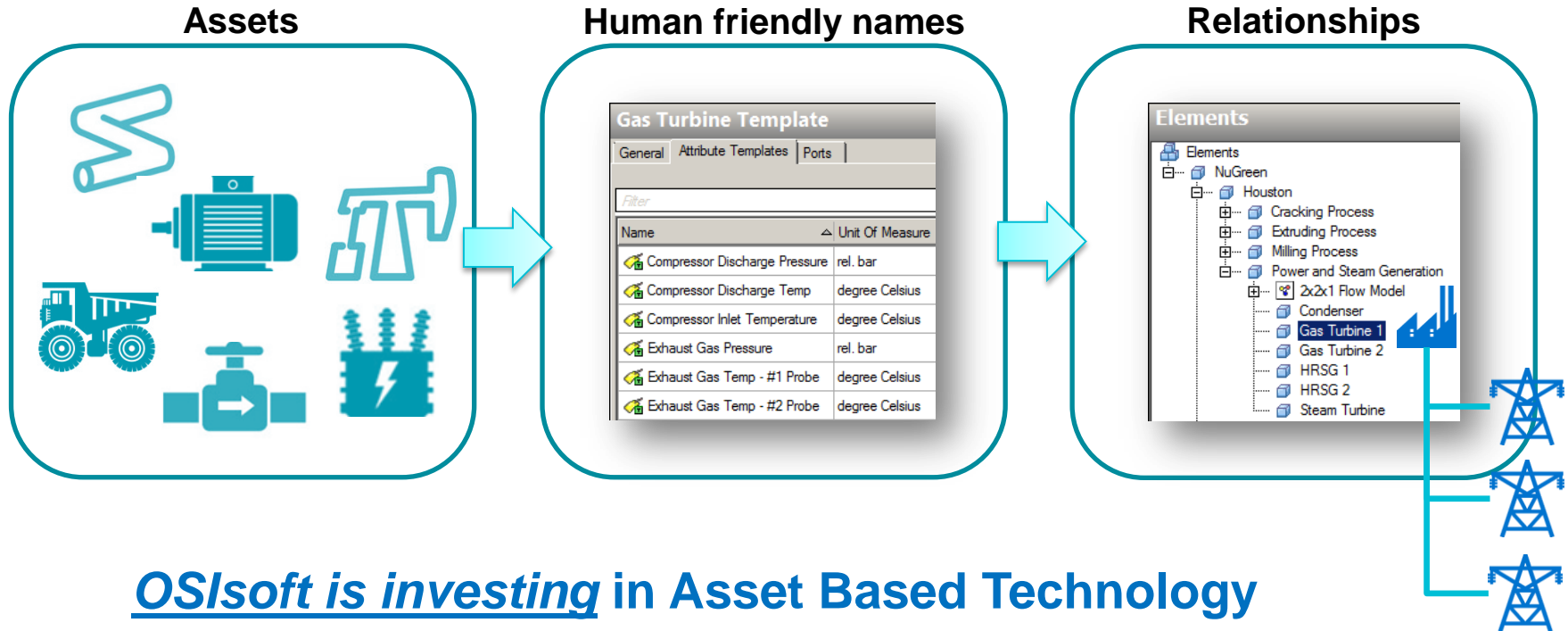
$$2 + 2 = 5$$

# Repeatability

- **Build Solution with Templates**
- **Apply Templates to Assets Over and Over**

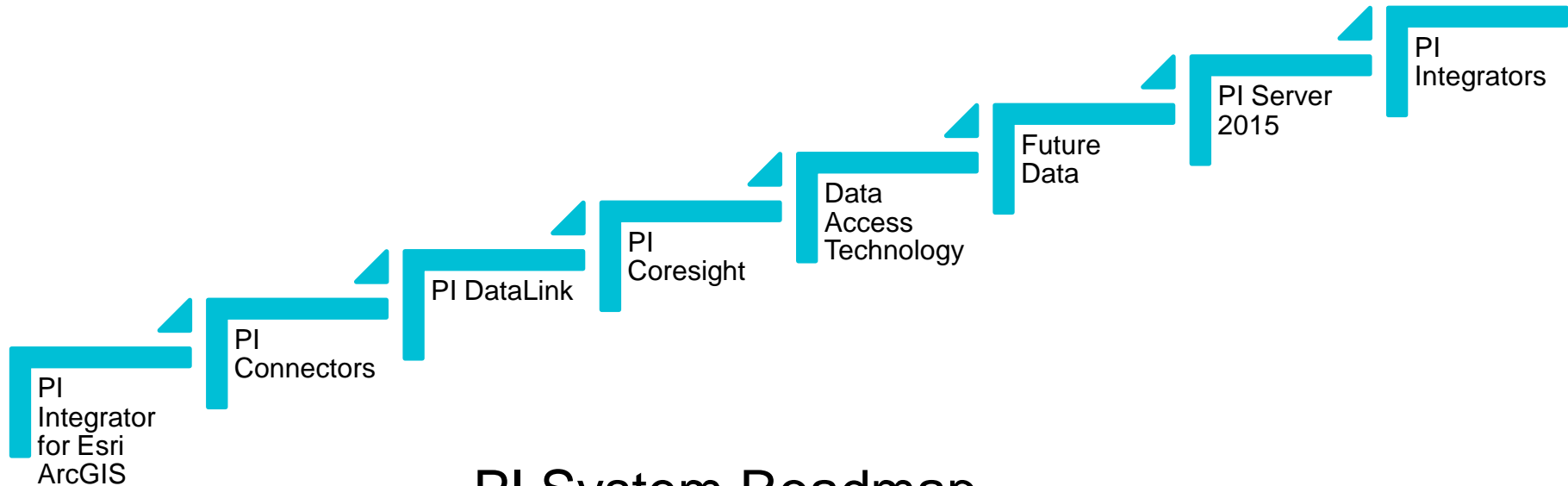


# Benefits of an Asset Based Approach





# Future OSIsoft Technologies are Assets Based



## PI System Roadmap

<https://techsupport.osisoft.com/Products/Product-Roadmap>



# New in PI Server 2014

# Performance

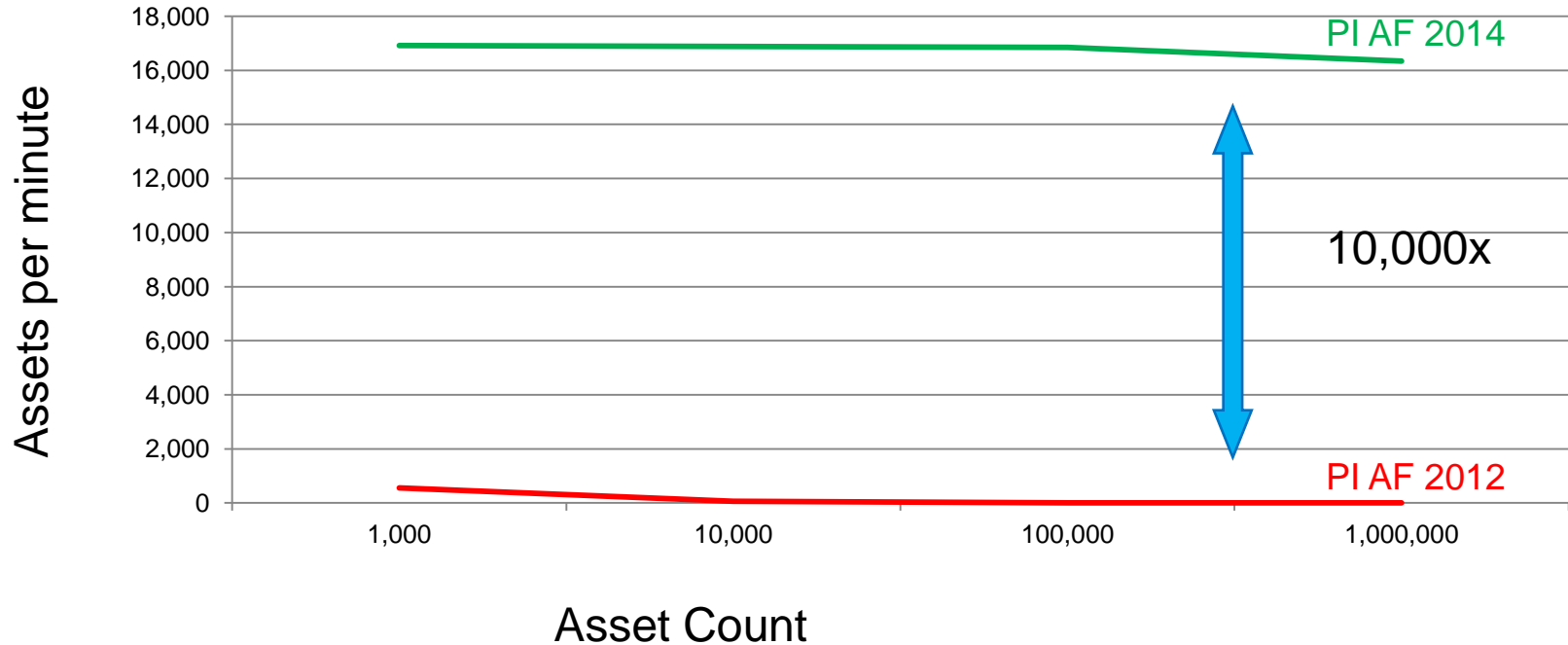
- Use Bulk RPCs
- Make One Call instead of Spinning Like a Top



# Performance - Bulk Calls

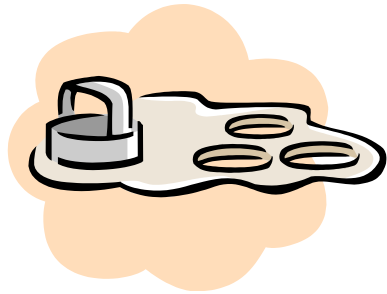


# Performance - Fast Searches



# Extensibility

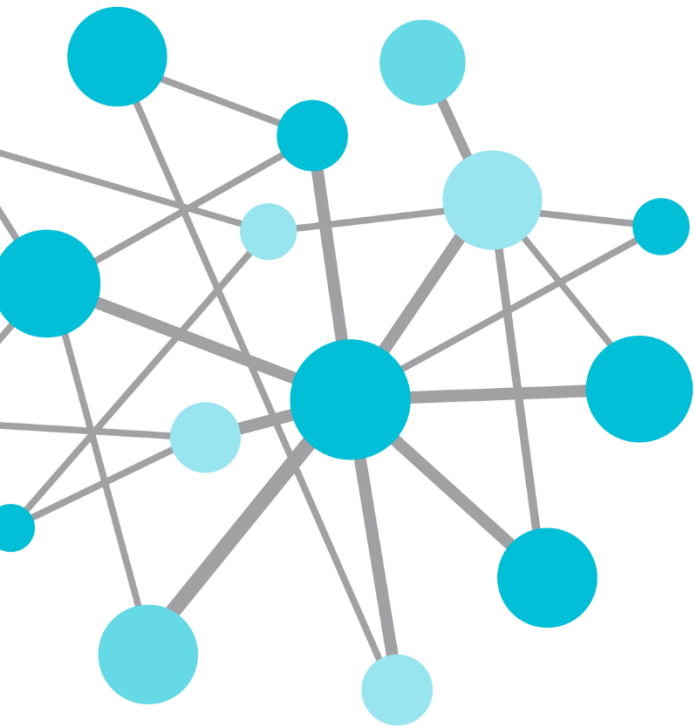
- **Separate Connection from Query and Reuse**
- **Filter Out Unwanted Data with Parameters**



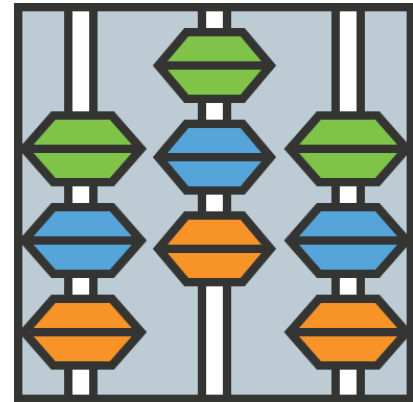
# Pipe & Cache

- Pipe Already Holds Interesting Data
- Cache Retains Data Client-Side



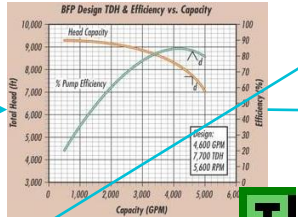
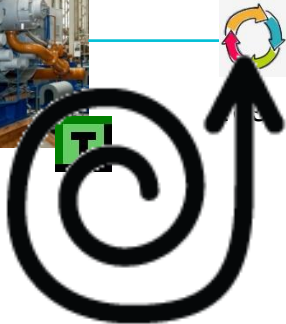


# Asset Based Analytics





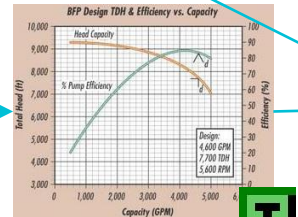
# Usage Scenario



Calculations



Test



Calculations

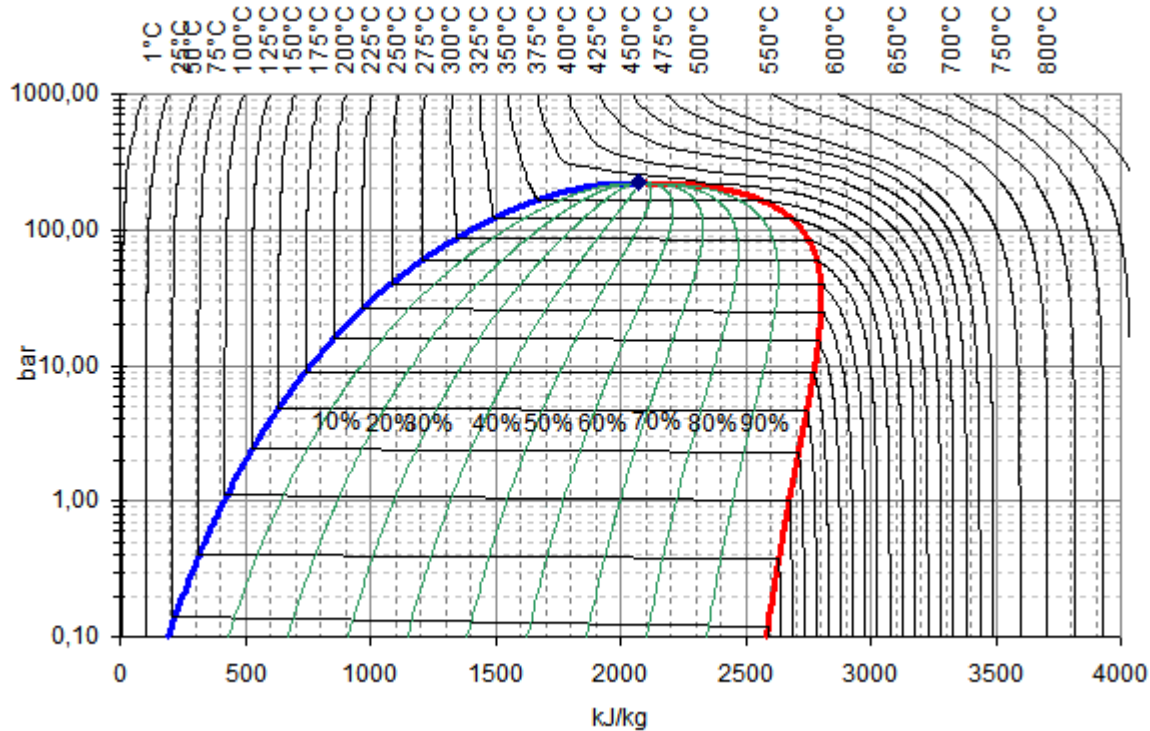


**Annual Sales Report**

Level	Level 1	Level 2	Level 3	Level 4
Head 1	10%	20%	30%	40%
Head 2	20%	30%	40%	50%
Head 3	30%	40%	50%	60%
Head 4	40%	50%	60%	70%

backfill

# Steam Tables – IAPWS-IF97





# DEMO

Elements

- Elements
  - NuGreen
  - Element Searches

---

- Elements
- Event Frames
- Library
- Unit of Measure
- Analyses

NuGreen

General Child Elements Attributes Ports Analyses Version

Filter

Name	Value
There are no attributes configured for this element. Attributes represent a single value that is used to represent a specific piece of information that is part of an element, event frame, transfer, case, or notification.	

Group by:  Category  Template

Name:

Description:

Configuration Item:

Categories:

Default UOM:

Value Type:

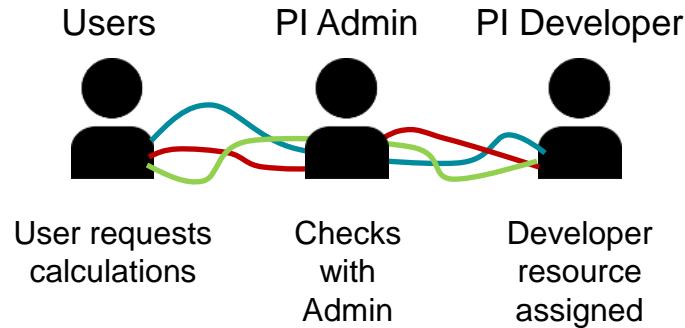
Value:  T

Data Reference:

Settings...

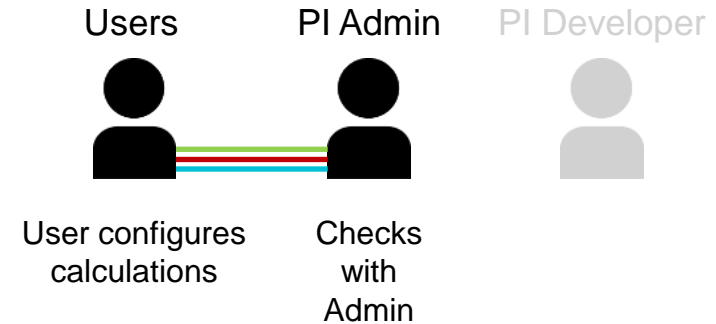
# Asset Based Analytics: Self-Service Analytics

## Before

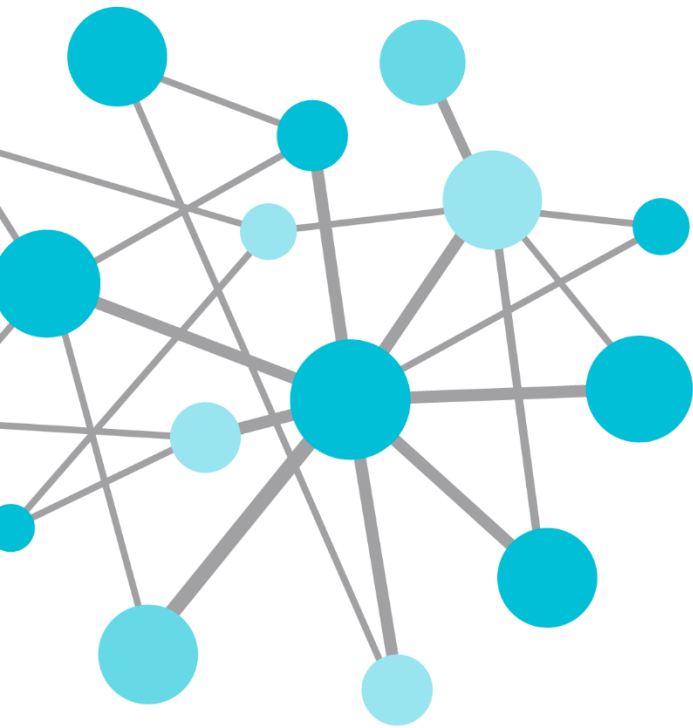


- Slows down time to value
- Numerous interactions, creates complexities

## After



- Configure, test and validate – immediate feedback
- Build new assets – templates ensure same calculations in all instances



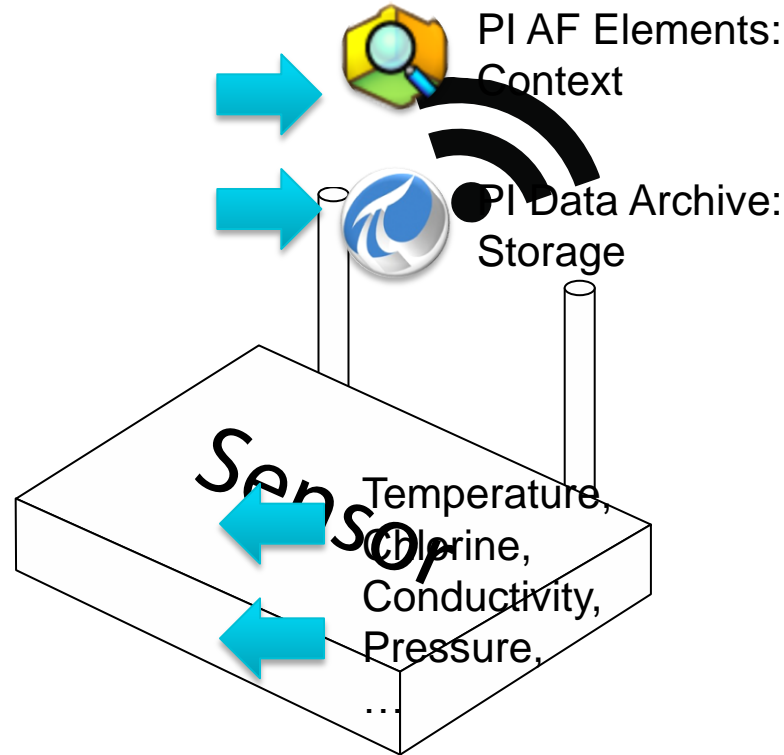
# PI Server 2014 Calculations and Analytics

## Asset Based Analytics at Veolia Water

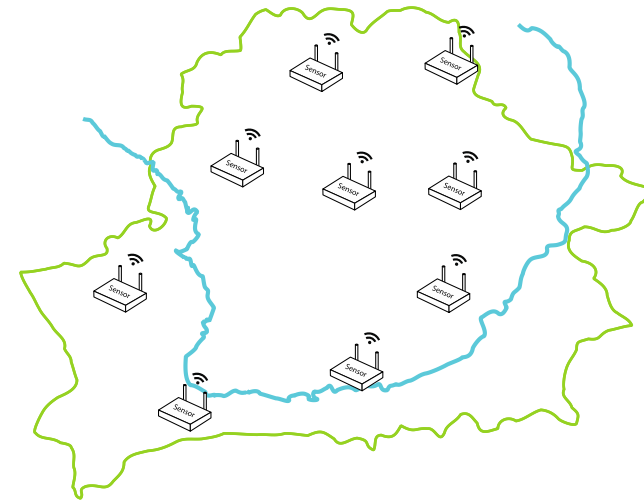
- Quentin Martouzet
- Mahyar Sepehr



# Introducing Sensors in a Zone



A Geographic Zone  
with a set of Sensors



## Use Case #1

# Aggregations on a set of sensors

- Sensors in the water network send data to our PI System
- Each sensor belongs to a geographic zone
- We need to calculate aggregations on every zone



## Use Case #1

# Aggregations on a set of sensors

*What solutions are available...*

*... before ?*

PI Totalizer, PI Performance Equations, PI ACE...

*... Now !*

PI Analytics Roll-Up

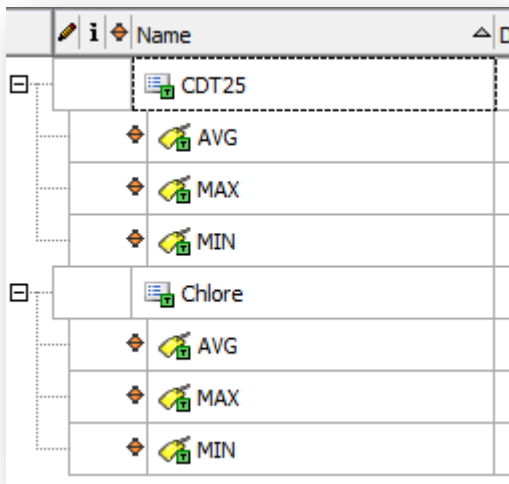
- Integrated with PI Asset Framework
- Templated
- Easy to back fill data through large durations



# Use Case #1

## Aggregations

PI AF Template for Zones : Aggregation rules



PI AF Template for Sensors : PI AF Attributes

The screenshot shows the PI AF software interface. On the left is the 'Library' panel, which contains a tree view of categories and templates. On the right is the 'Zone' configuration panel, which is currently showing the configuration for 'CDT25 Aggregation'.

**Library Panel:**

- Production
  - Categories
    - Analysis Categories
    - Attribute Categories
    - Element Categories
    - Reference Type Categories
    - Table Categories
  - Templates
    - Element Templates
      - Sonde
        - Zone
    - Event Frame Templates
    - Model Templates
    - Transfer Templates
  - Enumeration Sets
  - Reference Types
  - Tables
  - Table Connections

**Zone Panel:**

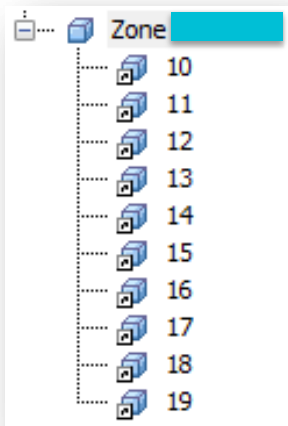
- General | Attribute Templates | Ports | Analysis Templates
- Name: [ ]
- Description: [ ]
- Category: [ ]
- Analysis: [ ]
- Example Element: [Select an example element](#)
- Rollup attributes from:
  - Child elements of Zone
  - This element - Zone
- To select attributes set criteria below
- Attribute Name: CDT25
- Attribute Category: [ ]
- Element Category: [ ]
- Element Template: [ ]
- Select the function(s) to write to an attribute

Function	Output(s)	Value
<input type="checkbox"/> Sum		
<input checked="" type="checkbox"/> Average	CDT25AVG	
<input checked="" type="checkbox"/> Minimum	CDT25MIN	
<input checked="" type="checkbox"/> Maximum	CDT25MAX	
<input type="checkbox"/> Count		
<input type="checkbox"/> Median		

- Scheduling:  Event-Triggered  Periodic
- Trigger on: Any Input

# Use Case #1 Aggregations

Associating a sensor to a zone



PI AF Elements Hierarchy

Zone VILJU150

General | Child Elements | Attributes | Ports | Analyses | Version

Name: CDT25 Aggregation  
 Description:  
 Categories:  
 Analysis Type:  Expression  Rollup  Event Frame Generation

Name	Parent Element	Categories	UOM
✓ CDT25	19		Micro Siemens...
✓ CDT25	17		Micro Siemens...
✓ CDT25	13		Micro Siemens...
✓ CDT25	14		Micro Siemens...
✓ CDT25	16		Micro Siemens...
✓ CDT25	11		Micro Siemens...
✓ CDT25	18		Micro Siemens...
✓ CDT25	15		Micro Siemens...
✓ CDT25	12		Micro Siemens...
✓ CDT25	10		Micro Siemens...
AgeEau	18		hour
AgeEau	19		hour
AgeEau	17		hour
AgeEau	13		hour
AgeEau	14		hour
AgeEau	11		hour
AgeEau	15		hour
AgeEau	12		hour
AgeEau	16		hour
AgeEau	10		hour
AgeEauMarge	19		hour
AgeEauMarge	14		hour
AgeEauMarge	17		hour
AgeEauMarge	18		hour
AgeEauMarge	11		hour
AgeEauMarge	16		hour
AgeEauMarge	12		hour
AgeEauMarge	15		hour

Rollup attributes from  
 Child elements of Zone VILJU150  
 This element - Zone VILJU150

To select attributes set criteria below

Attribute Name: CDT25  
 Attribute Category:  
 Element Category:  
 Element Template:

Select the function(s) to write to an attribute Evaluate

Function	Output(s)	Value
<input type="checkbox"/> Sum		
<input checked="" type="checkbox"/> Average	CDT25 AVG	
<input checked="" type="checkbox"/> Minimum	CDT25 MIN	
<input checked="" type="checkbox"/> Maximum	CDT25 MAX	
<input type="checkbox"/> Count		
<input type="checkbox"/> Median		

Scheduling:  Event-Triggered  Periodic  
 Trigger on: Any Input

● Connected to the PI Analysis Service.

## Use Case #2

# Water Services Monitoring

**Alert on threshold** (for chlorine, conductivity...)

*It has a start.*

*It has an end.*

*It represents and spots a significant phase in the business process.*

*This really looks like a job for ...*

**PI Event Frames !**



## Use Case #2

# Water Services Monitoring

*How can you build new PI Event Frames...*

*... before ?*

PI Event Frames Generator, PI ACE, PI AF SDK...

**... Now !**

Asset Based Analytics

- No custom development
- Preview the result before actually back filling data.

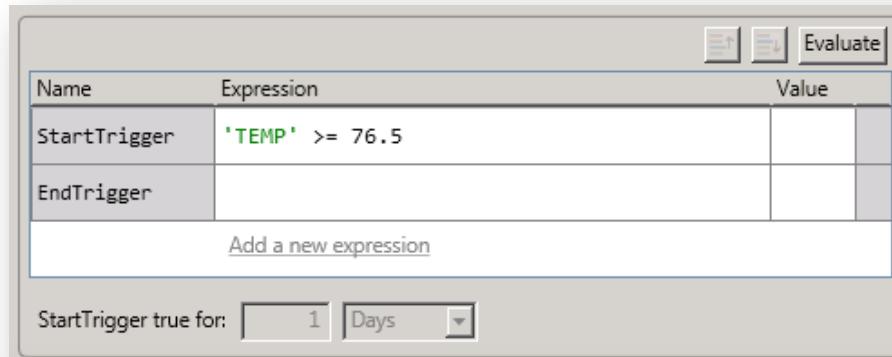
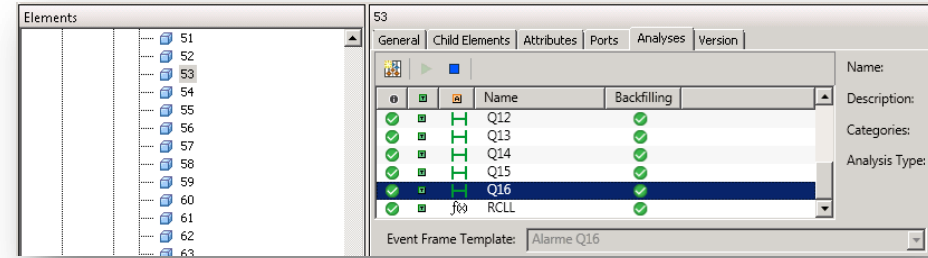


## Use Case #2

# Water Services Monitoring

Simple alert :

- Simple threshold.
- Raise alert if exceeded for more than a day.



Name	C [15.02:05:00]	Duration	Start Time	End Time
Q16 20140806 09:30:00		10:16:00:00	06/08/2014 09:30:00	17/08/2014 01:30:00
Q16 20140817 08:45:00		4:2:50:00	17/08/2014 08:45:00	21/08/2014 11:35:00

## Use Case #2

# Water Services Monitoring

### Complex alert :

- Simple Threshold.
- Alert should not be sent if any sensor are out of order.

The screenshot shows a software interface for configuring an alarm. On the left, there is a tree view of elements numbered 40 to 67. On the right, the 'General' tab is active, showing a list of elements with columns for Name and Backfilling. Below this, the 'Event Frame Template' is set to 'Alarme Q01'. A table at the bottom of the right pane shows the configuration for the alarm:

Name	Expression	Value
IsQ12	EventCount('RCLA1', '*-1d', '*') = 0	
IsQ16	TagMin('TEMP', '*-1d', '*') >= 76.5	
IsQ13	TagMin('DeltaRCLA', '*-1d', '*') > 0.15	
AlarmeTechnique	IsQ12 or IsQ13 or IsQ16	
StartTrigger	If not AlarmeTechnique Then 'RCLL' >= 'Seuils RCLL - Haut' Else False	
EndTrigger		

Name	Expression	Value
IsQ12	EventCount('RCLA1', '*-1d', '*') = 0	
IsQ16	TagMin('TEMP', '*-1d', '*') >= 76.5	
IsQ13	TagMin('DeltaRCLA', '*-1d', '*') > 0.15	
AlarmeTechnique	IsQ12 or IsQ13 or IsQ16	
StartTrigger	If not AlarmeTechnique Then 'RCLL' >= 'Seuils RCLL - Haut' Else False	
EndTrigger		

[Add a new expression](#)

## Use Case #2

# Water Services Monitoring

Raw Data  
(PI Data Archive)

Calculation & Analytics  
(PI AF Asset Based Analytics)

Logging  
(PI Event Frames)

Monitoring  
(Zabbix)

PROBLÈMES DE GROUPE DE CAPTEURS [12:00:30]

Groupe:

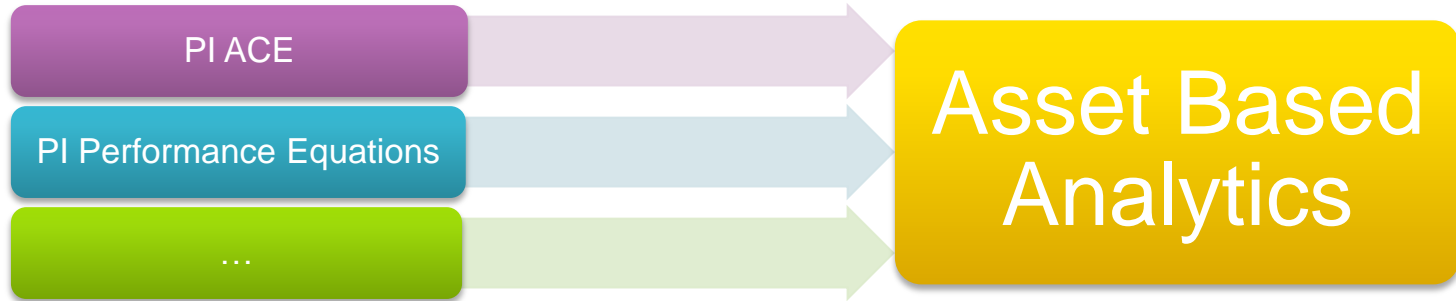
Capteur	Problème	Heure ↓↑	Age	Info	Acquitté	Actions
119	Pression Relative - Seuil Bas	<a href="#">15 Jul 2014 01:35:00</a>	10h		<a href="#">Non</a>	
66	Perte de données	<a href="#">14 Jul 2014 18:05:00</a>	17h		<a href="#">Non</a>	
72	Chlore Libre - Seuil Bas	<a href="#">14 Jul 2014 04:50:00</a>	7h		<a href="#">Non</a>	
87	Perte de données	<a href="#">07 Jul 2014 17:45:00</a>	18h		<a href="#">Non</a>	
51	Perte de données	<a href="#">17 Juin 2014 12:55:00</a>	23h		<a href="#">Non</a>	

5 problèmes sur 5 sont affichés



# Next steps ?

- Refactoring all our previous analysis



- Generalize our PI Event Frames based monitoring to other calculations:
  - Power consumption
  - Pressure

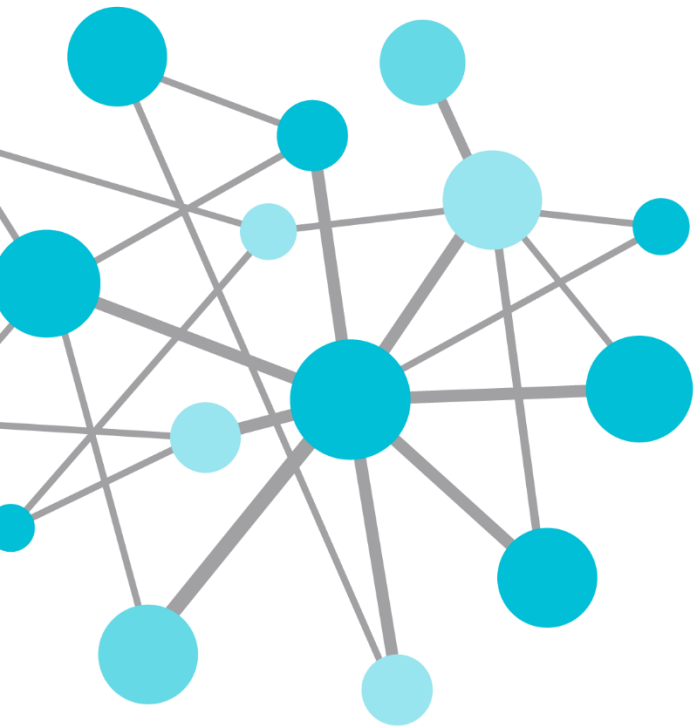
# Any benefits ?

- ✓ Easy to maintain by administrator
- ✓ Helps to communicate with functional teams
- ✓ A pleasure to implement *(or to refactor existing rules...)*

# Asset Analytics in PI Server 2014

- Easy – empower users to transform process knowledge into new data streams
- Reuse and standardize
  - Clarity and correctness
- PI Performance Equations expressions
- Rollup and summarize
- Mark important events
- Pre-calculate for fast retrieval
- Performance and scalability





# PI Server Roadmap

# What else are we working on

- PI Data Archive 2012 SP1
- PI Analytics – beyond configuration
- PI Notifications
- Future data
- Batch to event frame migration

DILBERT by Scott Adams

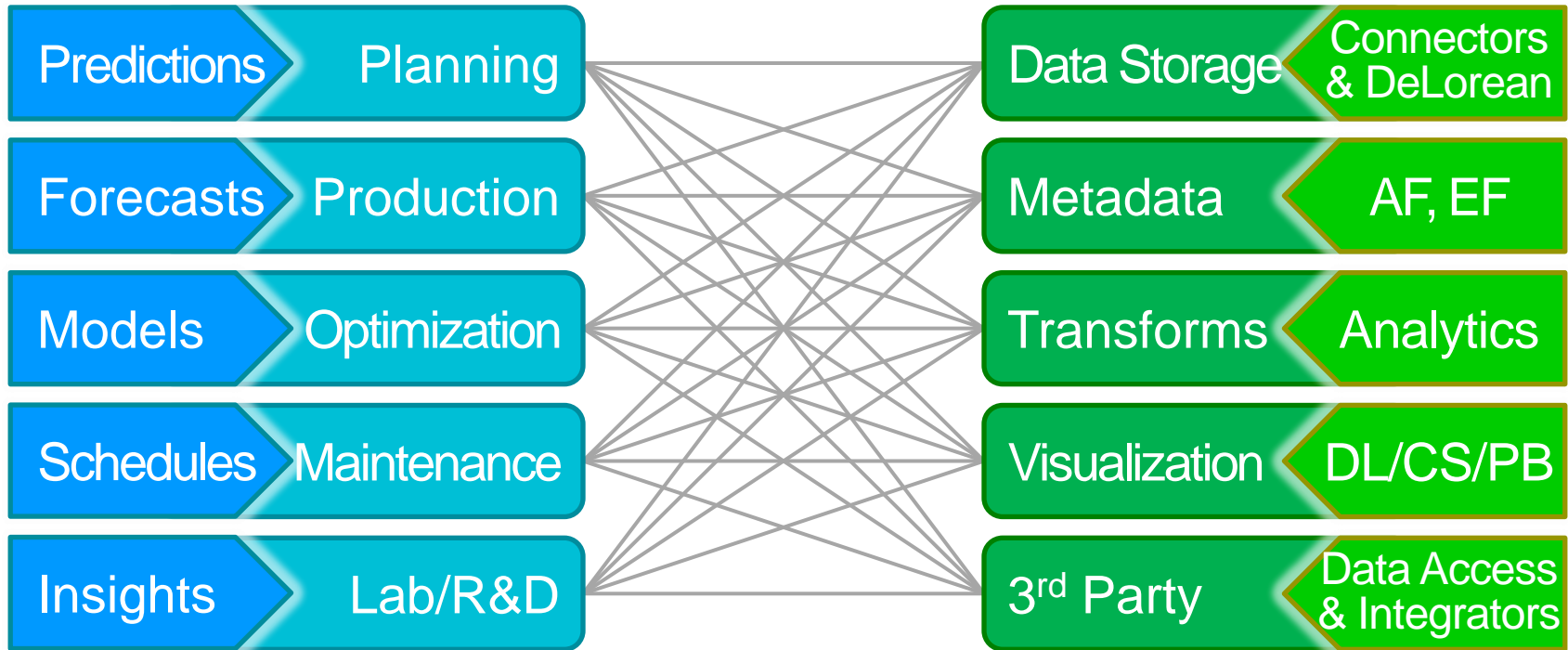


# Why Future Data?

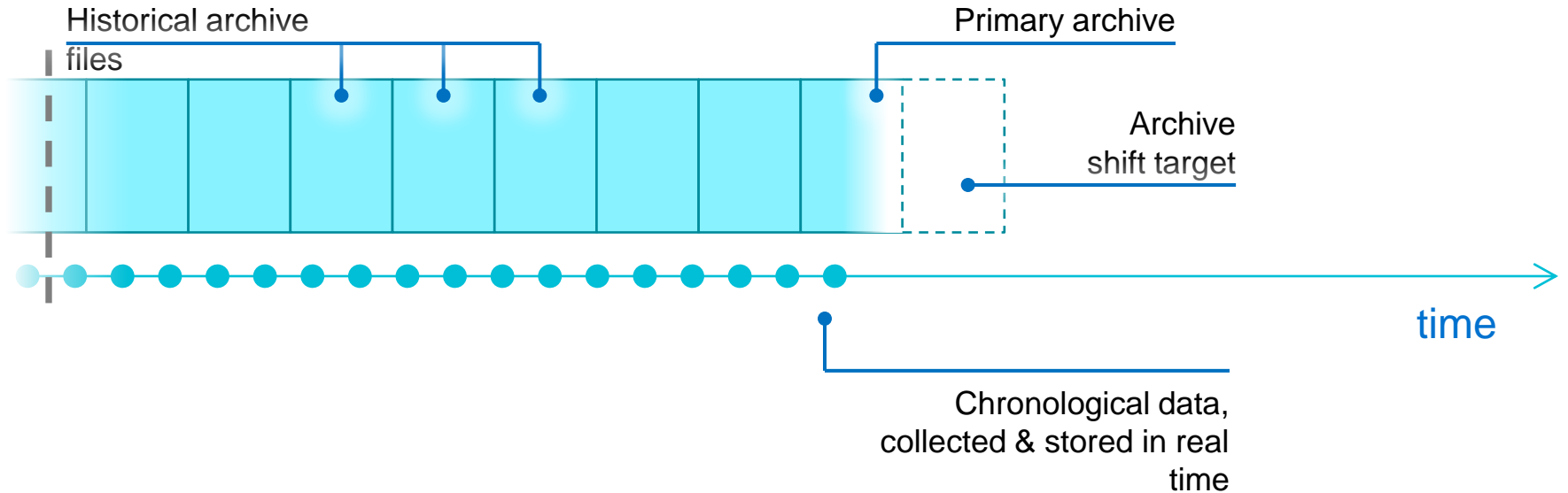
1. Expected
2. Strategic
3. Fundamental



# PI SYSTEM WITH FUTURE DATA

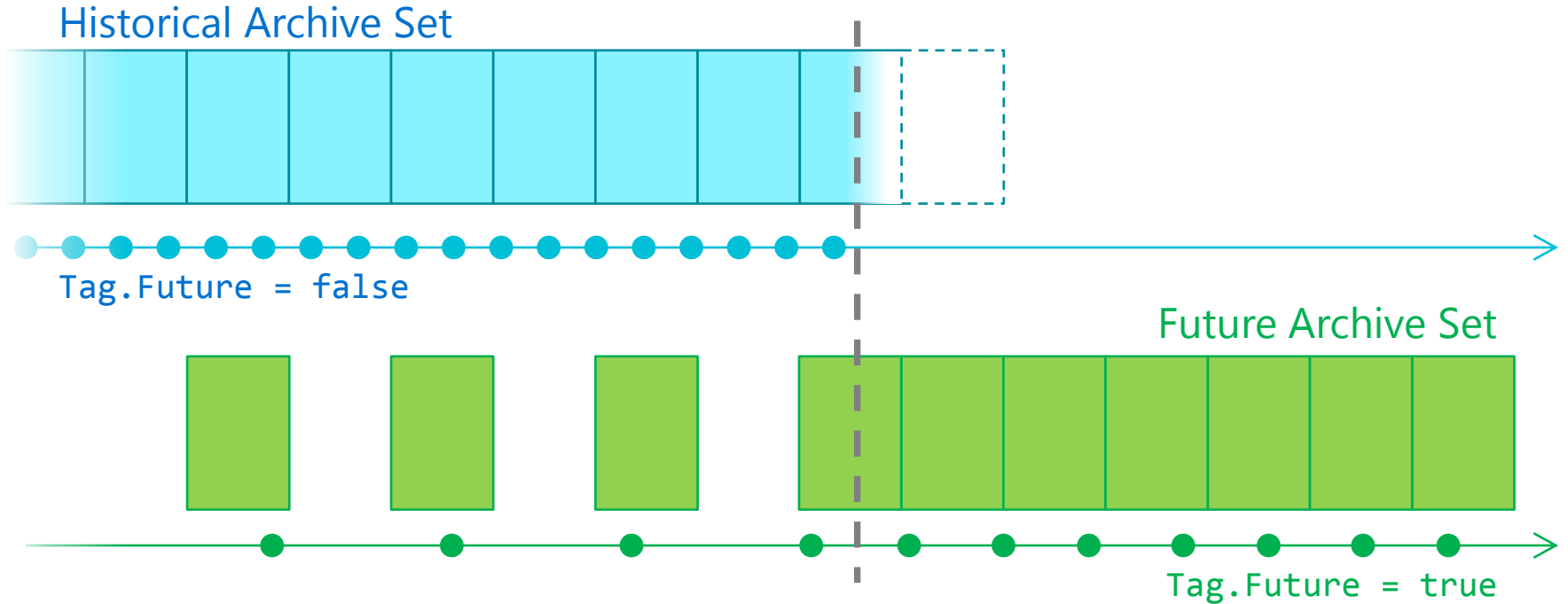


# Storing “Historical” Data...

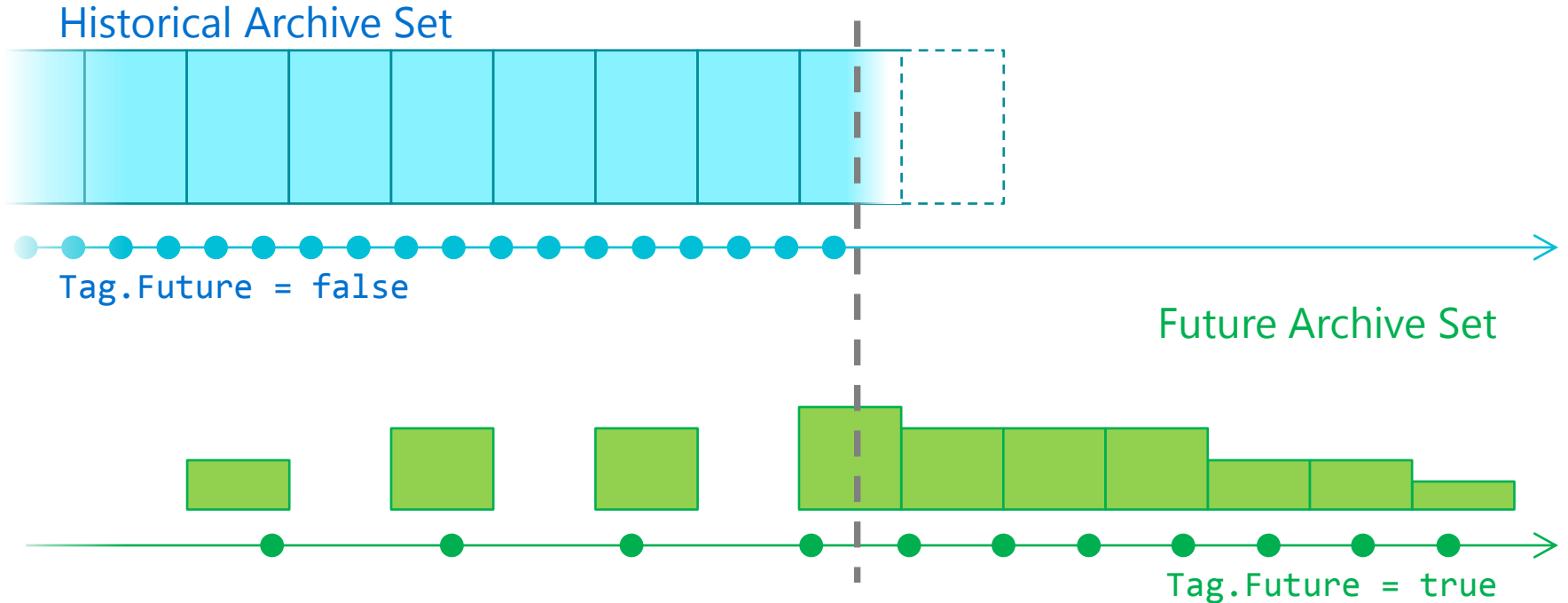




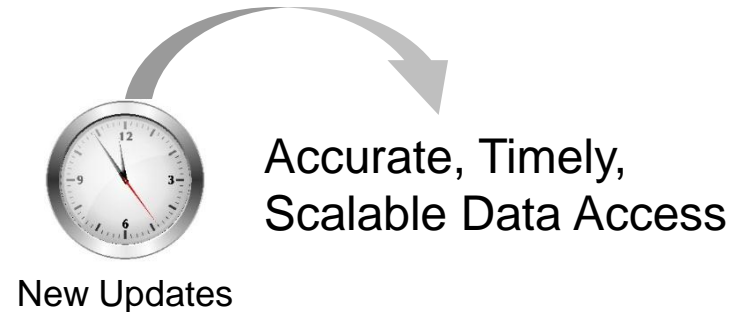
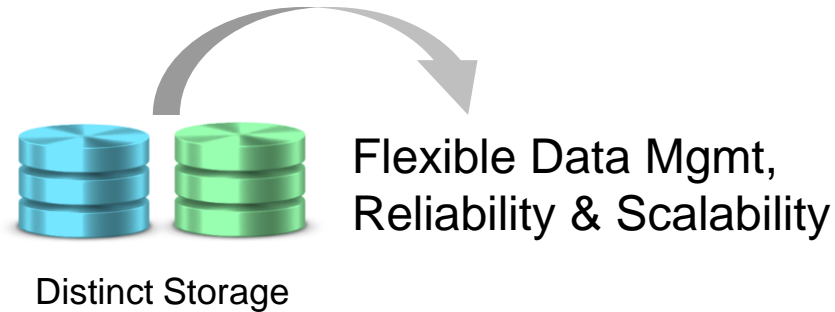
# ...And Storing “Future” Data



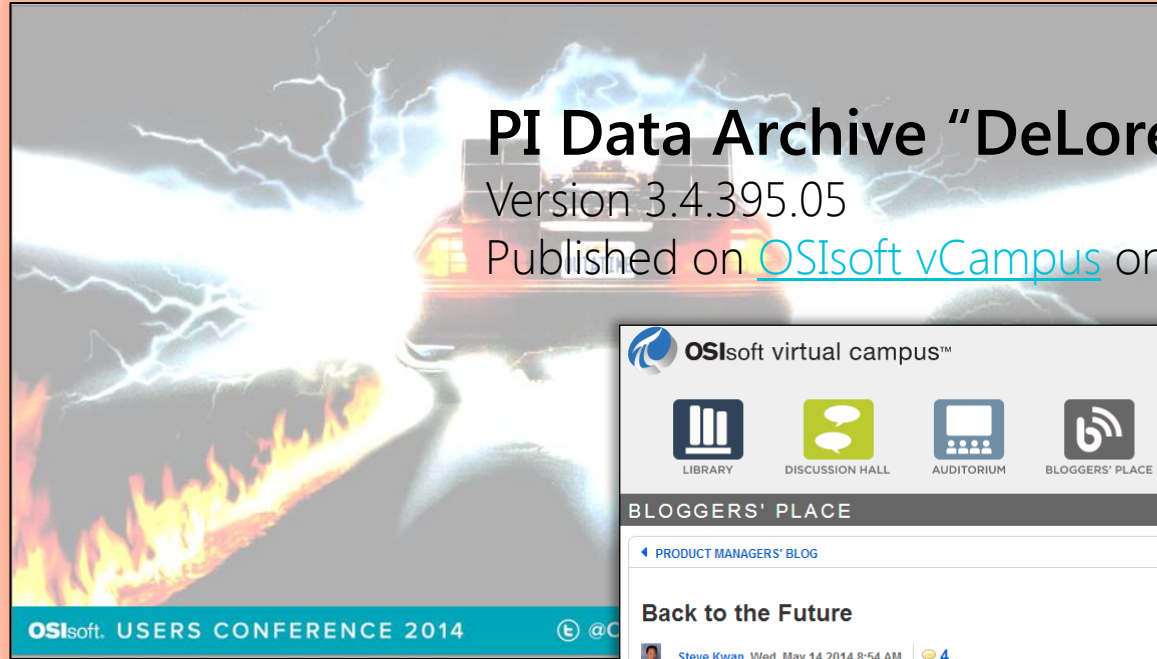
# ...And Storing “Future” Data



# PI Server 2015: Key Benefits



# UC San Francisco, March 2014



## PI Data Archive “DeLorean” CTP1

Version 3.4.395.05

Published on [OSisoft vCampus](#) on 5/14/14

OSisoft virtual campus™

LIBRARY DISCUSSION HALL AUDITORIUM BLOGGERS' PLACE TRAINING CENTER

BLOGGERS' PLACE

PRODUCT MANAGERS' BLOG

### Back to the Future

Steve Kwan Wed, May 14 2014 8:54 AM 4

RATE THIS ★★★★★

Hi vCampus Members,

We are excited to announce the availability of our first Community Technology Preview (CTP) of the next major version of the PI Data Archive, code-named "DeLorean" and tentatively labeled "PI Data Archive 2014 R2". This release introduces two major features: (1) the ability to store time series data with future time stamps and (2) the ability to migrate PI Batch data to PI Event Frames. As with any CTP, please review the limitations detailed in the accompanying documentation.

## Live demo of “DeLorean”

# Help Us Help You...

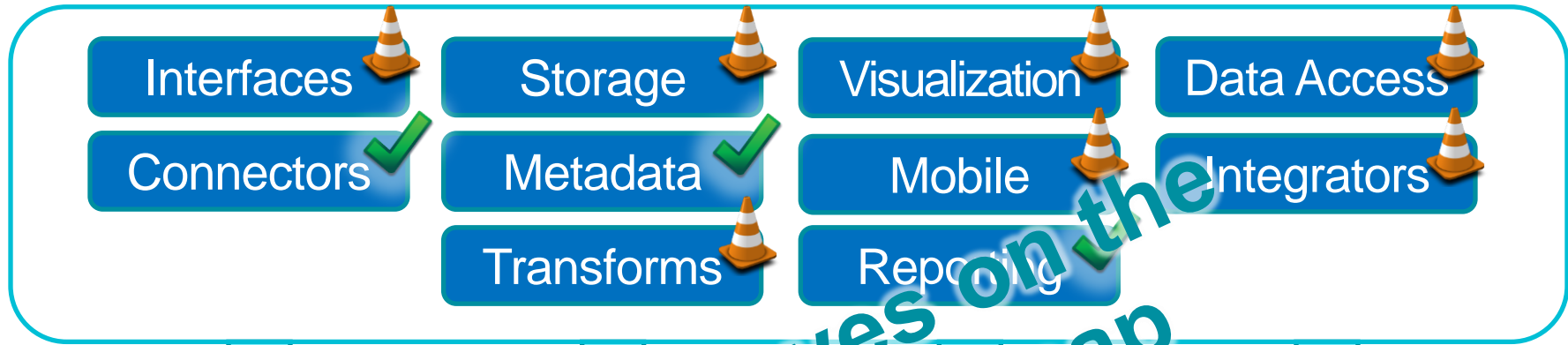
- PI Server 2015 Beta is available NOW!
  - Native future data support
  - Batch to Event Frames
  - Updated PI AF SDK



[www.osisoft.com/corporate/piserver2015beta](http://www.osisoft.com/corporate/piserver2015beta)

[BetaPIServer@osisoft.com](mailto:BetaPIServer@osisoft.com)





- **PI Buffering 4.3**
- PI RDBMS Interface
- PI UFL Interface  
(Contact Product Management for requests)

- **PI Server 2015**
- **Data Archive**
- **Analytics**

- **PI Coresight 2015 Desktop & Mobile**
- **PI ProcessBook 2015**
- PI DataLink 2013 and above

- **AF SDK 2.7**
- **PI WebAPI**
- **PI Integrator for Esri ArcGIS**
- **PI Integrator for BI/Big Data**

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# Mahyar Sepehr

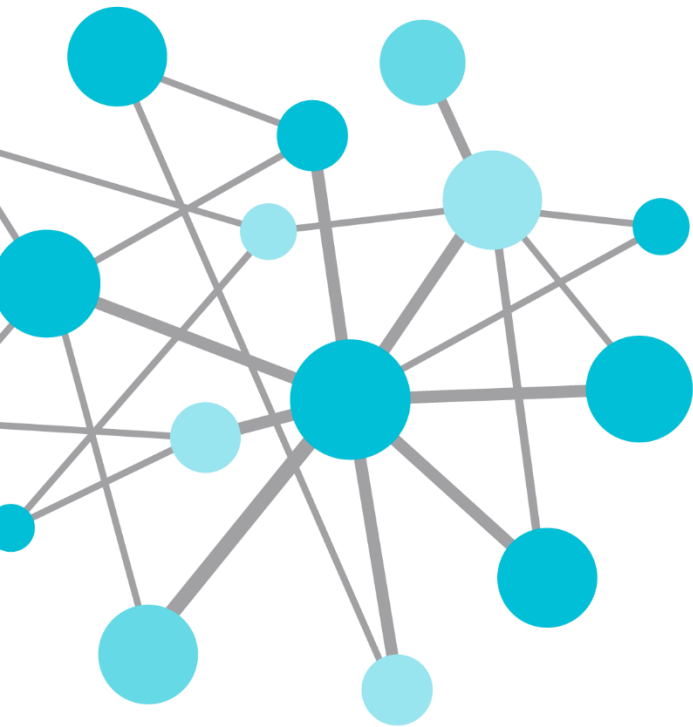
[Mahyar.Sepehr@ysance.com](mailto:Mahyar.Sepehr@ysance.com)

Architect  
Ysance for Veolia Water

# Quentin Martouzet

[Quentin.Martouzet@ysance.com](mailto:Quentin.Martouzet@ysance.com)

Architect  
Ysance for Veolia Water



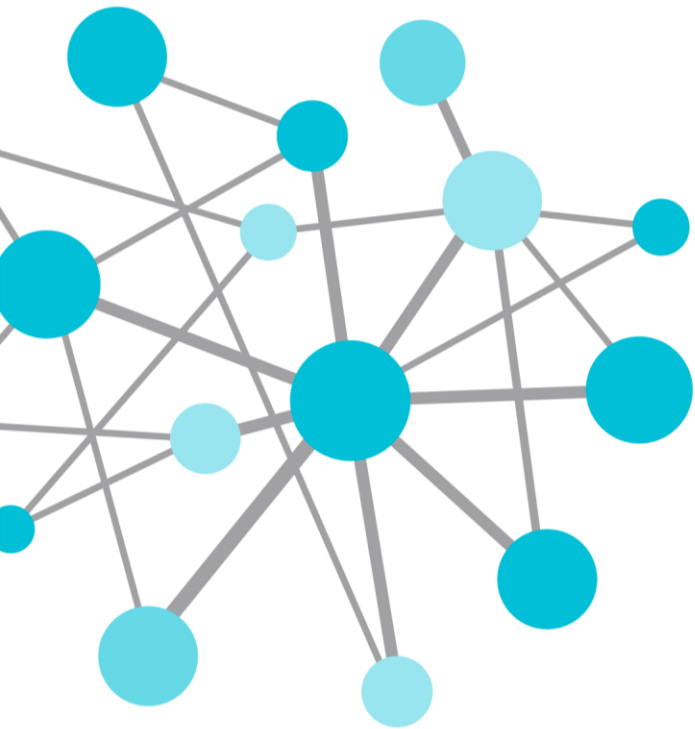
# Questions

Please wait for  
the **microphone**  
before asking  
your questions



State your  
**name &  
company**





THANK  
YOU

Brought to you by  **OSIsoft.**

# Please don't forget to...

Complete the online survey for  
this session

[eventmobi.com/emeauc14](http://eventmobi.com/emeauc14)



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#UC2014

