



OSIsoft®

UC2010

Real Time Information — Currency of the New Decade

Hilton San Francisco Union Square | San Francisco, CA

April 26-28, 2010

What's New in PI Analytics and PI Notifications

Beth McNeill - OSIsoft

Glenn Moffett - OSIsoft

Roman Schindlauer - Microsoft



Analytic and Notification Landscape

Visualization & DataLink for Excel

**Performance Equations, Totalizers,
Alarms and RTSQC**



Advanced Calculation Engine (ACE)

PI Notifications

Upcoming and Future Releases

- PI ACE 2010

A blue starburst shape with a white border and a white shadow, containing the word "Faster" in a dark red, sans-serif font.

Faster

- PI Notifications 2010

A blue starburst shape with a white border and a white shadow, containing the words "New Features" in a black, sans-serif font.

New
Features

- PI for StreamInsight

A blue starburst shape with a white border and a white shadow, containing the word "New!" in a dark red, sans-serif font.

New!

- PI AF Configured Analytics

A blue starburst shape with a white border and a white shadow, containing the word "Future" in a black, sans-serif font.

Future

PI ACE 2010

Advanced Calculation Engine (ACE) Overview

- Enables PI access from Visual Studio
- Allow user to focus on Business rules
- Write once use many

Advanced Calculation Engine (ACE) - Overview

Visual Studio add-in

enabling access to PI data for input and output

ACE Wizard Page 2/2: Tag Information for PowerCost.Residential

Context: \\wired\Sites\SEA\Ottier\Power

Input_Aliases

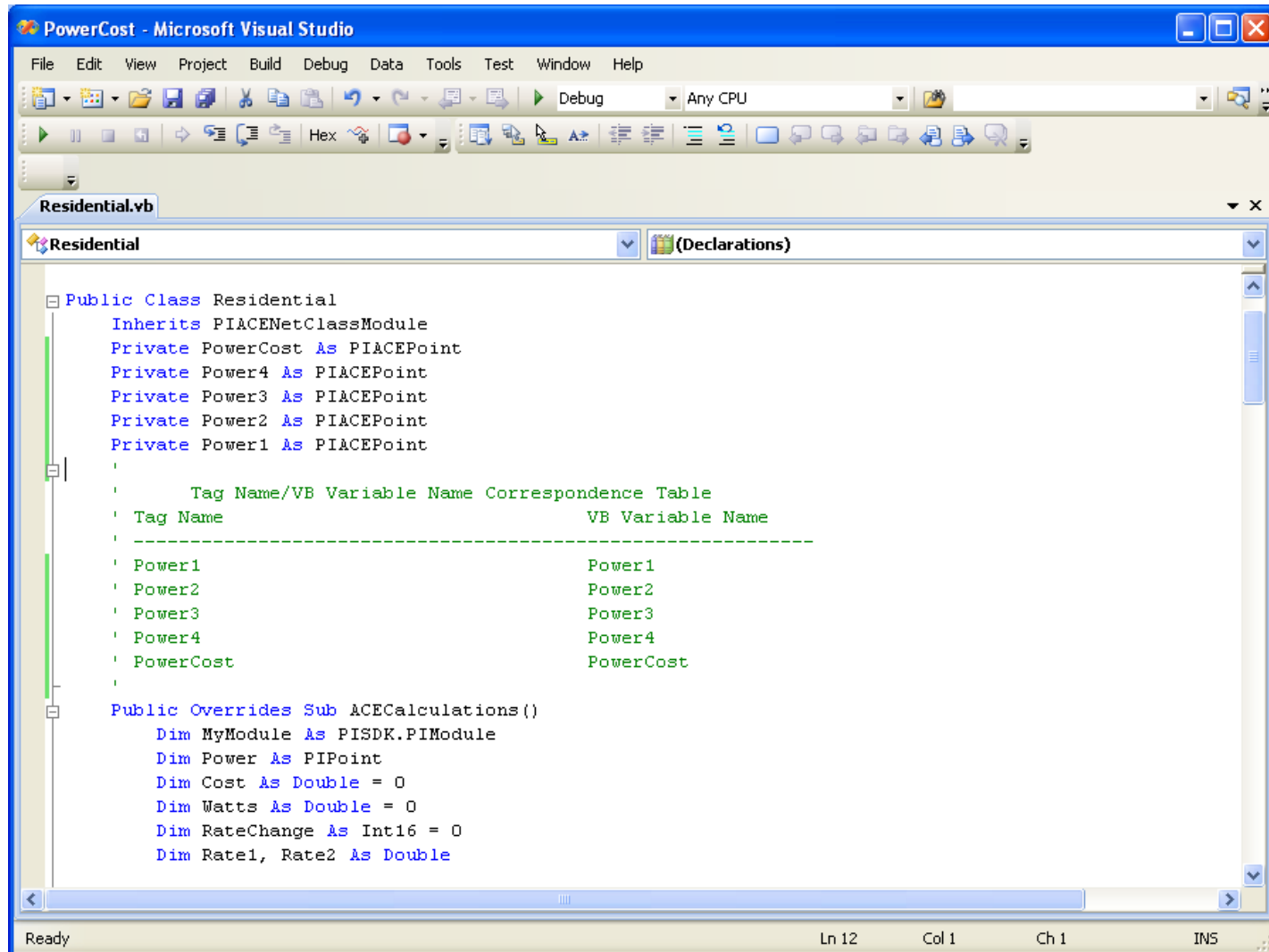
Tag Name	Current Value	Clamping	Bad Value
Power1	141	No Clamping	No Substitution
Power2	558	No Clamping	No Substitution
Power3	326	No Clamping	No Substitution
Power4	598	No Clamping	No Substitution

Output_Aliases

Tag Name	Current Value	Clamping	Bad Value
PowerCost	5.99	No Clamping	No Substitution

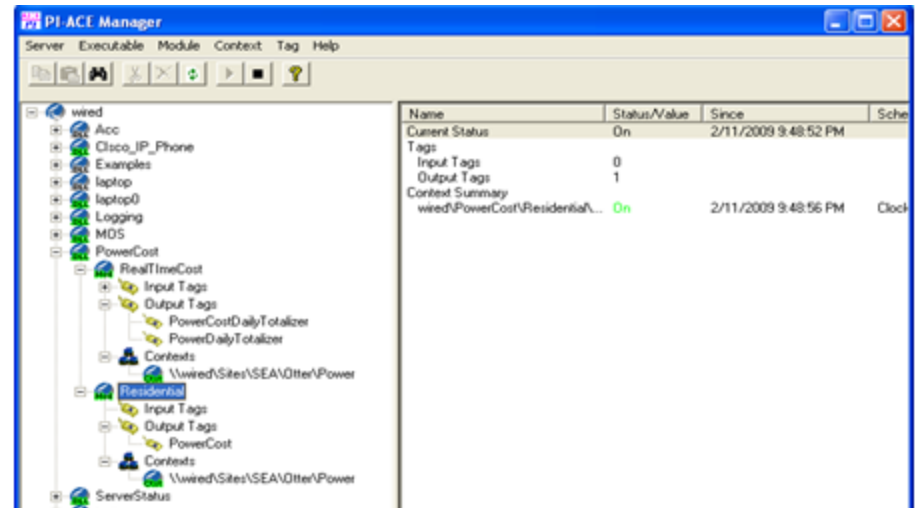
Buttons: Delete, Tag Search..., Alias Search..., Configure Tag..., Point Attributes..., Cancel, <Back, Next>, Finish

Visual Studio – Access to Data Points



Advanced Calculation Engine (ACE) - Overview

- Manager
 - Control



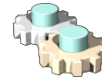
- Scheduler
 - Run calculations



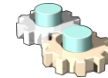
ACE Scheduler

ACE 2010 Enhancements Overview

- Multiple Schedulers
- Performance Improvements
 - Components re-written in .NET
- Visual Studio 2010 support
- Native 64-bit operating system support



ACE Scheduler 1



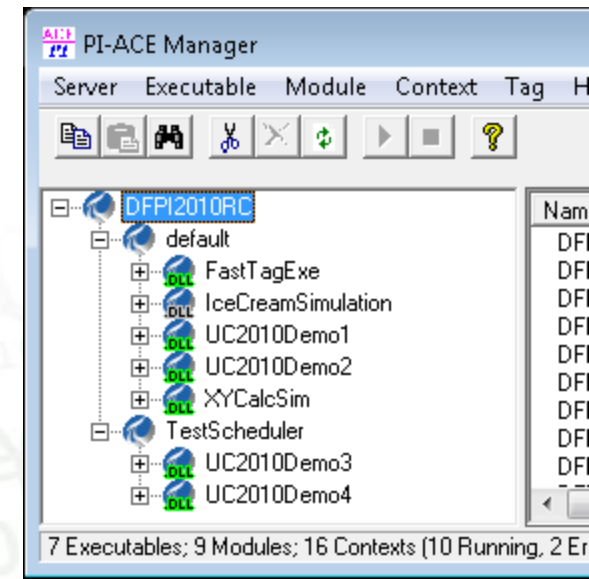
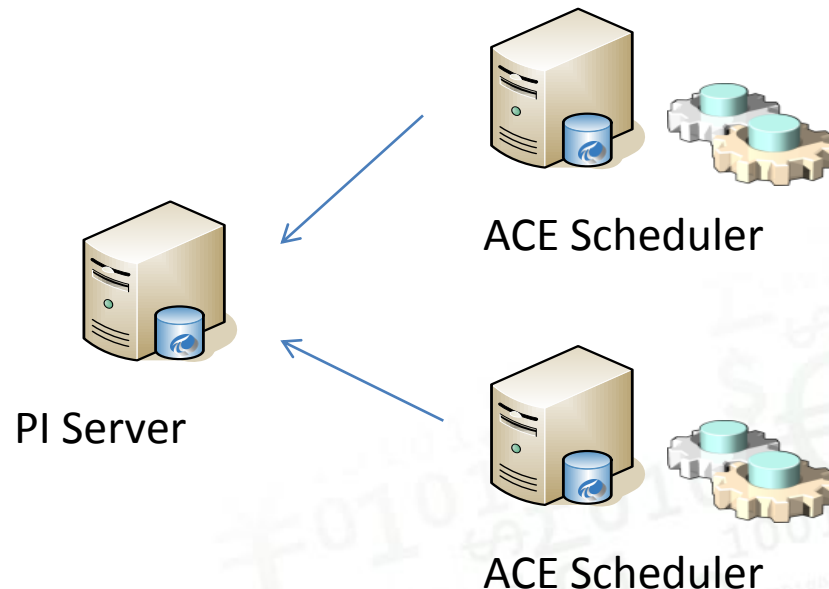
ACE Scheduler N



ACE 2010 Enhancements

New!

- Multiple ACE Schedulers
 - Split or increase number of calculations
 - One scheduler per machine



ACE 2010 Performance

Clock-scheduled calculations

ACE Version	Calculations CPU/Second
Current (32-bit)	572
ACE 2010 beta(64-bit)	3212

- 1000 calculations/sec
- Input event rate: 1600 events/sec

ACE 2010 Performance

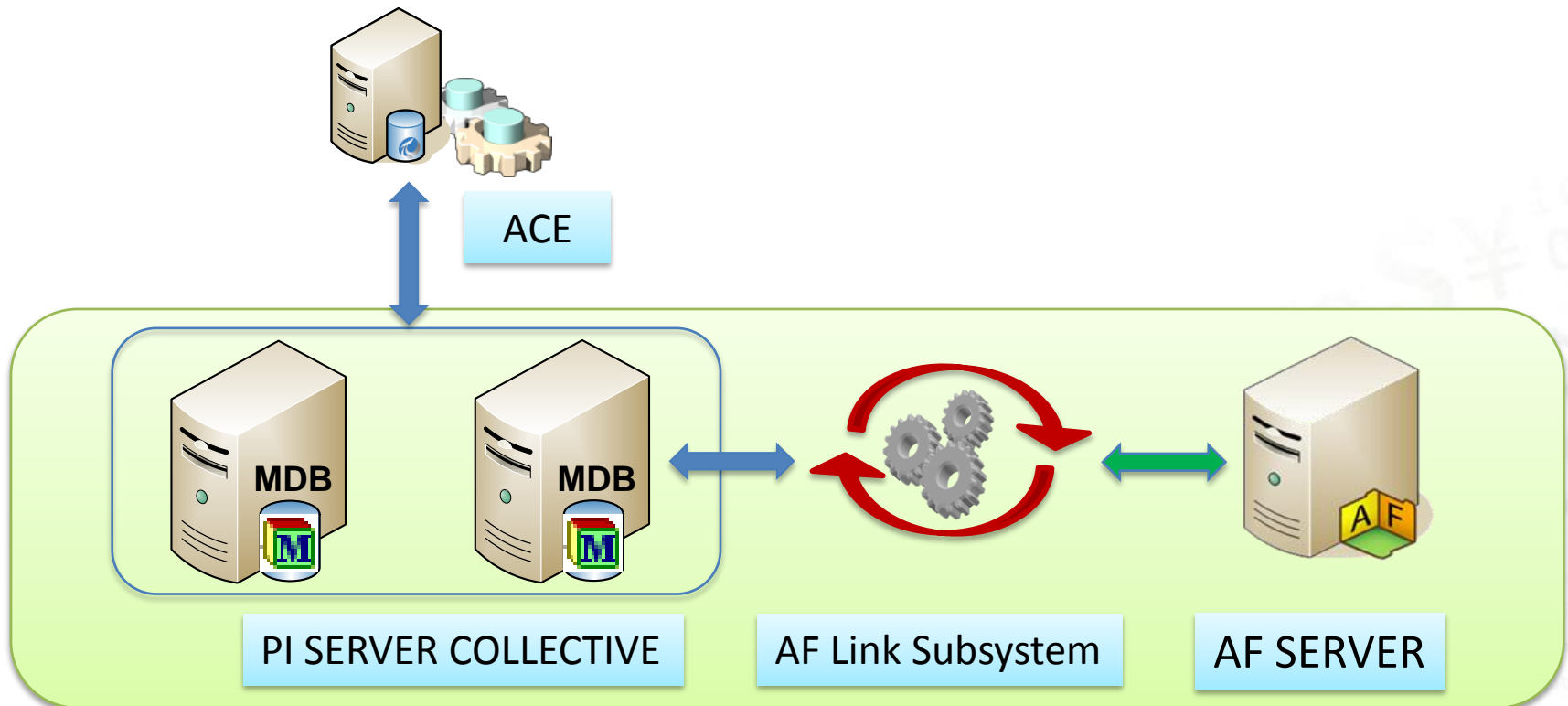
Natural scheduled calculations

ACE Version	Calculations CPU/Second
Current (32-bit)	593
ACE 2010 beta(64-bit)	4030

- 1 input trigger tag
- Input event rate: 1600 events/sec

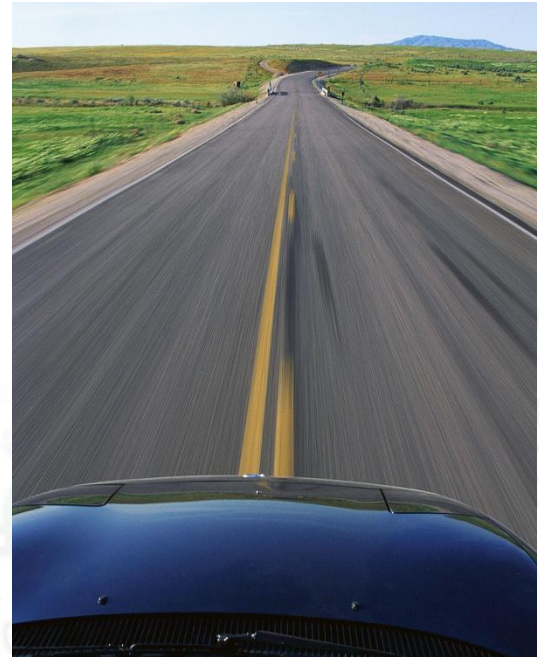
ACE and Asset Framework (AF)

- PI Server 2010 enables MDB to AF link and synchronization



ACE 2010

- Upcoming
 - OSIssoft vCampus beta – Available Now!
 - ACE 2010 release 2H 2010
- More information
 - Product Expo - POD



PI NOTIFICATIONS

PI Notifications - Overview

Configured from
AF Elements



Filtered with
sophisticated
rules



Recipients
selected from
Active Directory



Trigger



E-mail or OCS



Processbook
MyPI Desktop
PSE



Web Service
XML



Extensible

Features

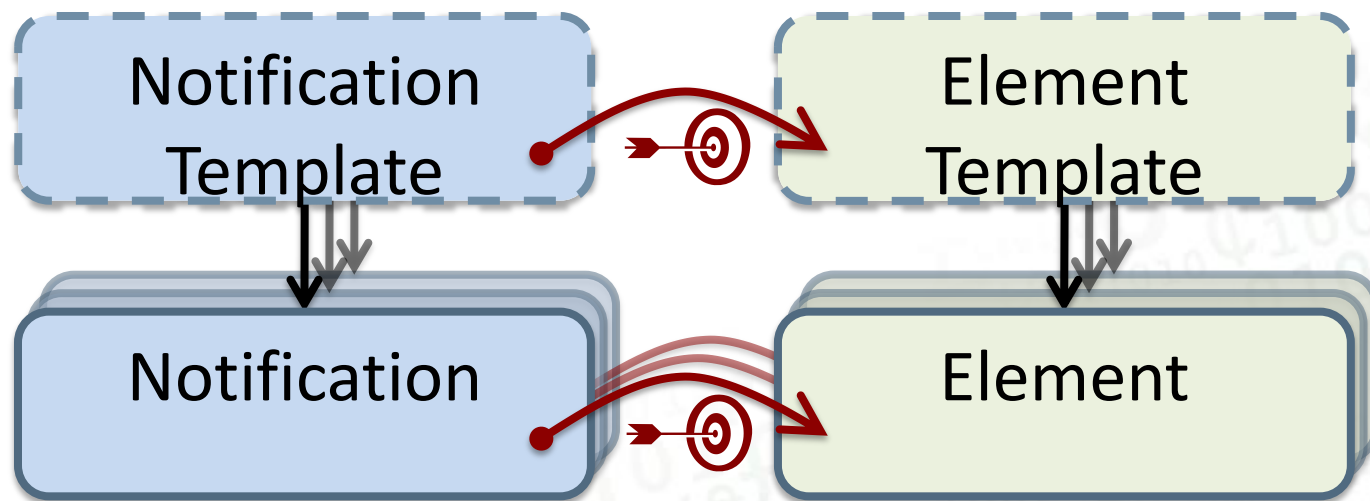
- Templates
- Custom Content
- Acknowledgement and Escalation

Delivery Channels

- User can create their own
- OSIssoft vCampus – XML & Skype

PI Notifications - Features

- Notification Templates enable rapid and automatic creation of maintainable notifications



Office Communication Server 2007 R2

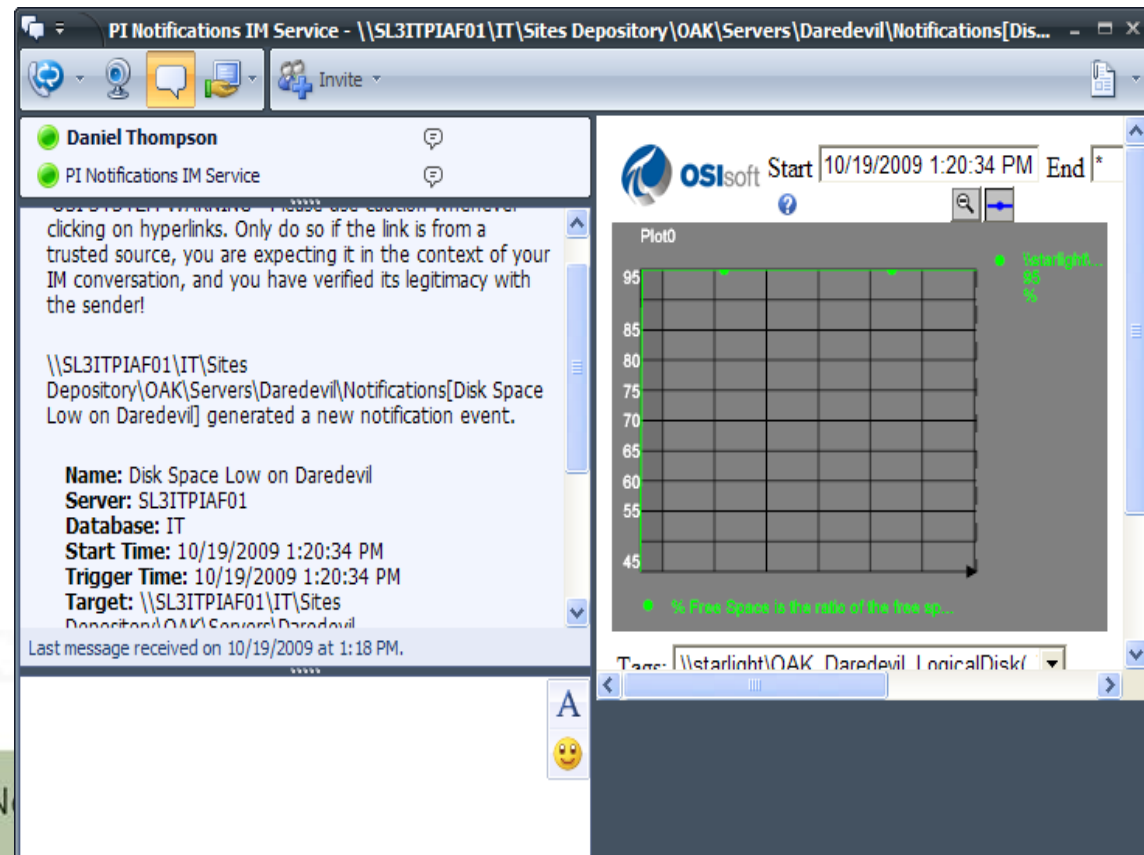
- Native Delivery Channel
- Supports presence and Instant Messaging (IM)

- Applications for phones

Windows Mobile

BlackBerry

iPhone



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



Message Formatting - Example

Email Subject

High temp for server [\\PIANODEMO\DM3\SL03-Database1](#) Location: Rack 23

Email Body

Subject: High temp for server [\\PIANODEMO\DM3\SL03-Database1](#) in Rack 23

Server [\\PIANODEMO\DM3\SL03-Database1](#) CPU exceeds temperature limit.

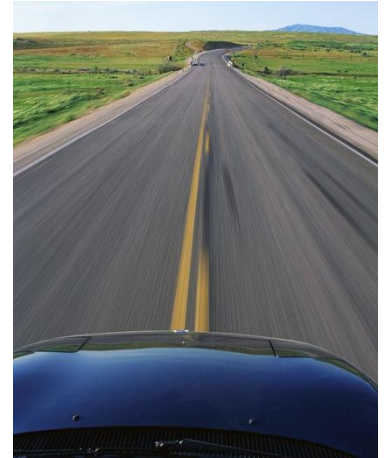
Trigger Attribute	Value
CPU Temp	72 °C
System Temperature	62 °C

Message Formatting - Features

- Format specified on
 - Template
 - Notification
 - Individual
 - Group
- Appearance of timestamps and numbers
- Insert Tables

Notifications

- Upcoming Release
 - Notifications 2010 release 2H 2010
- Product Expo - Notifications
- Talks
 - Enterprise Integration and PI Data Access
 - Delivery Channel
 - Using Templates to Speed Up Configuration of Your PI System
 - PI Notifications make a difference – Appleton Papers
- Learning Lab



PI AND MICROSOFT STREAM INSIGHT

Use Case Examples

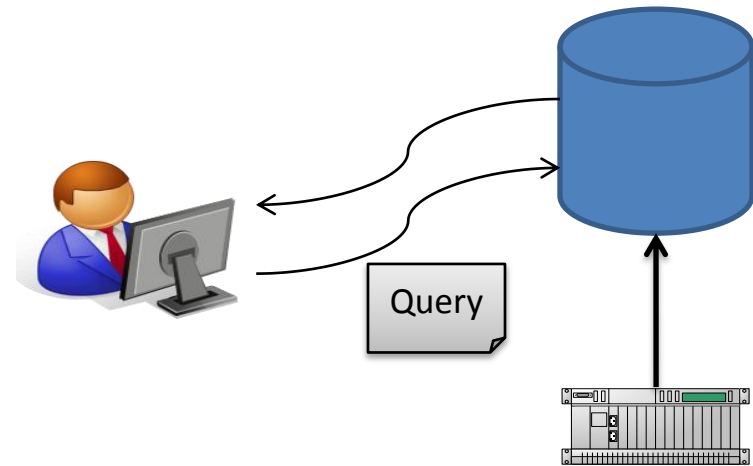
- Alarm and limit processing
- Validation and Estimation for AMI

Requirements

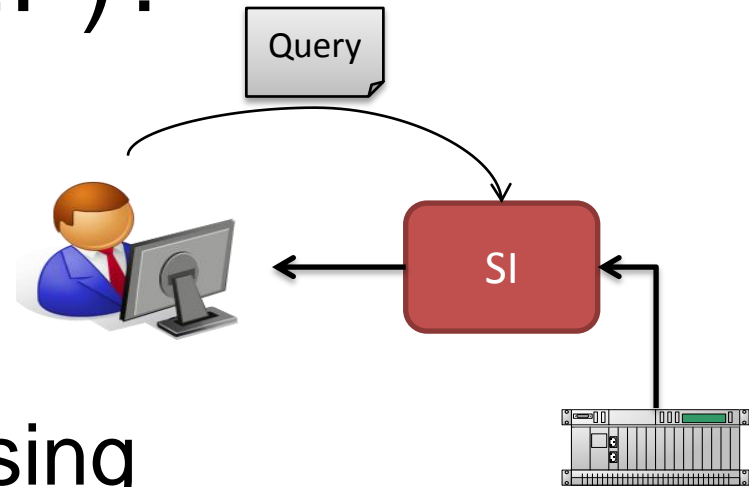
- Process stream(s) of data
- Perform time based queries
- Correlate and aggregate data
- Avoid writing (structured) code

MICROSOFT STREAMINSIGHT

What is CEP?



What is Complex Event Processing (CEP)?

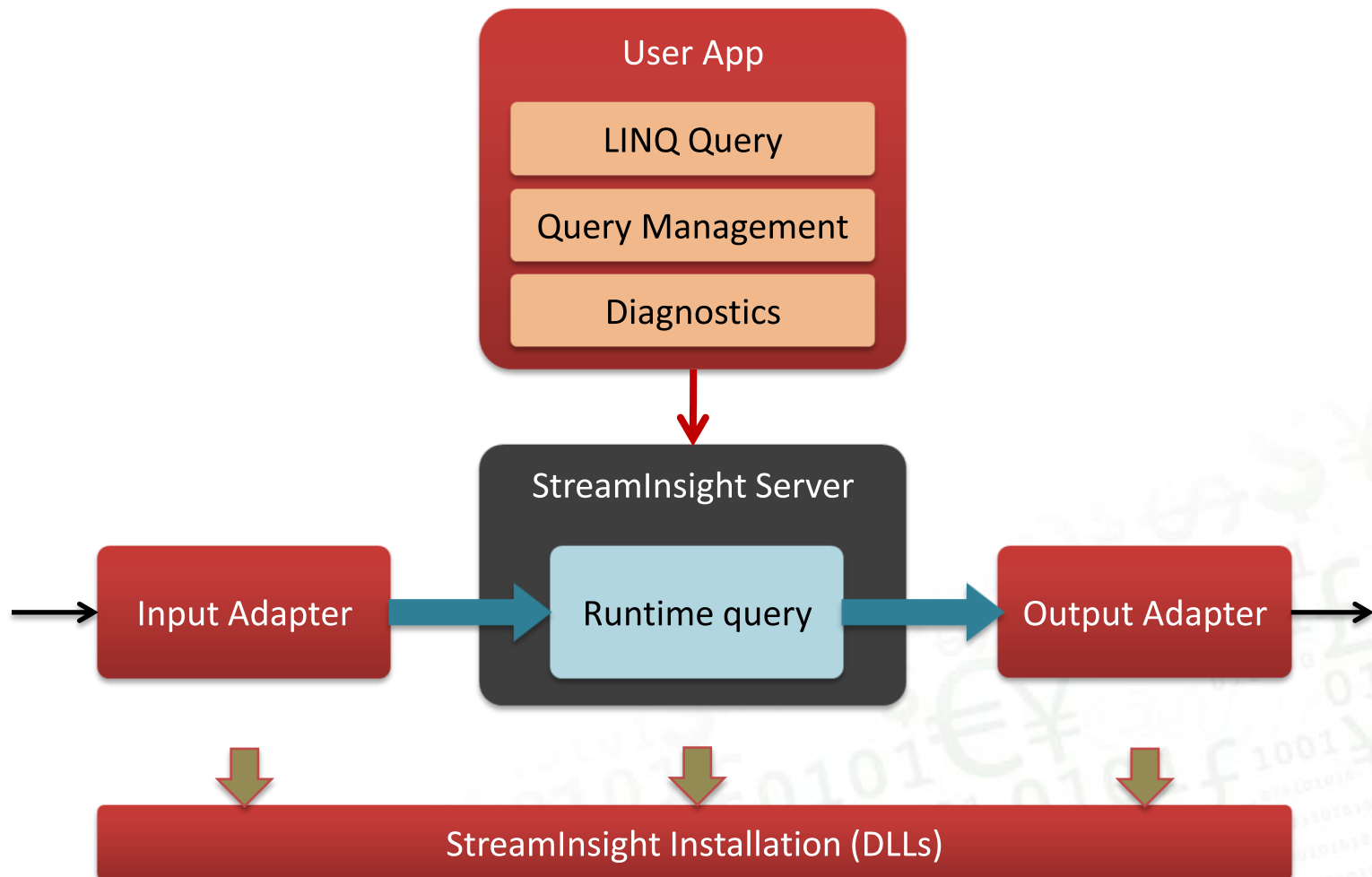


- **Continuous** processing of **event** streams
- from **multiple sources**
- based on a **declarative** query language
- with **near-zero latency**

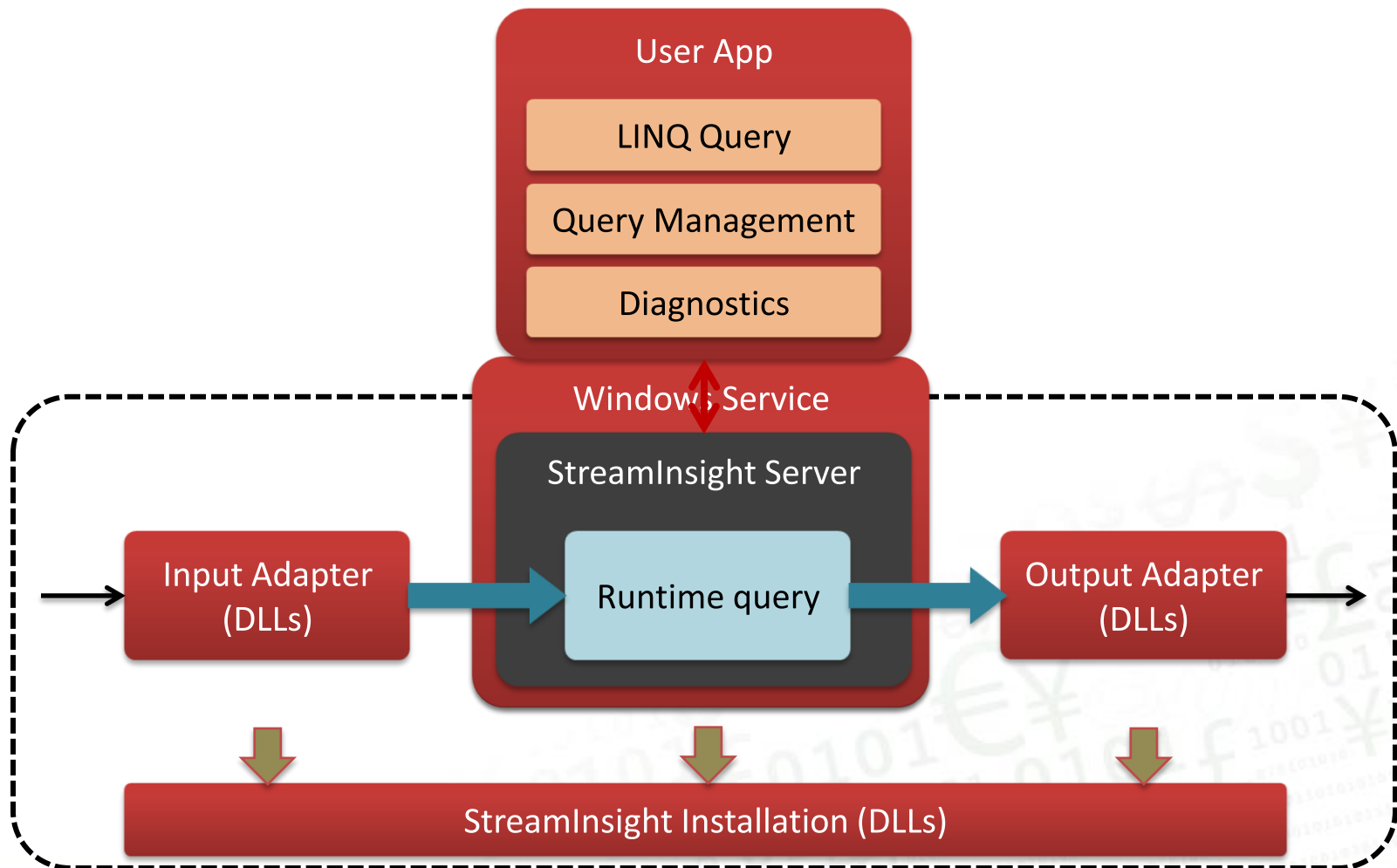
Event-Driven Data Processing Challenges

- Reason about time semantics
- Detect interesting patterns
- Process late data
- Re-use existing functions and algorithms

Overview of StreamInsight



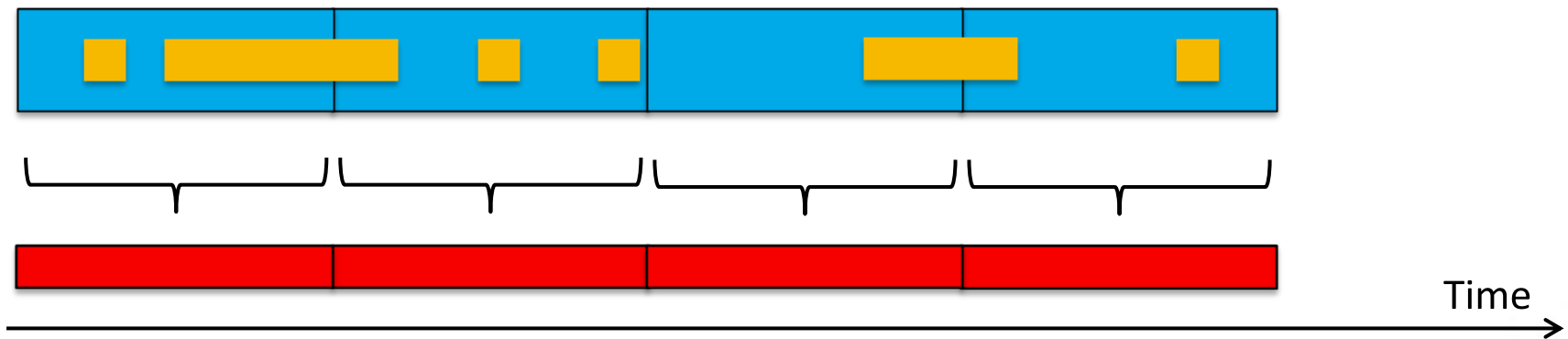
Overview of StreamInsight



Typical StreamInsight Queries

- “Give me the Top 3 values every 10 minutes”
- “Compute a running average of each sensor value over the last 20 seconds”
- “Filter out sensor readings when the device was in a maintenance period”
- “Tell me when an event A was followed by an event B within 3 minutes”

LINQ Example: Aggregate



```
var result = from win in inputStream.TumblingWindow(  
    TimeSpan.FromSeconds(10))  
select new { avg = win.Avg(e => e.W) };
```

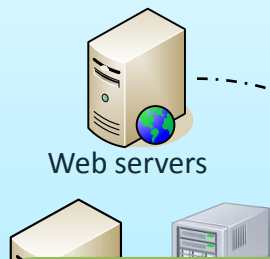
StreamInsight Platform

StreamInsight Application
Development in C#, LINQ



StreamInsight Application at Runtime

Event sources



**Flexible adapter SDK
with high performance
to connect to different
event sources and sinks**

Input
Adapters

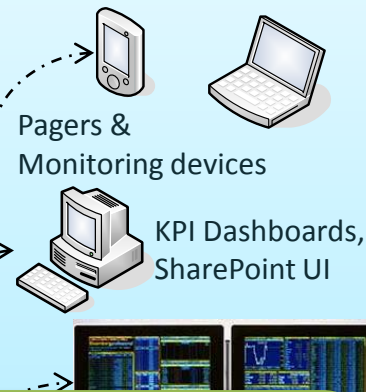
**The CEP platform does the heavy
lifting for you to deal with
temporal characteristics of event
stream data**

Logic

Logic

Output
Adapters



Event targets



**Queries are continuous,
consume and produce
streams, and compute results
incrementally**

**Rich diagnostic and
debugging interface**

SQL Server 2008 R2

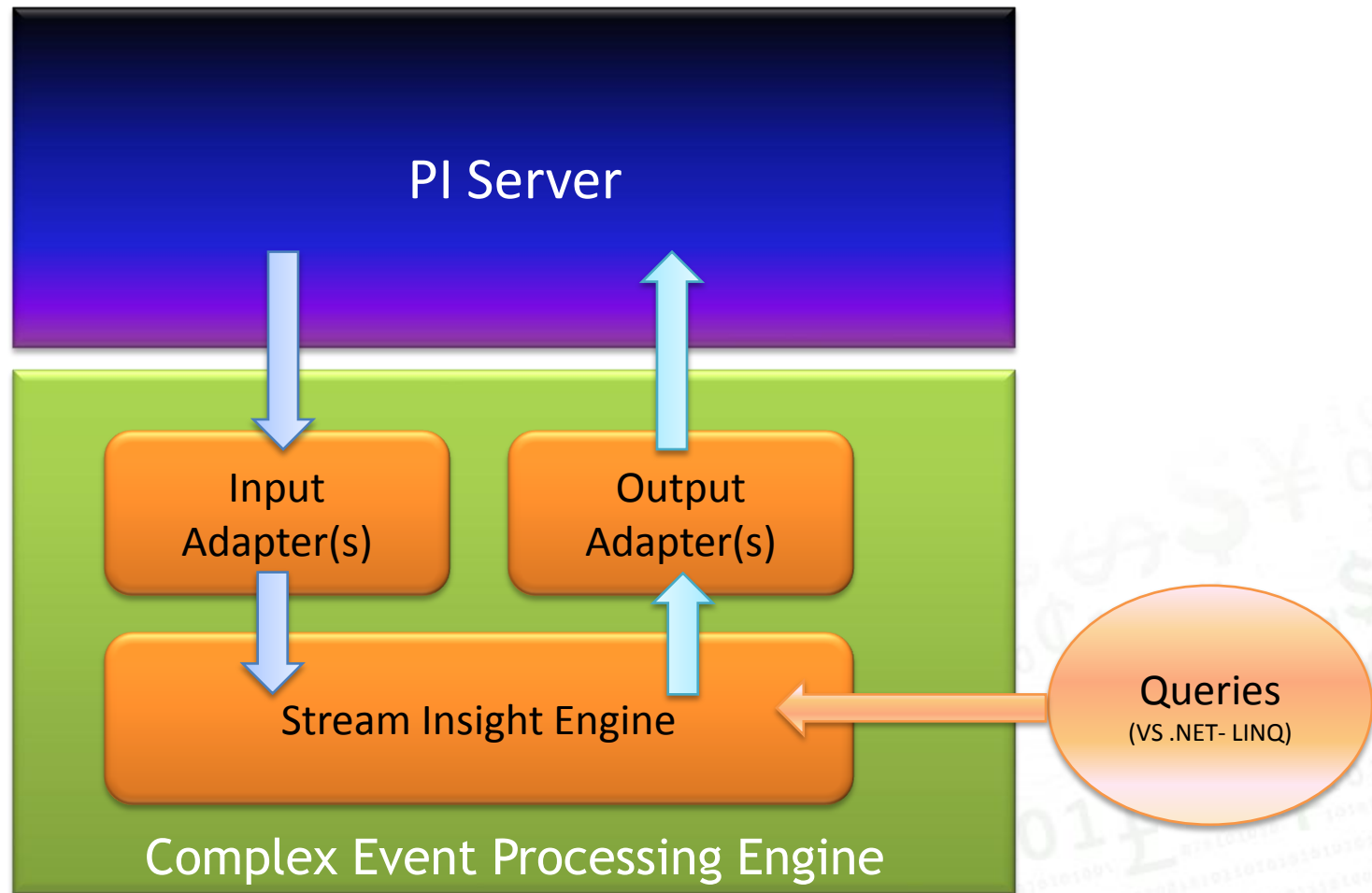
Workload	Standard	Enterprise	Datacenter 	Parallel Data Warehouse 
Custom/Packaged OLTP Apps	4 procs, 64GB RAM, Backup Compression	8 procs, 2TB RAM, Adv. Security, Backup Compression	>8 procs, OS Max, Adv. Security, Backup Compression	N/A
Server Consolidation	1 VM/license	4 VMs/license, Resource Governor App & Multi-Server Mgmt (up to 25 instances)	Unlimited Virtualization, Resource Governor, App & Multi-Server Mgmt (> 25 instances)	N/A
Data Warehousing		Scale-Up DW, Data Compression 10s of TBs, Up to 30 TB with FastTrack	Scale-Up DW, Data Compression 10s of TBs	Scale-Out DW 10s - 100s of TBs
Business Intelligence	Dept/Team BI	Enterprise-Scale BI, Master Data Services, PowerPivot Mgmt	Enterprise-Scale BI, Master Data Services, PowerPivot Mgmt	Integrated with SSIS, SSAS and SSRS
Complex Event Processing (StreamInsight)	<5000 events/sec & > 5 s latency	<5000 events/sec & > 5 s latency	>5000 events/sec & < 5 s latency	N/A

Microsoft StreamInsight

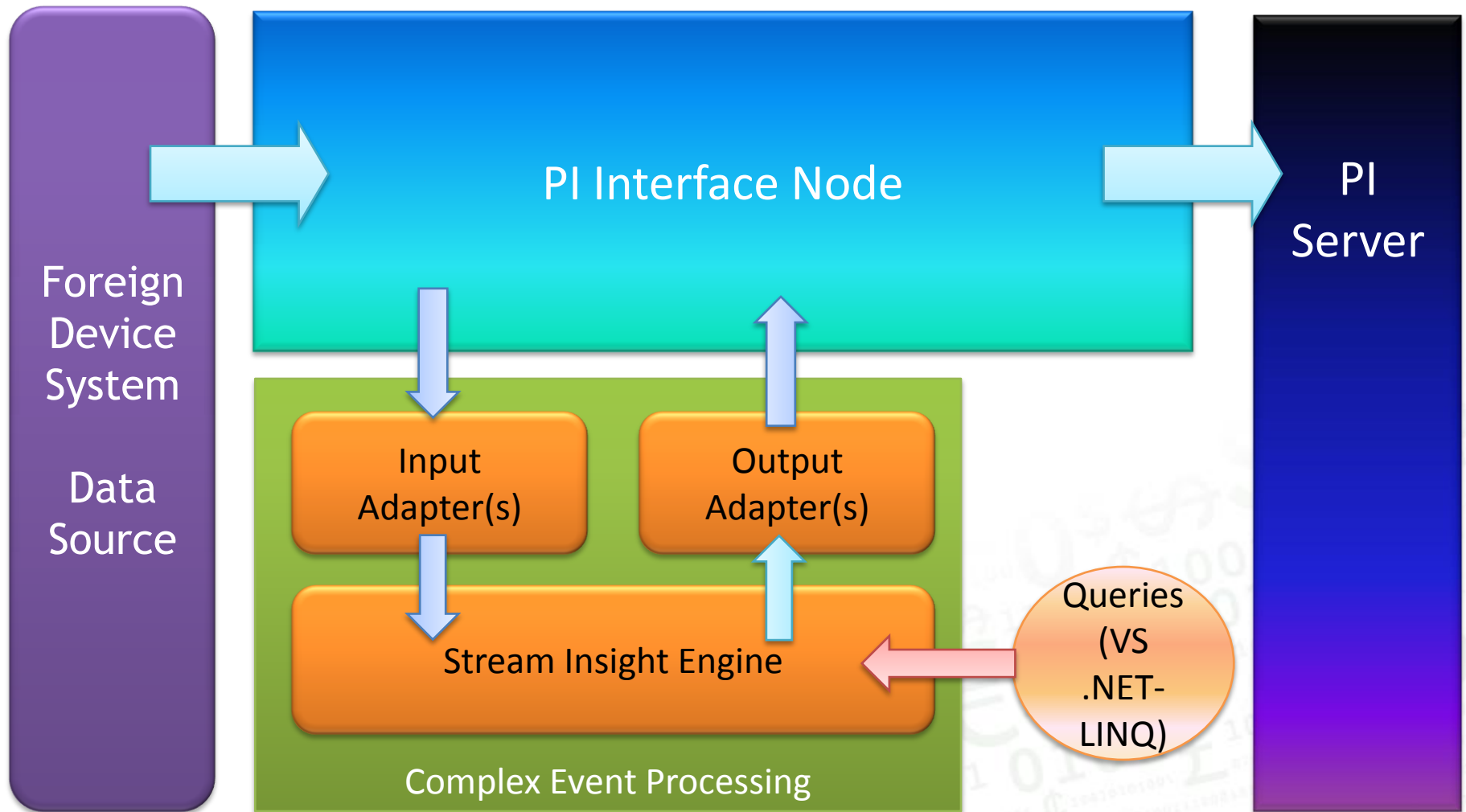
- SQL Server 2008 R2 RTM
 - Evaluation Version online now
 - Released to Enterprise customers May/June
- Future Version
 - Scale-out / HA

PI FOR STREAMINSIGHT

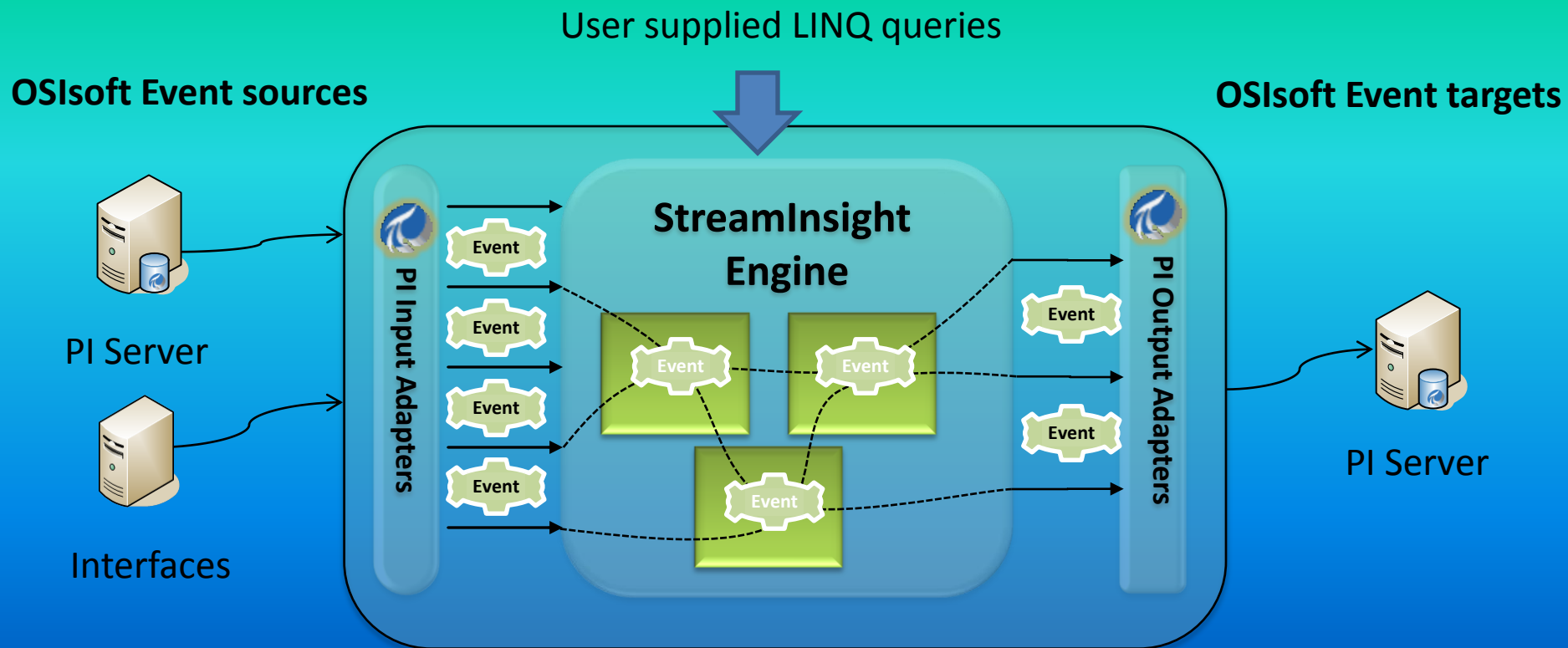
“Server-Side” Processing



“Edge” Processing



PI for StreamInsight



Data access (Adapters) to StreamInsight

Today

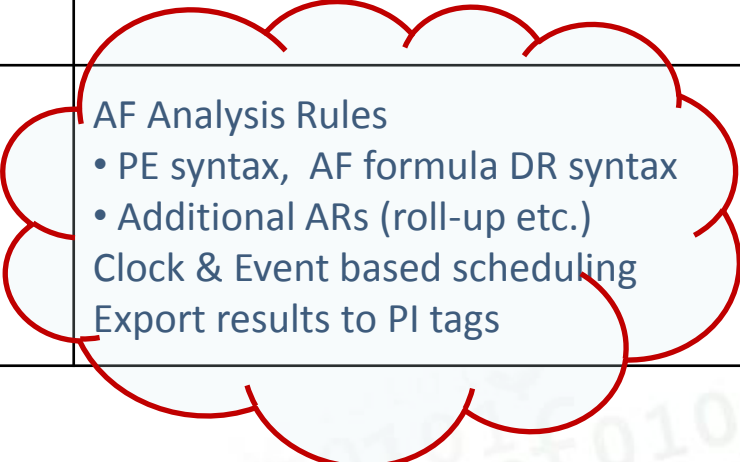
- PI for StreamInsight CTP
 - Available on OSIsoft vCampus
- Functionality
 - PI Snapshot Input Adapter
 - Write to PI Output Adapter
- Includes sample queries
- Based on November CTP of StreamInsight

PI for StreamInsight

- Upcoming
 - Version 1 Q3
- OSIssoft vCampus
 - Blog
 - Webinar
 - Software samples
- Product Expo - Analytics Pod

CONFIGURED ANALYTICS





The Analytics Landscape today




		Configuration	Programming
Specific Context	PI Tags	PI PE, PI Totalizers, PI Alarms, PI RT SQC	PI ACE, PI SDK (Custom applications)
Generic Context	PI MDB	None	PI ACE, PI SDK (Custom applications)
	PI AF	 AF Analysis Rules • PE syntax, AF formula DR syntax • Additional ARs (roll-up etc.) Clock & Event based scheduling Export results to PI tags	Custom AF Data References Custom AF Analysis Rules Custom applications (AF SDK)

AF Configured Analytics Overview

- Leverage AF Features
- GUI based
- Performance Equation
- Rollup
- Write results to PI

Attribute/Attribute Template

Name:	Shell Side Heat Capacity
Description:	
Configuration Item:	<input type="checkbox"/>
Categories	<input type="text"/> 
UOM:	British thermal units per poun
Value Type:	Double
Value:	1 BTU/(lb °F)
Data Reference:	Table Lookup 
 Settings...  Convert to Analysis...	
SELECT [Heat Capacity] FROM [Material Properties] WHERE MaterialID = @[Shell Side Material]	

Name:	Shell Side Heat Capacity
Description:	
Configuration Item:	<input type="checkbox"/>
Categories	<input type="text"/> 
UOM:	British thermal units per poun
Value Type:	Double
Value:	1 BTU/(lb °F)
Data Reference:	Table Lookup 
 Settings...	
SELECT [Heat Cap. Properties] WHERE Material]	

<None>

Formula

Ideal Gas Law

PI Point

PI Point Array

Table Lookup

Comparison

Performance Equation

Analysis

Name: LMTD Calculation

Target: HeatExchanger

Analysis Rule

Performance Equation

+ Add

= Evaluate

Function

Operator

Attribute...

Ceiling

Char

Compare

Concat

Input Parameters

ColdIn

ColdOut

HotIn

HotOut

. |Shell Side Inlet Temperature; UOM=°C

. |Shell Side Outlet Temperature; UOM=°C

. |Tube Side Inlet Temperature; UOM=°C

. |Tube Side Outlet Temperature; UOM=°C

Add

Output Parameters

LMTD

PI Point

. |LMTD

\\%Server%\%Element%. %Attribute%

Add

...

Schedule

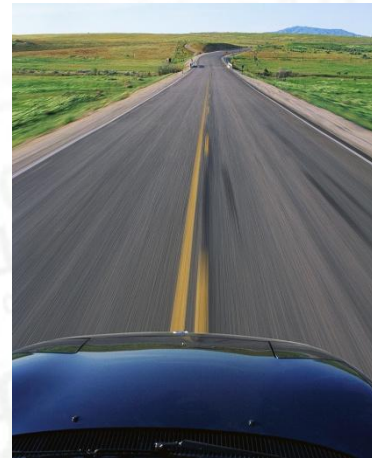
Hourly

Frequency=3600

SUMMARY

Upcoming Product Releases

- PI ACE 2010 – 2H 2010
 - Performance and scale out
- PI Notifications 2010 – 2H 2010
 - Formatting & history performance
- PI for StreamInsight – Q3
 - Data access to analytics engine



Want more?

- OSIssoft vCampus
 - PI for StreamInsight
 - PI Notifications
 - PI ACE
- UC 2010 presentations on PI Analytics and PI Notifications
- Product Expo
 - PI Notifications
 - PI Analytics
- Learning labs – PI Notifications



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Thank you

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