



OSIsoft®

# REGIONAL SEMINAR 2012

E M E A

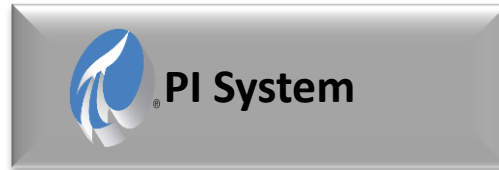
The Power of Data



# Integrating PI with Enterprise Systems

Presented by

Production Maintenance Inventory Quality



# Business Integration – Why?

Enable business agility (time enough to act)

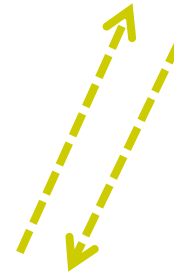
- Available-to-promise (ATP), better inventory, visibility into capacity
- Condition-based maintenance (CBM) for better asset reliability, reduce maintenance cost
- Quality – compare production runs, close out orders faster
- Visual – visibility into PI System data throughout the enterprise



# Business Integration - What?



- Data/Event integration (transactions)
  - 1000s/day
  - small amounts of data (per transaction)



- Visual integration



- Business Intelligence + Reporting  
(not covered in this talk)

# Business Integration - How?

- PI Data Access family of products
- PI Notifications
- Assets Synchronization



ORACLE

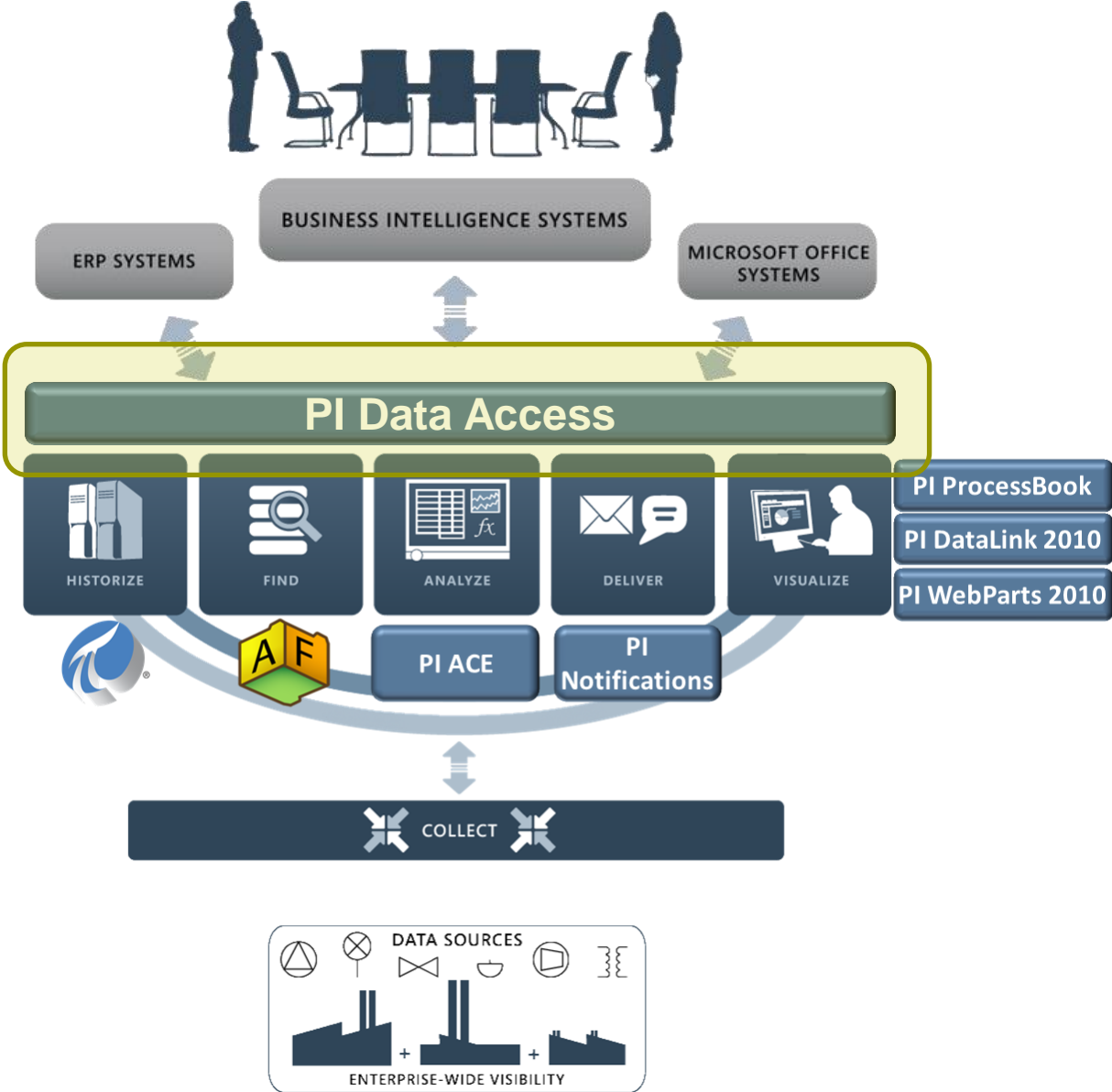
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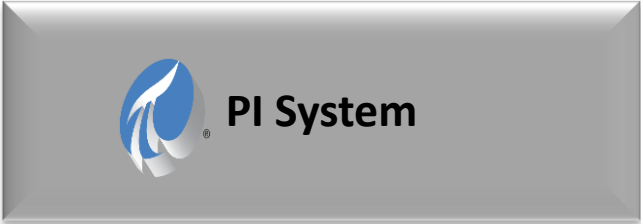
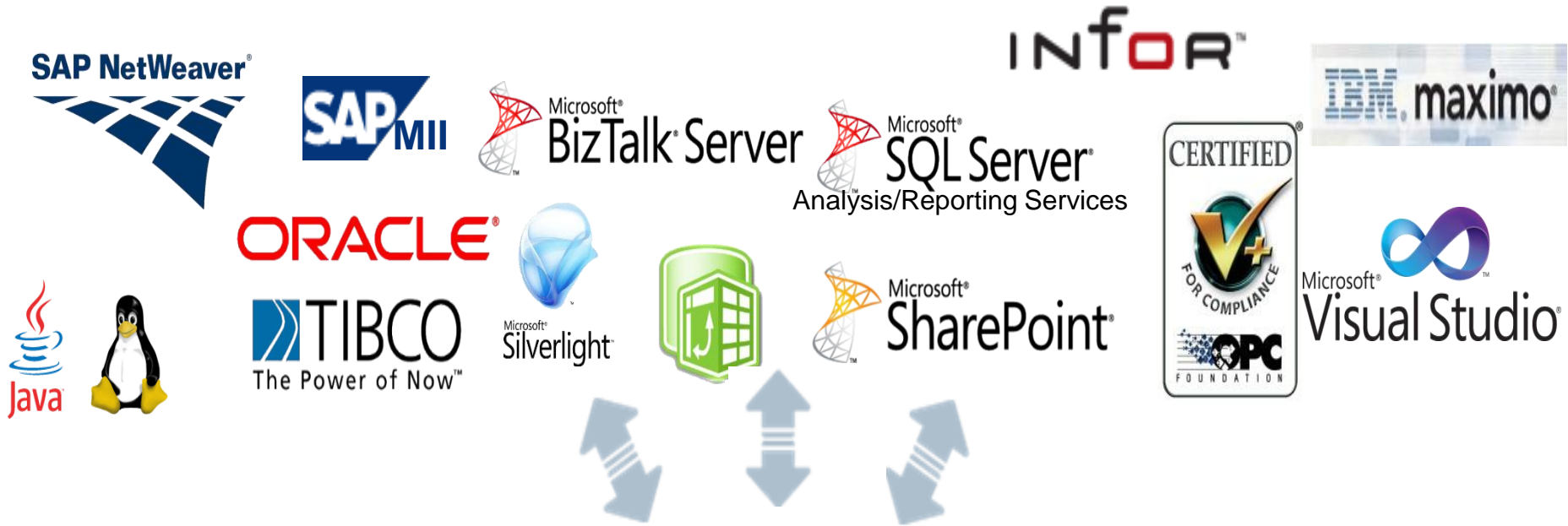
MINCOM



# The PI System

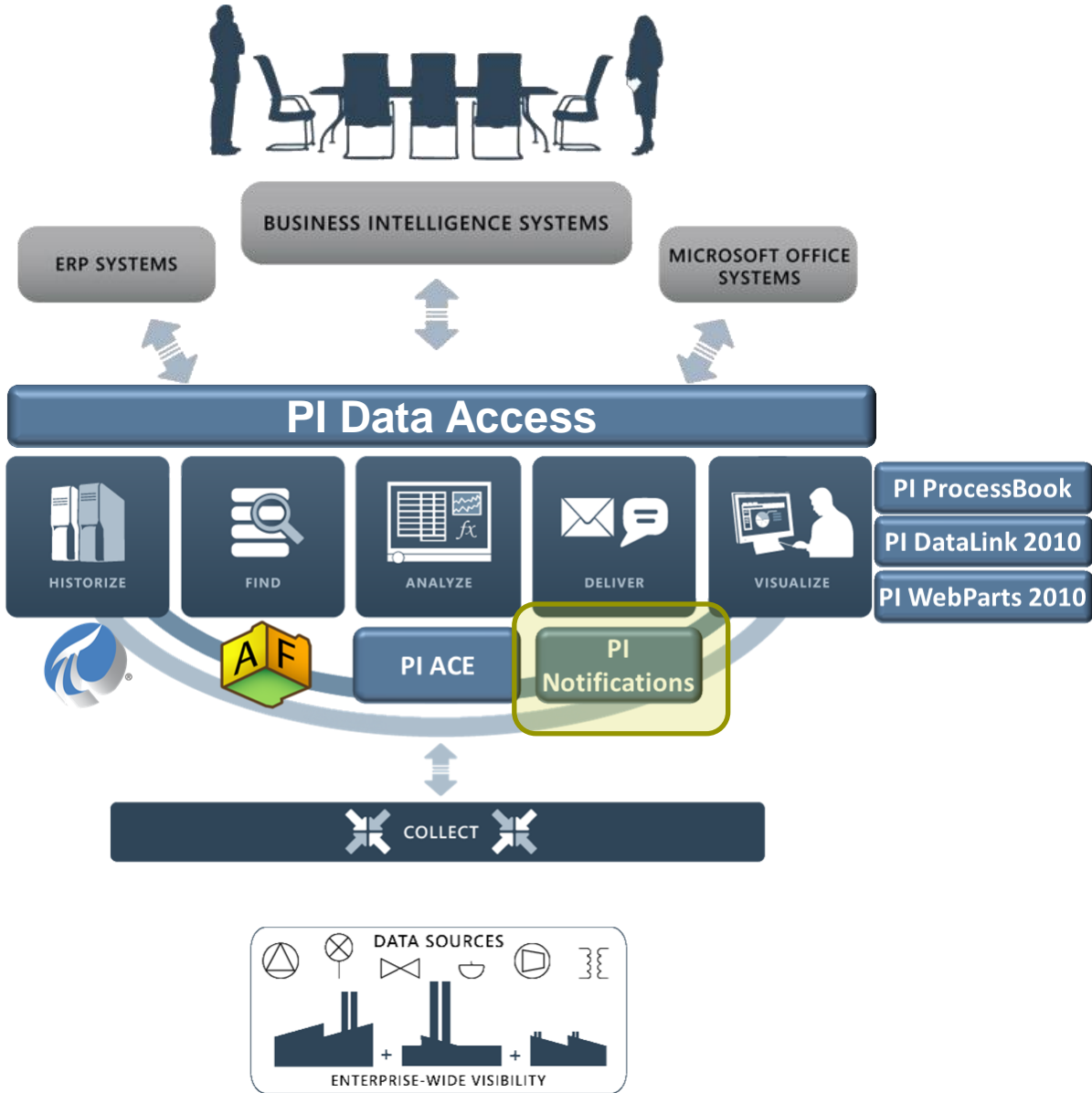


# PI Data Access

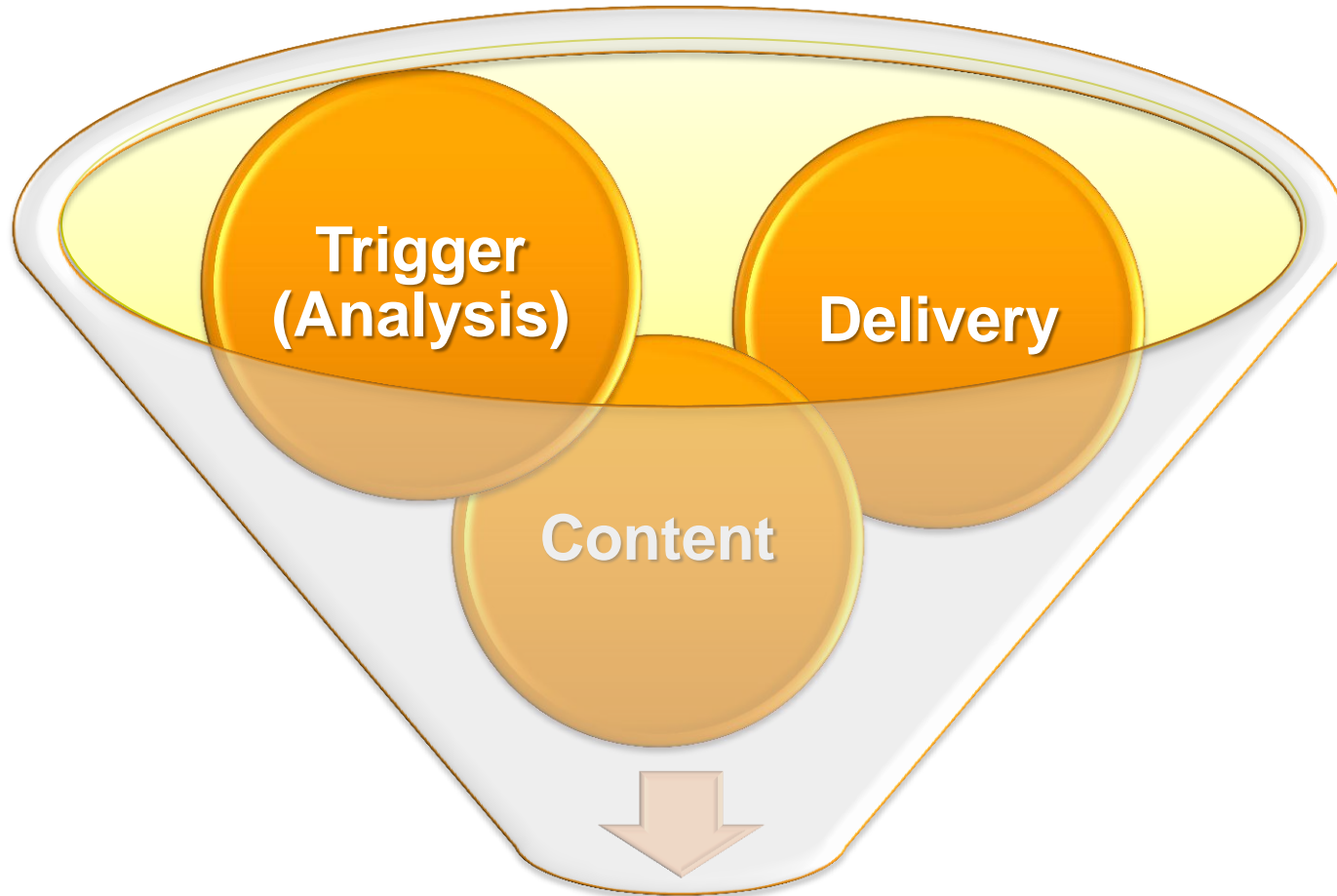




# The PI System

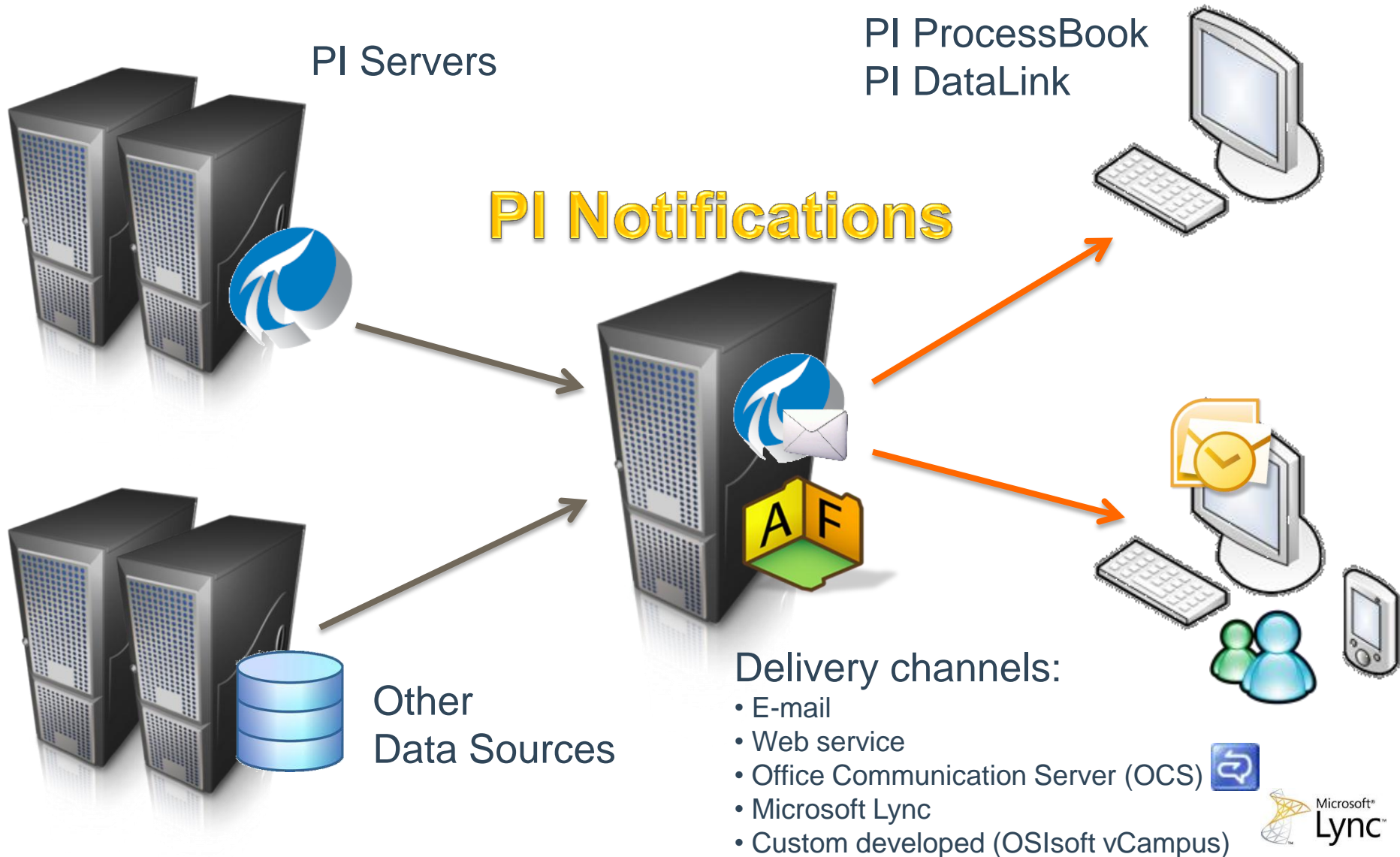


# Base Concept of a PI Notifications

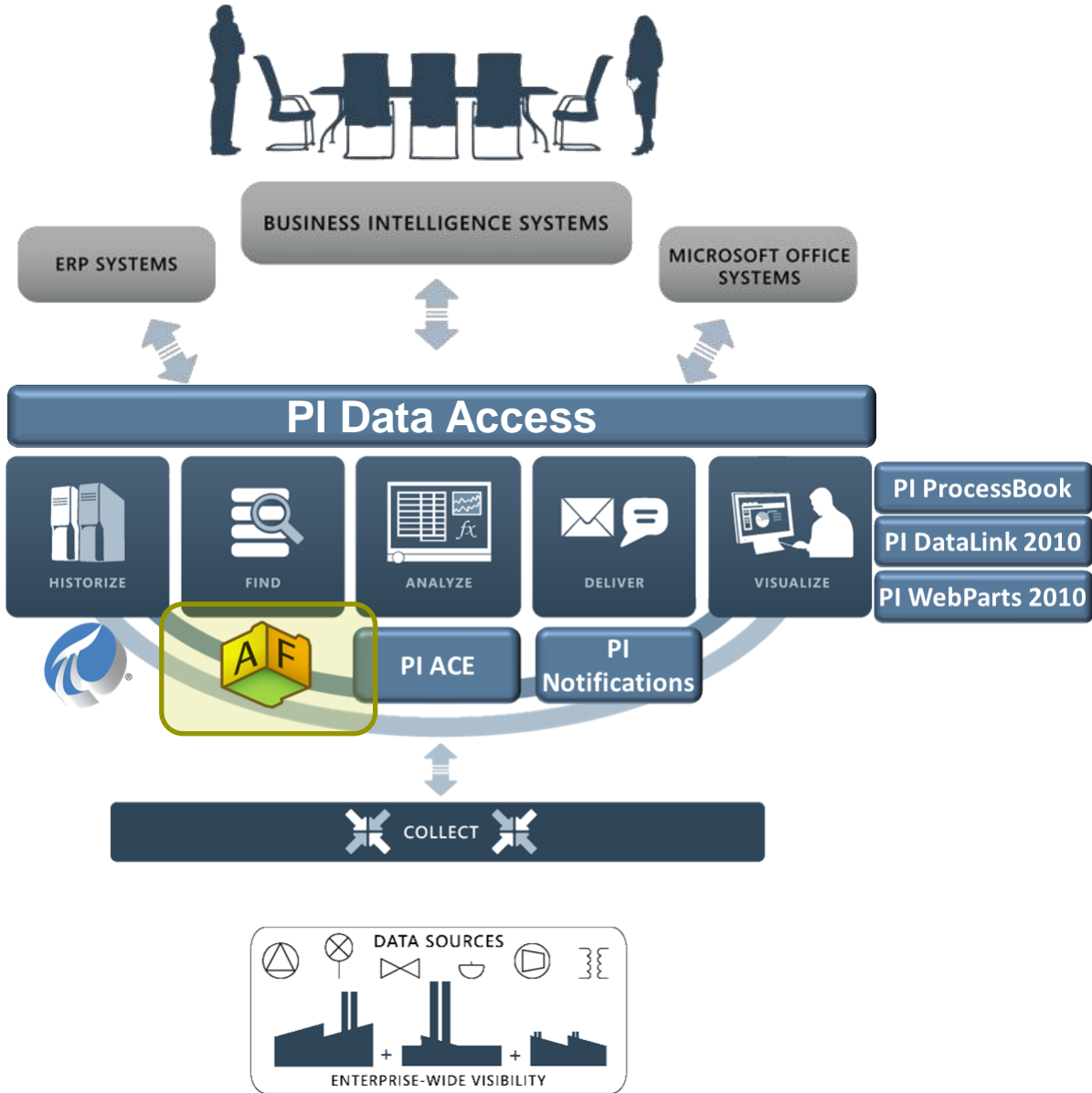


## Notification

# PI Notifications Architecture



# The PI System



# Business Integration – asset naming convention

The screenshot displays the IBM Maximo interface. On the left, a table lists assets with columns for 'Asset' and 'Description'. The main window, titled 'AF - PI System Explorer', shows a tree view of 'Elements' under a 'Database' context. The selected element is '11210 : Circulation Fan- Centrifugal/ 20/000 CFM'. The right pane provides details for this element, including its name, description, template ('Maximo\_Asset'), and default attribute ('assetnum').

Asset	Description
11200	HVAC System- 50 T Heat Cap
11210	Circulation Fan- C
11211	Motor Starter- Size 2
11220	Electrical Control Pa
11230	Emergency Generat
11240	Circulation Fan- Cen
11250	Circulation Fan- Cen
11300	Reciprocating Comp CFM
11340	Motor Starter- Size 12/440v/3ph/60hz
11400	Boiler- 50,000 Lb/Hr Tube
11430	Centrifugal Pump 10
11450	Centrifugal Pump 10

**AF - PI System Explorer**

File Edit View Go Tools Help

Database Query Date Back Check In New Element Search

### Elements

- Maximo\_Eqpt\_List
  - 11200 : HVAC System- 50 Ton Cool Cap/ 45
  - 11210 : Circulation Fan- Centrifugal/ 20/000 CFM**
  - 11211 : Motor Starter- Size 2/440v/3ph/60cy
  - 11220 : Electrical Control Panel- HVAC System
  - 11230 : Emergency Generator
  - 11240 : Circulation Fan- Centrifugal/ 20/000 CFM
  - 11250 : Circulation Fan- Centrifugal/ 20/000 CFM
  - 11300 : Reciprocating Compressor- Air Cooled
  - 11340 : Motor Starter- Size 4/NEMA 12/440v
  - 11400 : Boiler- 50,000 Lb/Hr/ Gas Fired/ Water Tube
  - 11430 : Centrifugal Pump 100GPM/60FT HD
  - 11450 : Centrifugal Pump 100GPM/60FT HD
  - 11470 : Centrifugal Pump 100 GPM, 60 FT-H
  - 11480 : Centrifugal Pump 100 GPM, 60 FT-H

### 11210 : Circulation Fan- Centrifugal/ 20/000 CFM

General Child Elements Attributes Ports Version

Name: 11210 : Circulation Fan- Centrifugal/ 20/000 CFM

Description:

Template: Maximo\_Asset Type: None

Categories:

Default Attribute: assetnum

[Extended Properties](#)

Find: [Parents](#) [Models](#) [Layers](#) [Connections](#) [Analyses](#) [Notifications](#)

# Business Integration – shared asset names

The image displays two software interfaces side-by-side. On the left is the Maximo 'Assets' page, and on the right is the PI ProcessBook 'Plot-0' page. A search for 'pump' is performed in both. In Maximo, the search results show a list of assets with descriptions like 'Centrifugal Pump'. In PI ProcessBook, the search results show a list of elements with names like '11430 : Centrifugal Pump 100GPM/60F...'. A plot on the right shows data for 'E. MotorWindingT' and 'E. HealthIndex'.

**Search for "pump" in Maximo**

**Search for "pump" in PI ProcessBook**

Asset	Description
11430	Centrifugal Pump
11450	Centrifugal Pump
11480	Centrifugal Pump
11470	Centrifugal Pump
12222	Centrifugal Pump

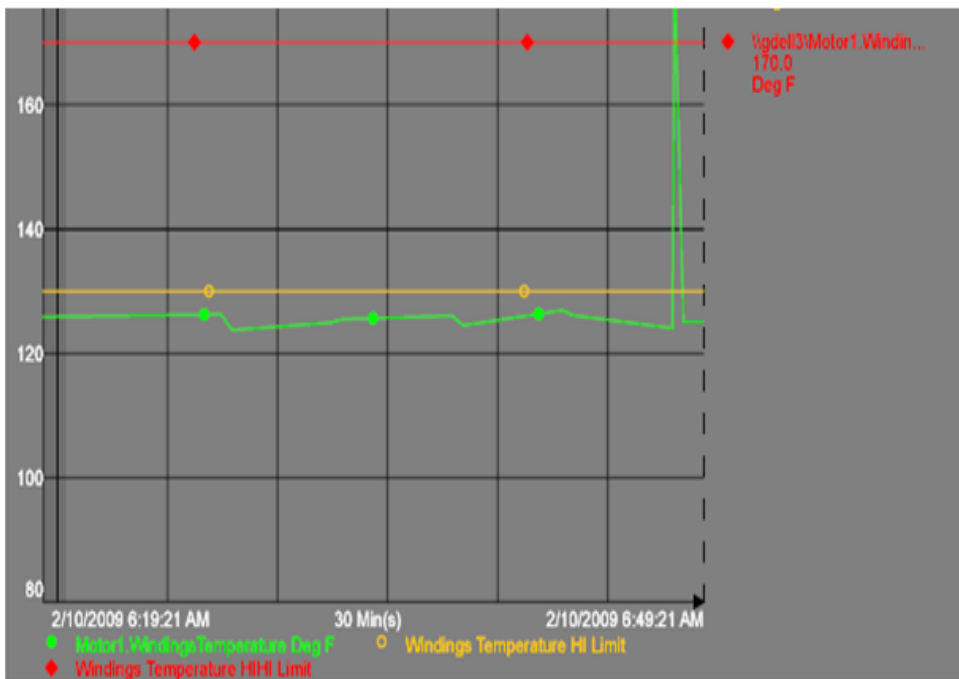
Name	Description
Maximo_Asset	
11430 : Centrifugal Pump 100GPM/60F...	
11450 : Centrifugal Pump 100GPM/60F...	
11470 : Centrifugal Pump 100 GPM, 60 ...	
11480 : Centrifugal Pump 100 GPM, 60 ...	

Plot-0

E. MotorWindingT  
125.42  
Deg F

E. HealthIndex  
9

# Business Integration – shared asset names



PI Coresight™ homepage

New Undo Redo Messages

Home ▶ DFPIAF ▶ PIML2 ▶ Maximo\_Eqpt\_List ▶

Search in Maximo\_Eqpt\_List

- 11220 : Electrical Control Panel- HVAC System
- 11230 : Emergency Generator
- 11240 : Circulation Fan- Centrifugal/ 20/000 CFM
- 11250 : Circulation Fan- Centrifugal/ 20/000 CFM
- 11300 : Reciprocating Compressor- Air Cooled/1
- 11340 : Motor Starter- Size 4/NEMA 12/440v/3p
- 11400 : Boiler- 50,000 Lb/Hr/ Gas Fired/ Water T
- 11430 : Centrifugal Pump 100GPM/60FT HD
- 11450 : Centrifugal Pump 100GPM/60FT HD1

11430 : Centrifugal P 149.58

700

600

500

400

300

## Maximo Work Orders

Equipment	WoNum	PM	Description	Status	StatusDate	Location	ReportedBy	Re
11430	1668		HiTempAlert	COMP	12/8/2008 10:22:18 AM	BR430	WILSON	12/10:
11430	1666		HiTempAlert	COMP	11/21/2008 10:21:53 AM	BR430	WILSON	11/21/2008 10:21:53 AM
11430	T1573		Check pump operation.	WSCH	5/2/2008 1:33:34 PM	BR430	MAXADMIN	5/2/2008 1:33:22 PM
11430	T1574		Check pump float switch.	WSCH	5/2/2008 1:33:34 PM	BR430	MAXADMIN	5/2/2008 1:33:23 PM
11430	T1575		Check seal and housing for leaks.	WSCH	5/2/2008 1:33:33 PM	BR430	MAXADMIN	5/2/2008 1:33:23 PM

Maximo Work Orders for "pump" 11430 in PI Web Parts

# Enterprise Integration Use Cases

- Maintenance
  - Usage-based maintenance (as opposed to calendar-based maintenance)
  - Condition-based maintenance
- Production
  - Real-time Inventory
  - Real-time Costing
- Implementation
  - Machine runhours (PI Totalizer Tag) is posted to CMMS
  - PI Alert posted to CMMS as a Work Request
  - Raw material consumption (PI Tag value) posted to SAP



# PI Totalizer reading to Maximo

- PI Notifications (with XML Delivery Channel)
- Push data from PI
- Transaction Objects in AF for mapping
- No middleware required

# MAXIMO\_METER

General

Attribute Templates

Ports

Group by:  Category

Search



	<b>i</b> Name	Description	Default Value
[-] MAX_METER_METERINFO_ToMaximo			
	Assetnum	Required (optional if Location is specified)	
	Location	Required (optional if Assetnum is specified)	
	Metename	Required	
	SiteID	Required, Maximo site, example BEDFORD	
[-] MAX_METER_READINGINFO_ToMaximo			
	Inspector	Optional - Person who took the reading, take from PIPoint Annotation i...	
	Reading	Required - PI Point with Reading Value and Timestamp to send to Ma...	



AF - PI System Explorer

File Edit View Go Tools Help

Database Query Date Back Check In New Element New Attribute Search

### Elements

- MAXIMO\_METER
  - 11430\_O-PRESSUR
  - 11430\_RUNHOURS
  - 11450\_O-PRESSUR
  - 11450\_RUNHOURS
  - 11470\_O-PRESSUR
  - 11470\_RUNHOURS
  - 11480\_RUNHOURS
  - 12500\_FUEL-G
  - 12500\_RUNHOURS
  - A6001\_ODOM-M

---

Elements

Event Frames

Library

Unit of Measure

MyPI

Notifications

Contacts

## 11430\_RUNHOURS

General Child Elements **Attributes** Ports Version

Group by:  Category

Search

	Name	Value	Description	Settings
MAX_METER_METERINFO_ToMaximo				
<input checked="" type="checkbox"/>	Assetnum	11430	Required (optional if Location is specified)	
<input checked="" type="checkbox"/>	Location	BR430	Required (optional if Assetnum is specified)	
<input checked="" type="checkbox"/>	Metename	RUNHOURS	Required	
<input checked="" type="checkbox"/>	SiteID	BEDFORD	Maximo site, example BEDFORD	
MAX_METER_READINGINFO_ToMaximo				
<input checked="" type="checkbox"/>	Inspector		Optional - Person who took the reading, take from PIPoin...	
<input checked="" type="checkbox"/>	Reading	12.55867	Required - PI Point with Reading Value and Timestamp t...	\\gdell6...

Reading

AF - PI System Explorer

File Edit View Go Tools Help

Database Query Date Back Check In New Template Search

### Library

- AF
  - Categories
  - Templates
    - Element Templates
    - Event Frame Templates
    - Model Templates
    - Notification Templates
      - HiMotorWindingT
      - HiVibration
      - Runhours
    - Transfer Templates
  - Enumeration Sets
  - Reference Types
  - Tables

### Runhours

Overview Trigger Content Subscriptions

Add

#### Standard Content

- Name
- Description
- Target
- Start Time
- End Time
- Trigger Time
- State
- Escalation Level
- Priority

#### Attribute Value

- \\GDELL610\AF\Element Templates[MAXIMO\_METER]\Assetnum
- \\GDELL610\AF\Element Templates[MAXIMO\_METER]\Inspector
- \\GDELL610\AF\Element Templates[MAXIMO\_METER]\Location
- \\GDELL610\AF\Element Templates[MAXIMO\_METER]\Metename
- \\GDELL610\AF\Element Templates[MAXIMO\_METER]\Reading
- \\GDELL610\AF\Element Templates[MAXIMO\_METER]\SiteID

#### Link

- Instant RtWebParts Trend

Runhours Modified: 1/29/2010 10:09:17 AM.

```
MaximoMeter.XML - Notepad
File Edit Format View Help
<Notification>
<NotificationName>Runhours1</NotificationName>
<NotificationDescription />
<NotificationState>Runhours</NotificationState>
<StartTime>1/29/2010 7:08:00 PM</StartTime>
<EndTime>1/1/1970 12:00:00AM</EndTime>
<\\GDELL610\AF\MAXIMO_METER\11430_RUNHOURS|Assetnum>11430</\\GDELL610\AF\MAXIMO_METER\11430_RUNHOURS|Assetnum>
<\\GDELL610\AF\MAXIMO_METER\11430_RUNHOURS|Inspector />
<\\GDELL610\AF\MAXIMO_METER\11430_RUNHOURS|Location>BR430</\\GDELL610\AF\MAXIMO_METER\11430_RUNHOURS|Location>
<\\GDELL610\AF\MAXIMO_METER\11430_RUNHOURS|Metername>RUNHOURS</\\GDELL610\AF\MAXIMO_METER\11430_RUNHOURS|Metername>
<\\GDELL610\AF\MAXIMO_METER\11430_RUNHOURS|Reading>88.325872</\\GDELL610\AF\MAXIMO_METER\11430_RUNHOURS|Reading>
<\\GDELL610\AF\MAXIMO_METER\11430_RUNHOURS|SiteID>BEDFORD</\\GDELL610\AF\MAXIMO_METER\11430_RUNHOURS|SiteID>
</Notification>
```

```
MaximoMeterInterface.xml - Notepad
File Edit Format View Help
<?xml version="1.0" encoding="utf-8"?>
<METERInterface xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns="http://www.mro.com/mx/integration">
  <Header operation="Notify">
    <SenderID>EXTSYS1</SenderID>
  </Header>
  <Content>
    <METERDATA>
      <METERDATA>
        <ORGID>EAGLENA</ORGID>
        <SITEID>BEDFORD</SITEID>
        <ASSETNUM>11430</ASSETNUM>
        <METERNAME>RUNHOURS</METERNAME>
        <NEWREADING>11</NEWREADING>
        <NEWREADINGDATE>2010-01-22T19:11:00-05:00</NEWREADINGDATE>
      </METERDATA>
    </METERDATA>
  </Content>
</METERInterface>
```

Database Query Date Back Check In New Template Search

### Library

- AF
  - Categories
  - Templates
    - Element Templates
    - Event Frame Templates
    - Model Templates
    - Notification Templates
      - HiMotorWinding T
      - HiVibration
      - Runhours
    - Transfer Templates

### Runhours

Overview Trigger Content Subscriptions

Target: MAXIMO\_METER Select A Target...

Conditions

New Condition X Edit Up Down

Rule	Configuration	Time T...	Result ...	Priority
PerformanceEquation	True	0	Runhours	Normal

Time Rule: Periodic

Runhours Modified: Periodic Time Rule Configuration

### Periodic Time Rule Configuration

Interval

Periodic
  Daily
  Monthly

Begin at: 23:00:00 on

Monday
  Friday  
 Tuesday
  Saturday  
 Wednesday
  Sunday  
 Thursday

OK Cancel

# Enterprise Integration Use Cases

- **Maintenance**

- Usage-based maintenance (as opposed to calendar-based maintenance)
- **Condition-based maintenance**

- **Production**

- Real-time Inventory
- Real-time Costing

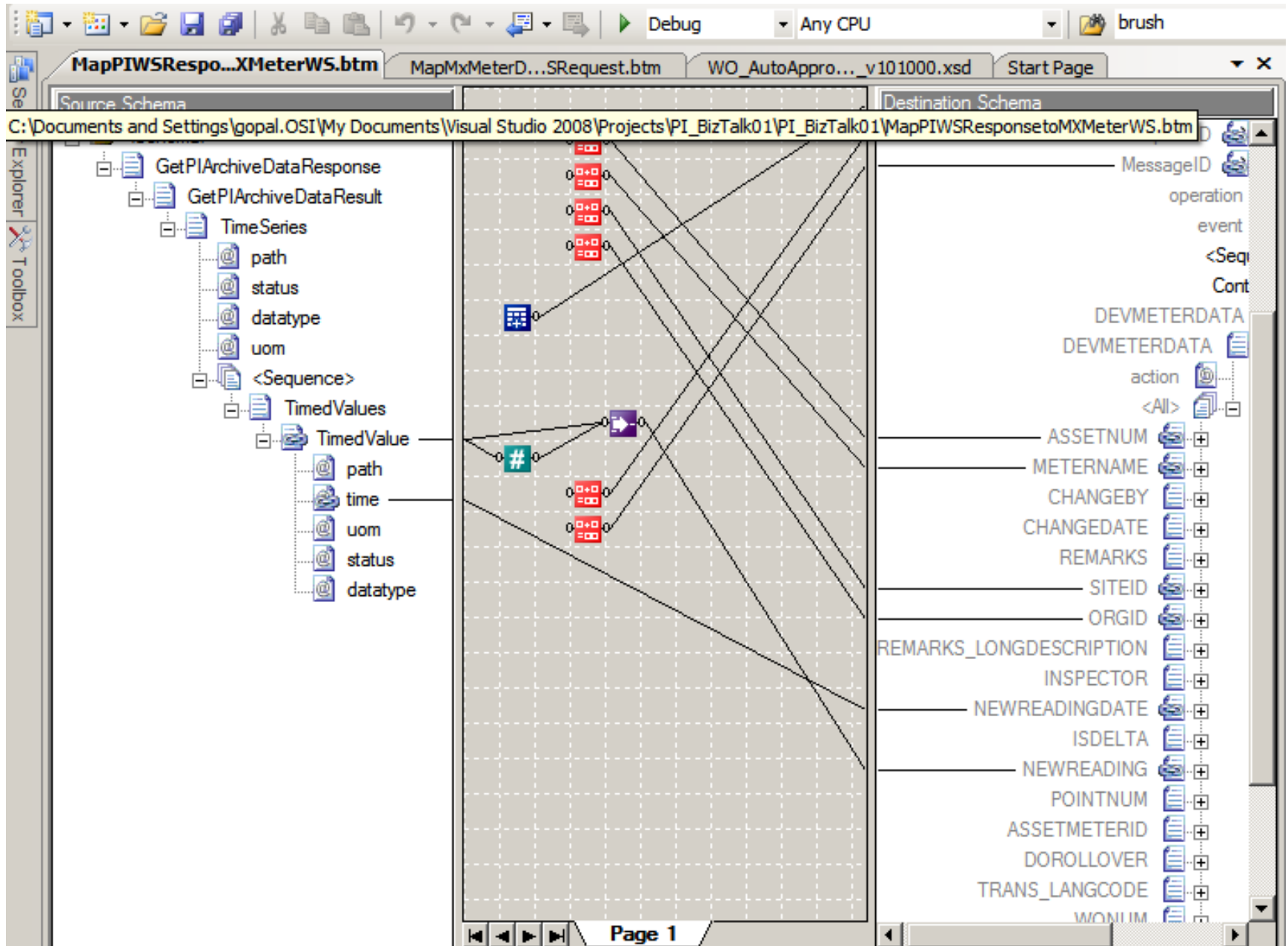
- **Implementation**

- Machine runhours (PI Totalizer Tag) is posted to CMMS
- **PI Alert posted to CMMS as a Work Request**
- Raw material consumption (PI Tag value) posted to SAP

# Bearing temperature high alert to Maximo Work Request

- Condition assessment using PI
- PI Web Services
- Middleware: Microsoft BizTalk





# Enterprise Integration Use Cases

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- **Implementation**
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# THANK YOU

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