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# REGIONAL SEMINAR 2012

E M E A

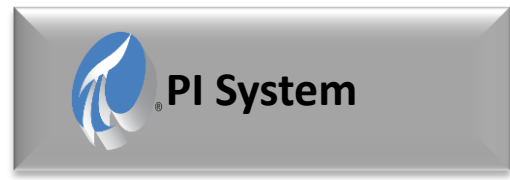
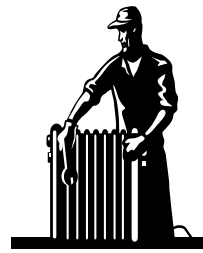
The Power of Data



# Integrating PI with Enterprise Systems

Presented by

Production Maintenance Inventory Quality



# Business Integration – Why?

Enable business agility (time enough to act)



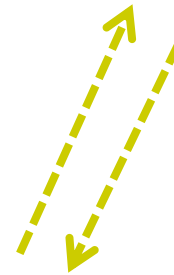
- Available-to-promise (ATP), better inventory, visibility into capacity
- Condition-based maintenance (CBM) for better asset reliability, reduce maintenance cost
- Quality – compare production runs, close out orders faster
- Visual – visibility into PI System data throughout the enterprise



# 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



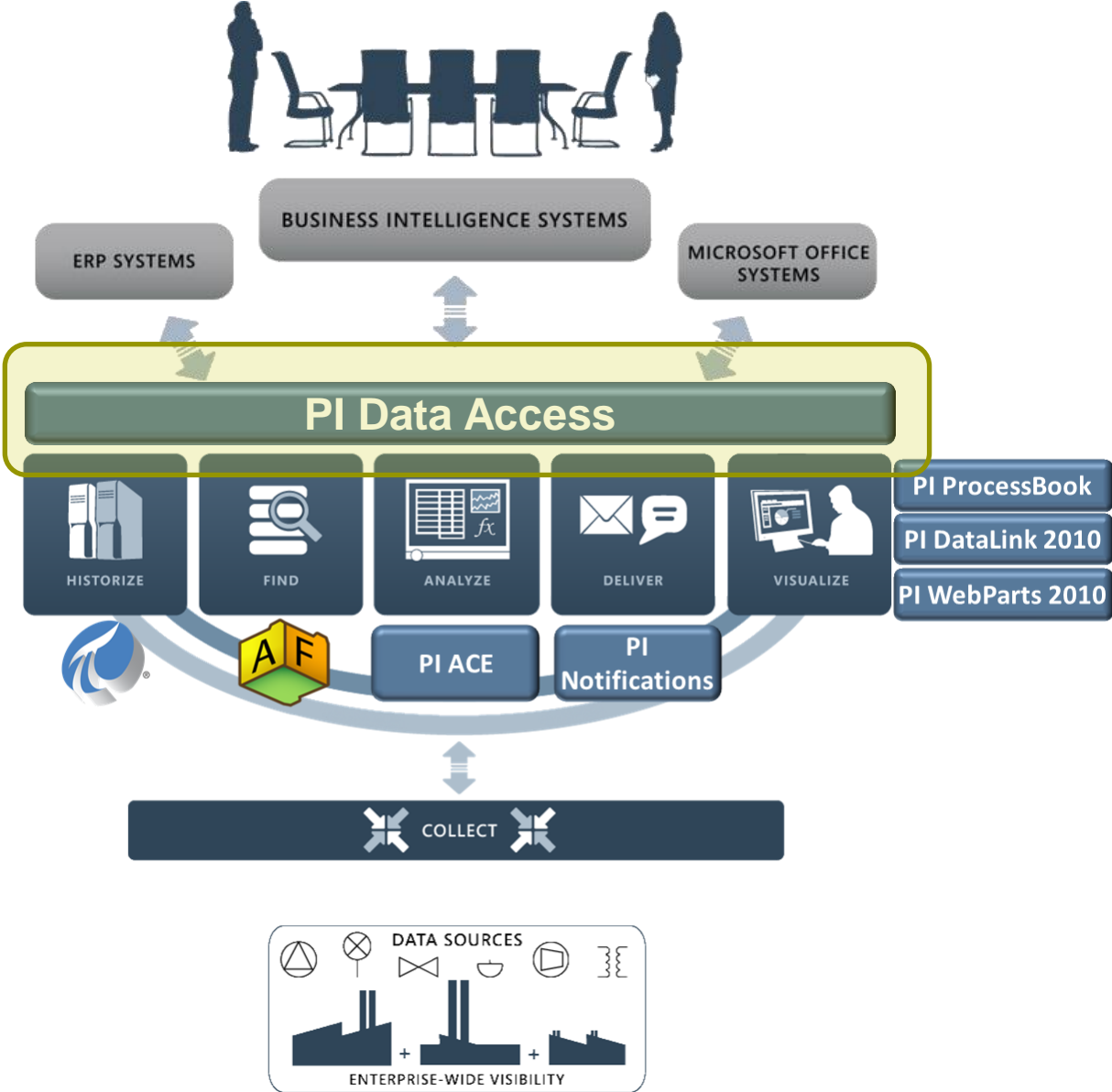
ORACLE

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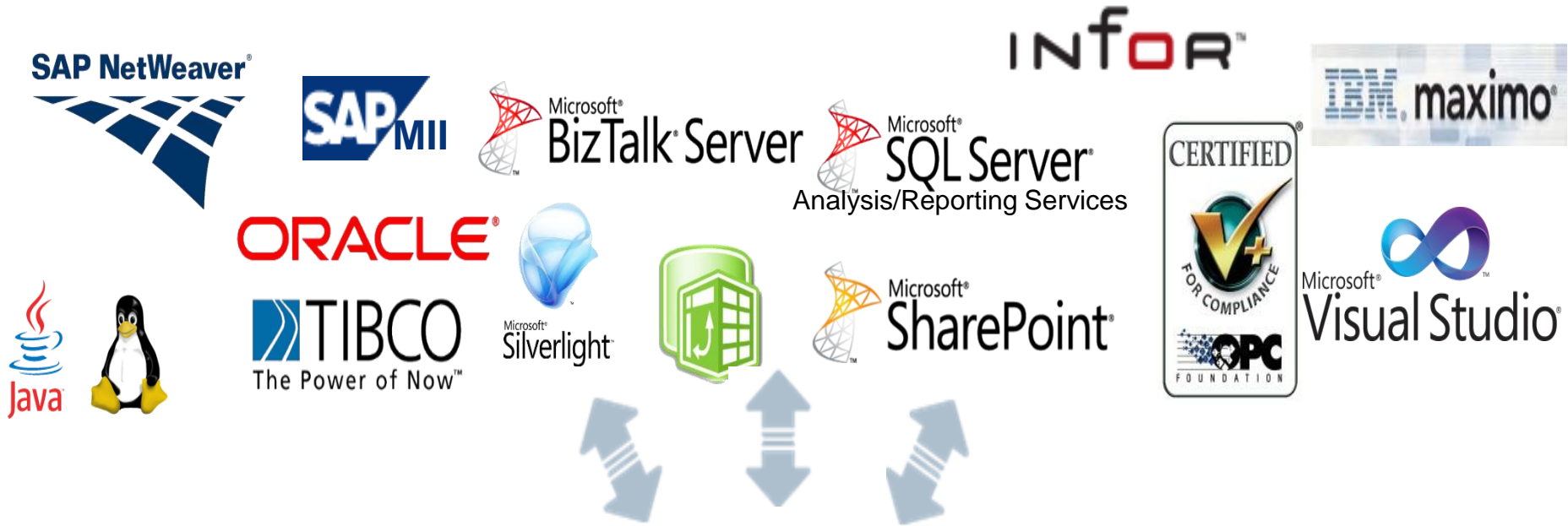


MINCOM

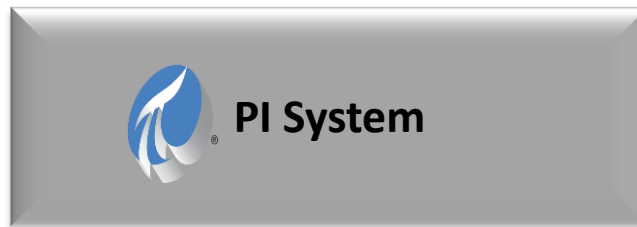
# The PI System



# PI Data Access

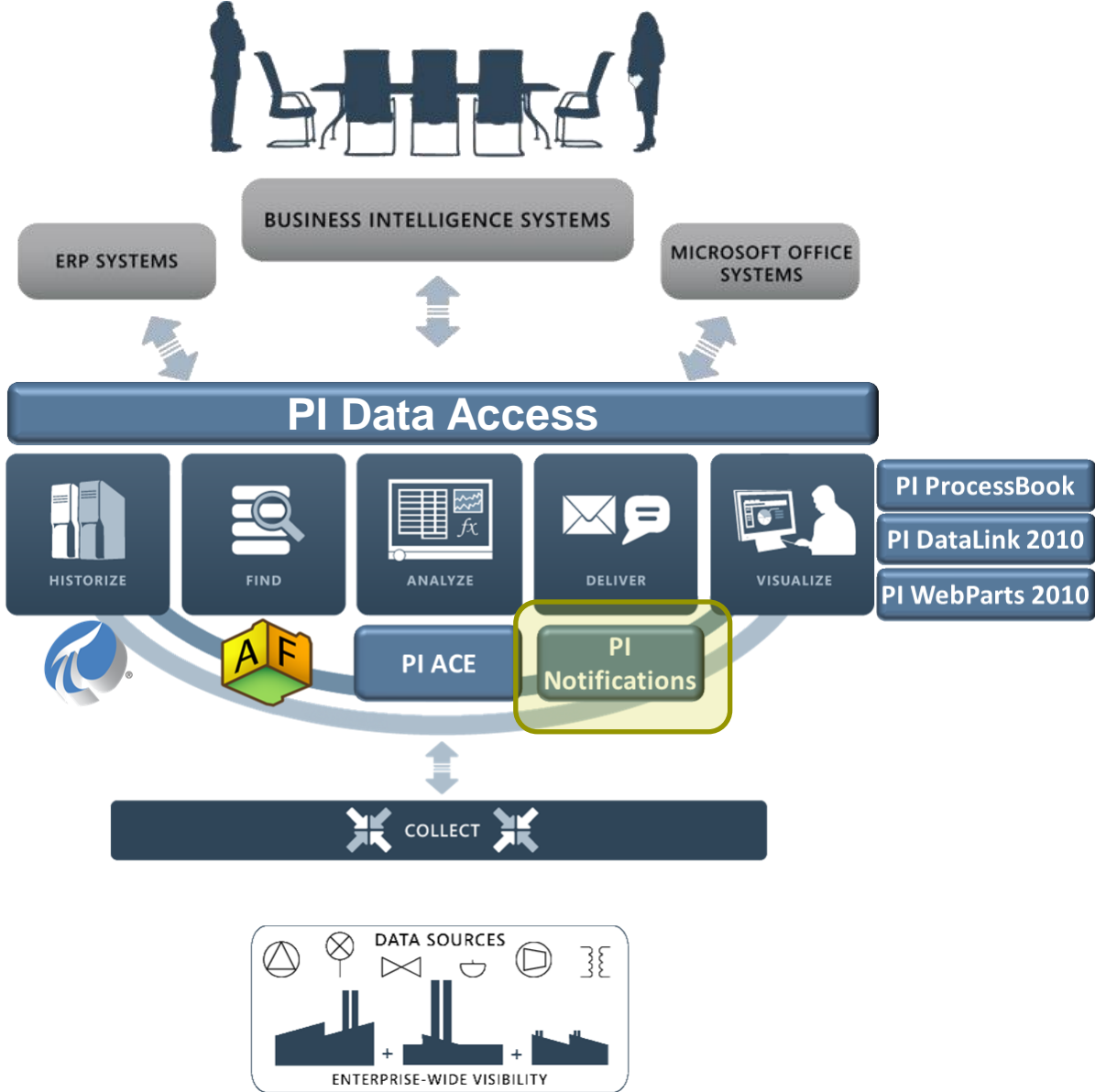


PI Data Access family of products

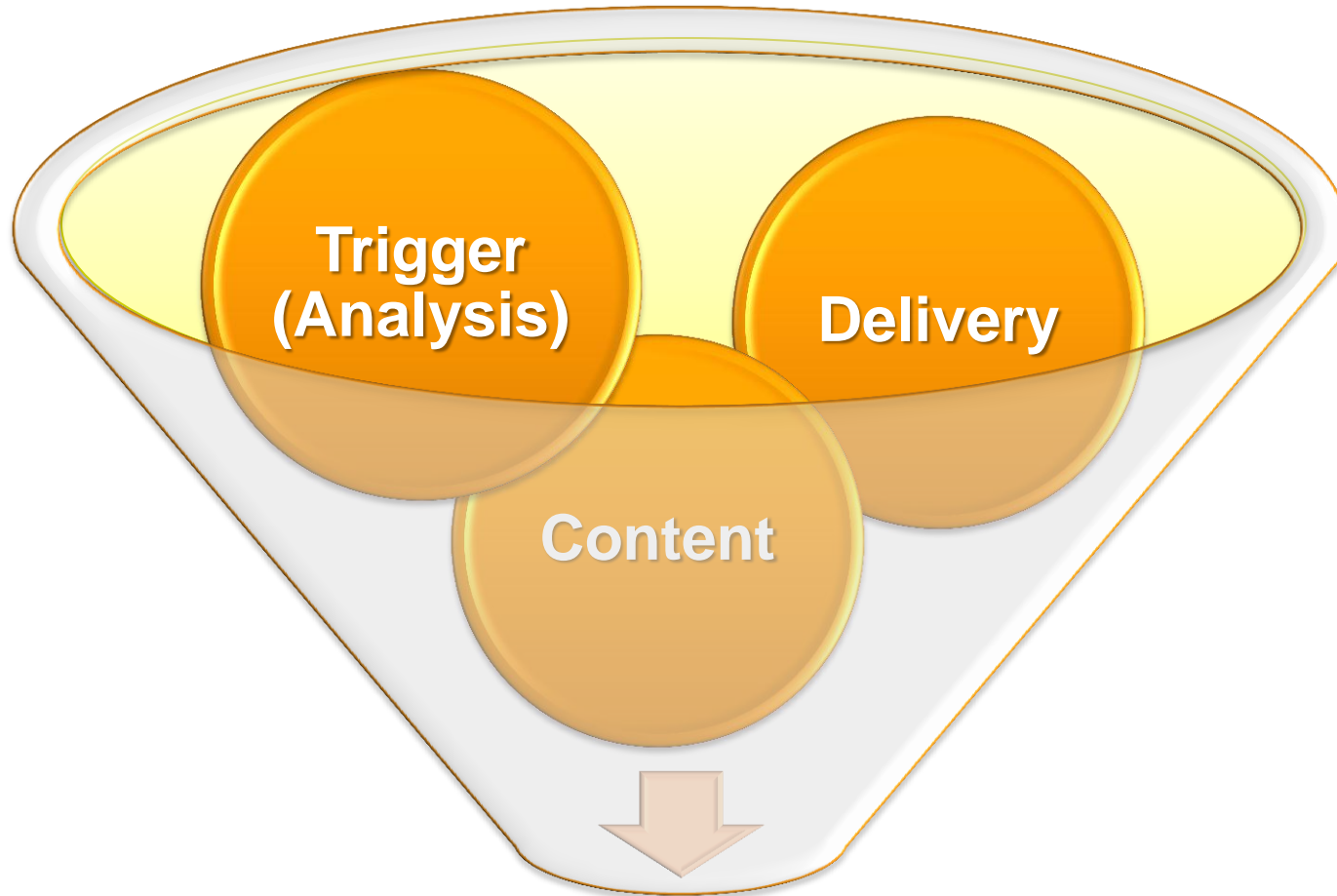




# The PI System

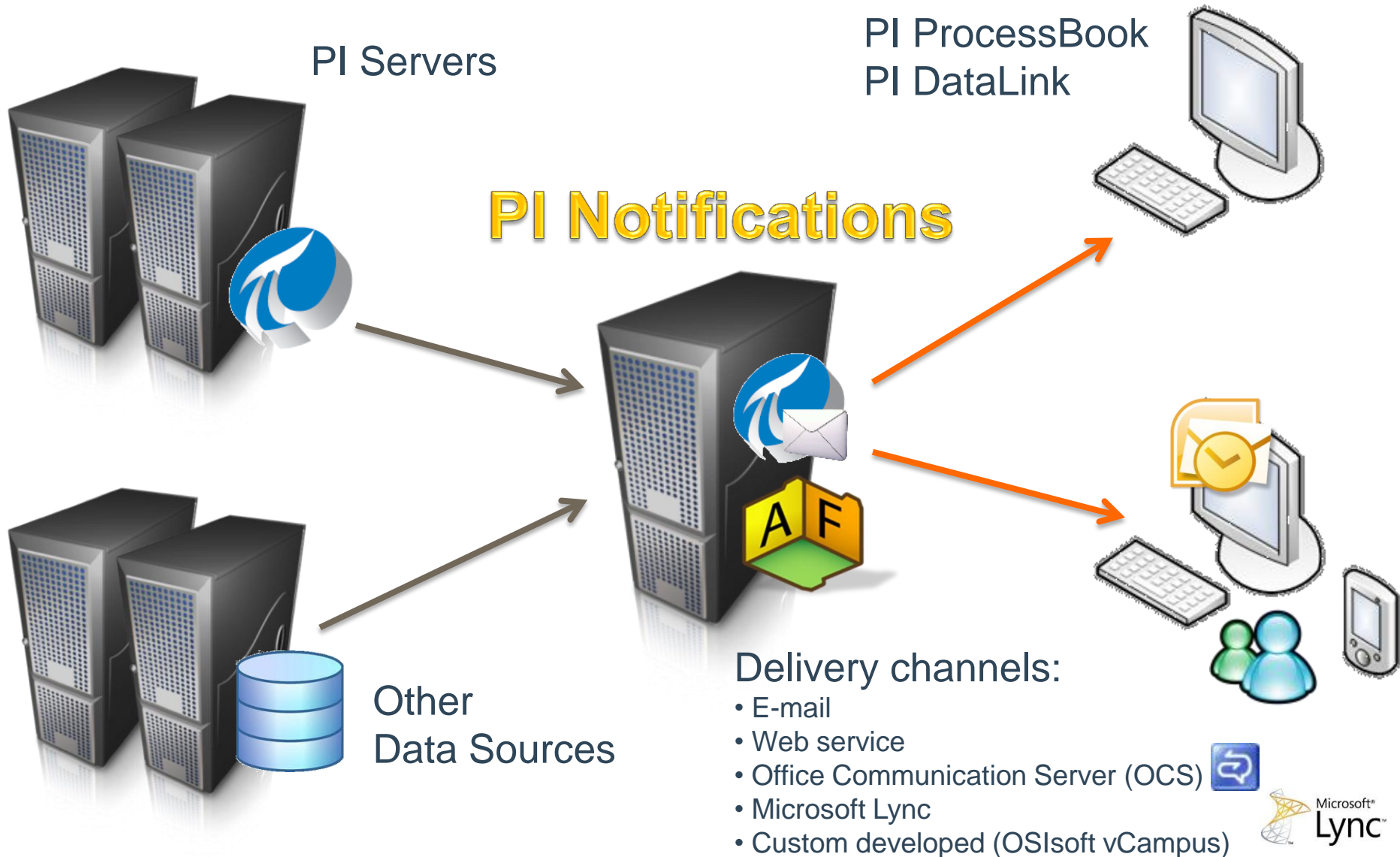


# Base Concept of a PI Notifications

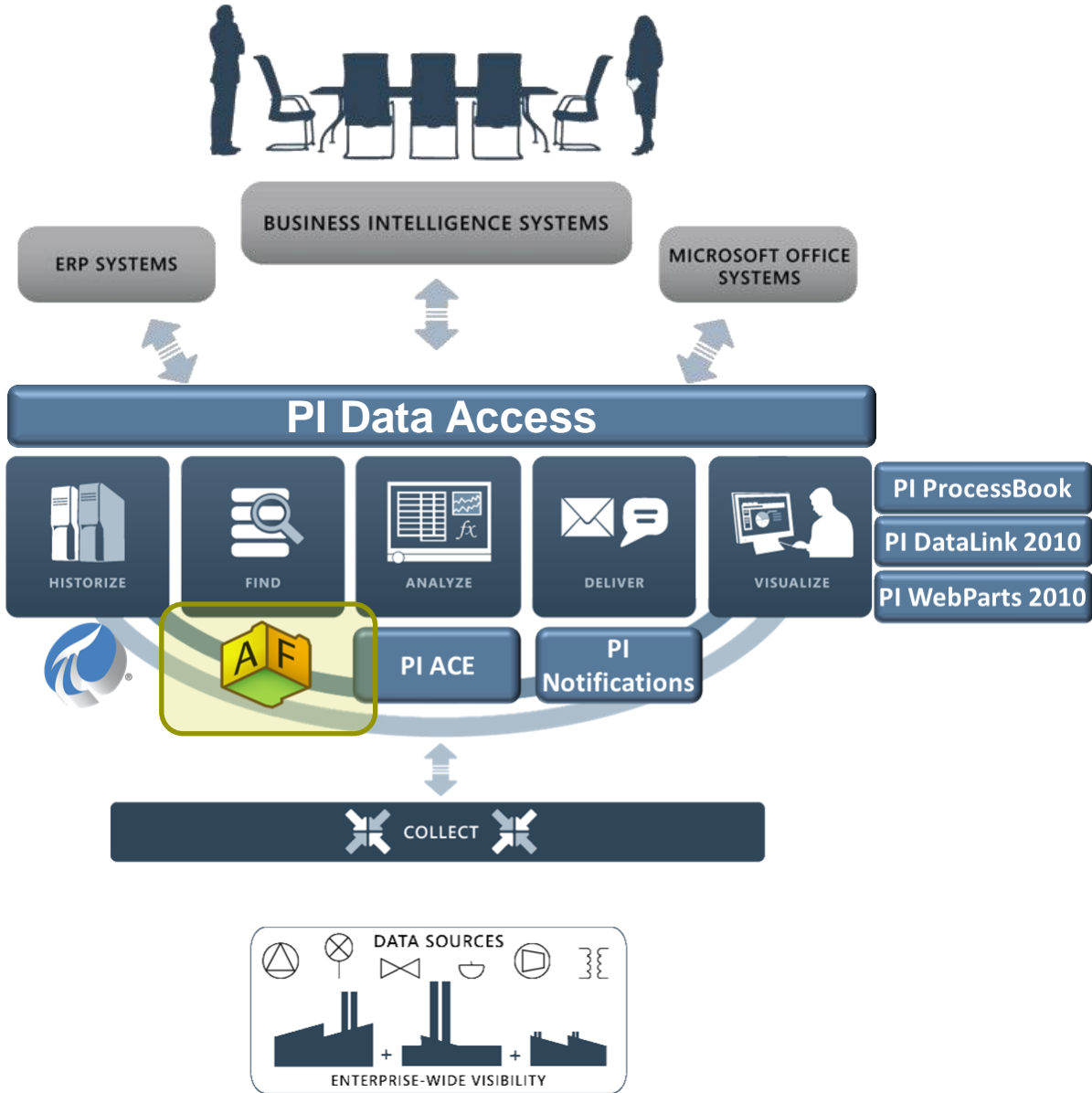


## Notification

# 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 asset 11210 is highlighted. The main window, titled 'AF - PI System Explorer', shows a tree view of 'Elements' under 'Maximo\_Eqpt\_List'. The element 11210 is selected, and its details are shown on the right. The details include the name, description, template, categories, and default attribute.

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 C**
  - 11211 : Motor Starter- Size 2/440v/3ph/60cy
  - 11220 : Electrical Control Panel- HVAC System
  - 11230 : Emergency Generator
  - 11240 : Circulation Fan- Centrifugal/ 20/000 C
  - 11250 : Circulation Fan- Centrifugal/ 20/000 C
  - 11300 : Reciprocating Compressor- Air Cooler
  - 11340 : Motor Starter- Size 4/NEMA 12/440v
  - 11400 : Boiler- 50,000 Lb/Hr/ Gas Fired/ Wa
  - 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

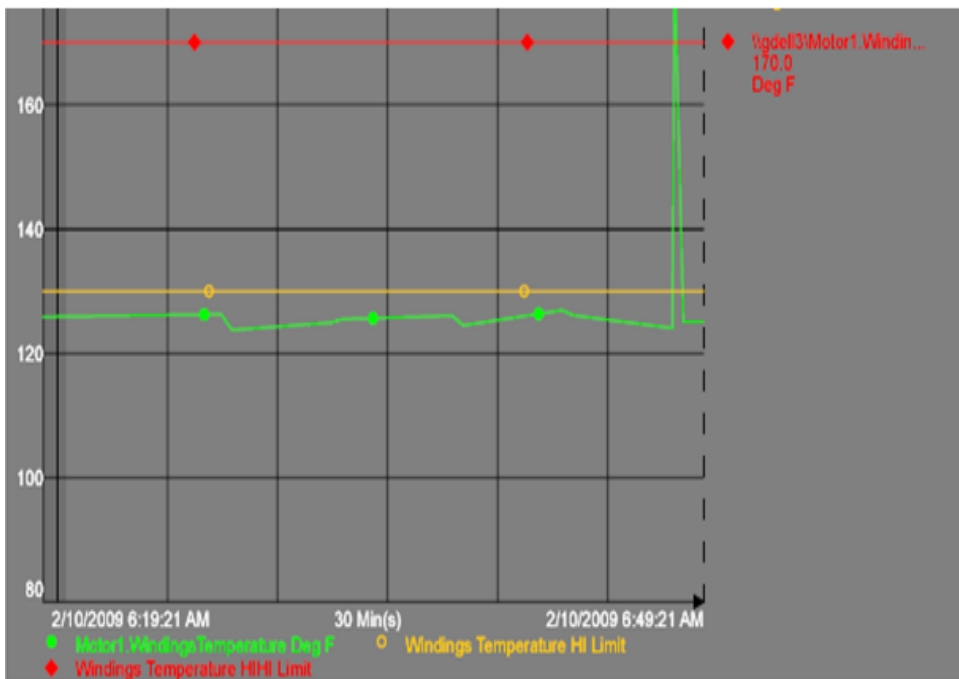
The image shows a screenshot of the Maximo software interface with a search for 'pump' in the Assets table. A yellow callout bubble points to the search input field with the text 'Search for "pump" in Maximo'. Another yellow callout bubble points to the search input field in the PI ProcessBook interface with the text 'Search for "pump" in PI ProcessBook'. The PI ProcessBook interface shows a search for '\*pump\*' and a list of 'Elements of Interest' under the 'Maximo\_Asset' group, including assets 11430, 11450, 11470, and 11480, all identified as 'Centrifugal Pump'. To the right, a 'Plot-0' graph displays two data series: 'E.MotorWindingT' (green line) and 'E.HealthIndex' (cyan line). The 'E.MotorWindingT' series has a value of 125.42 Deg F, and the 'E.HealthIndex' series has a value of 9.

Asset ID	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 ...	

Series	Value	Unit
E.MotorWindingT	125.42	Deg F
E.HealthIndex	9	

# Business Integration – shared asset names



PI Coresight™ homepage

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

## 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	12/10/2008
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			
	<input checked="" type="checkbox"/> Assetnum	Required (optional if Location is specified)	
	<input checked="" type="checkbox"/> Location	Required (optional if Assetnum is specified)	
	<input checked="" type="checkbox"/> Metename	Required	
	<input checked="" type="checkbox"/> SiteID	Required, Maximo site, example BEDFORD	
[-] MAX_METER_READINGINFO_ToMaximo			
	<input checked="" type="checkbox"/> Inspector	Optional - Person who took the reading, take from PIPoint Annotation i...	
	<input checked="" type="checkbox"/> 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

Elements

Event Frames

**Library**

Unit of Measure

MyPI

Notifications

Contacts

### 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

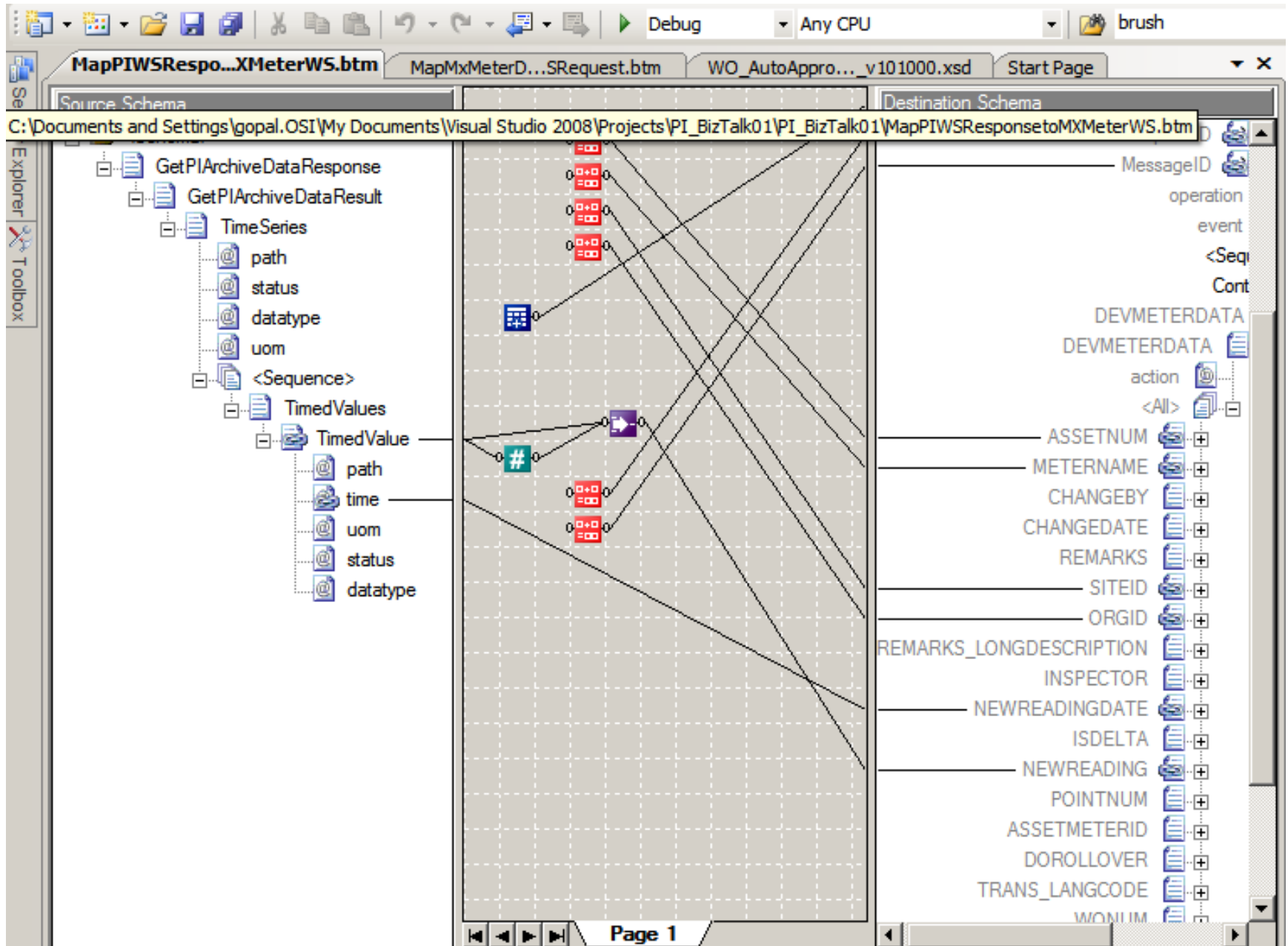
- **Implementation**

- 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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  - Real-time Inventory
  - Real-time Costing
- **Implementation**
  - Machine runhours (PI Totalizer Tag) is posted to CMMS
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# THANK YOU

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