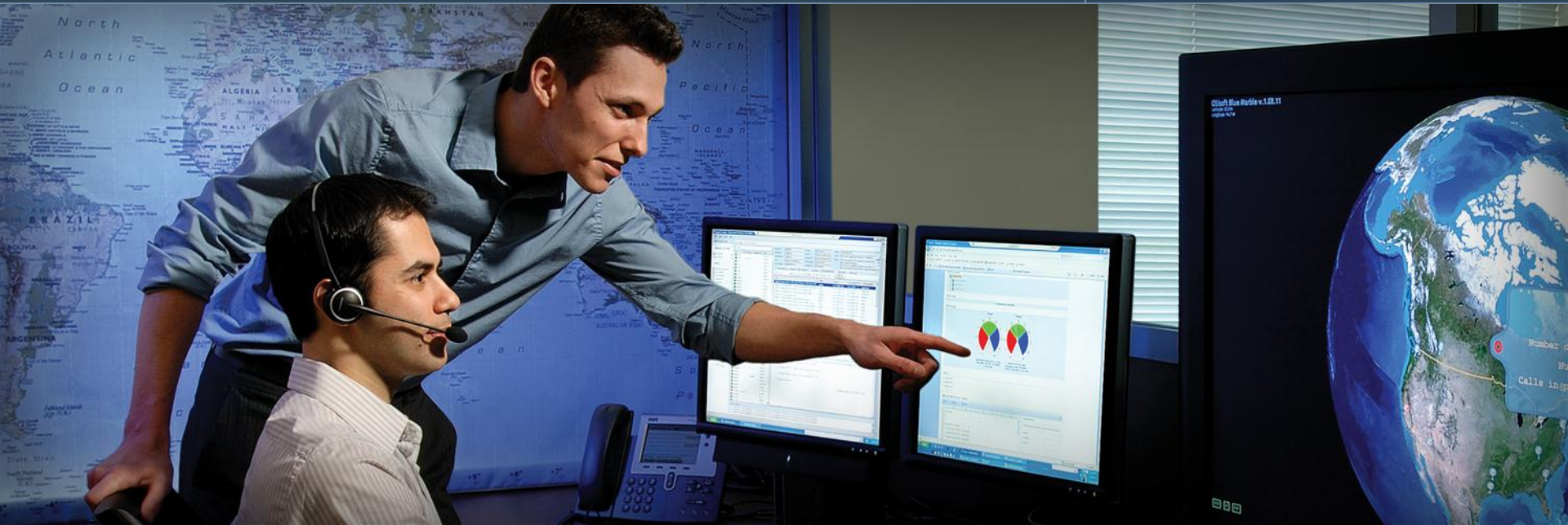Regional Seminar Series

Boston

PI Asset Framework (AF)

Stephen Kwan
Product Manager
OSIsoft, LLC

3 November 2010

- Overwhelming amount of data from disparate sources

  - Multiple interfaces

  - Multiple PI Servers

  - Non time series data – relational databases, design data, tables, etc.

  - Difficult to find the exception rather than the norm

- Complicated, inconsistent naming, definition and structure

- Difficult if not impossible to find all the data you need to make business decisions

- No single version of the truth – lacks consistency, difficult to communicate

Empowering Business in Real Time.

PI Asset Framework (AF)

"An information model to organize and structure all your data with context"

Empowering Business in Real Time.

Add Context to Your Data
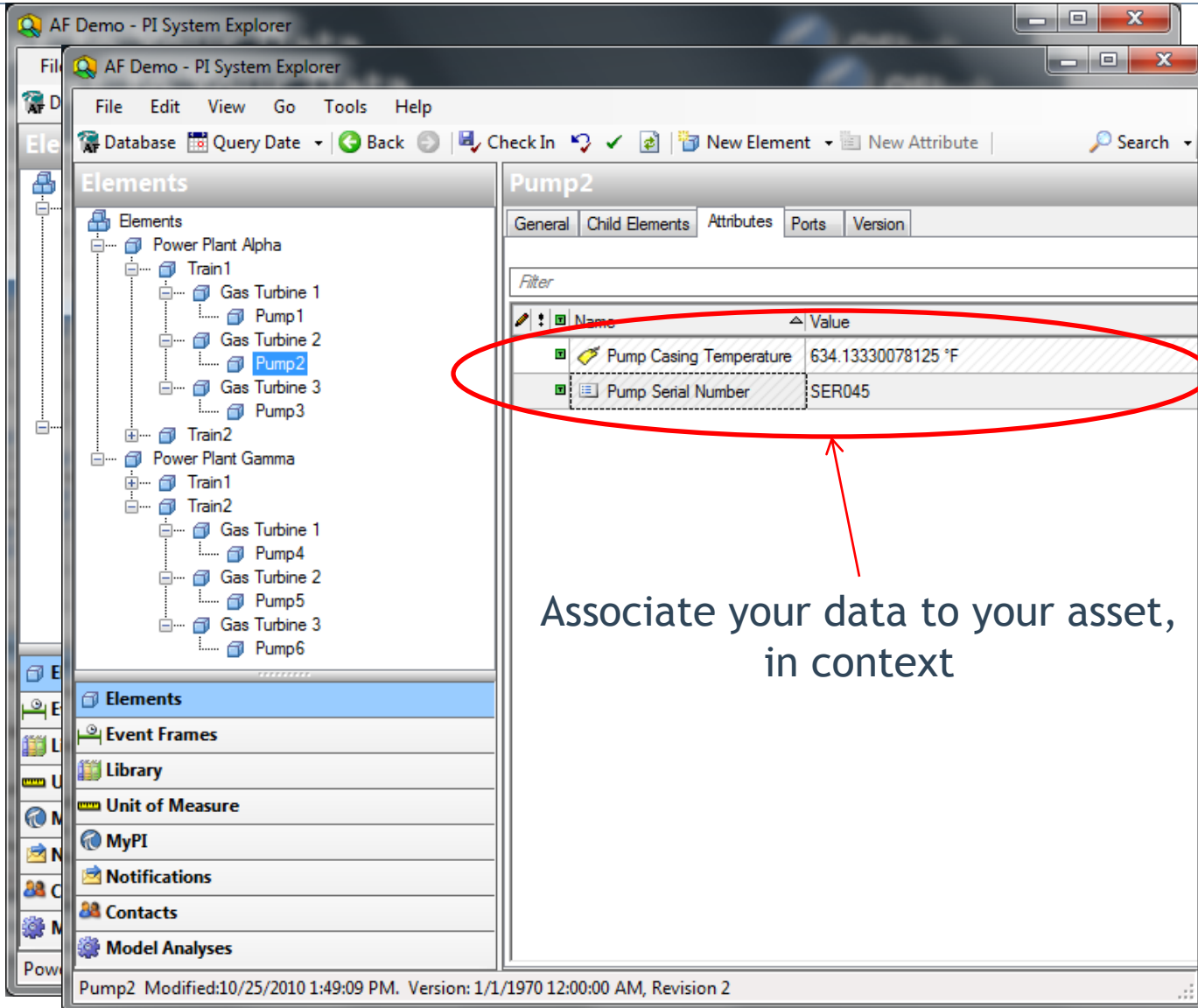
Difficult to decipher tag names

PI TAG	ENG UNITS	DESCRIPTION	MIN	MAX
ESFI21A2	KPPH	STEAM TURBINE UNCONTROLLED (IND FLOW)	0	100
TMTI132A	DEGF	ST-100 METAL TEMP (BEARING2)	0	400
TI99047	??	??		
G1:DWATT		Generator MW Output		
TMZ120A1	%	ST-100 AXIAL POSITION (PROBE #1)	-100	100
TMZ120A2	%	ST-100 AXIAL POSITION (PROBE #2)	-100	100
GT2PEAK.PV		GT2 Peakload Signal	0	1
FE_PUMP		Fire Extinguisher Pump Status		
ESFI33A	KPPH		0	425
ESTI34A	DEGF	LETDOWN TEMP TYPE E (HP STEAM)	0	1000
HPPI30B1	PSI	HP STEAM PRESSURE 1 (HP STM P)	-1	1550
ESFI21A1	KPPH	STEAM TURBINE UNCONTROLLED (EXTR FLO)	0	210

Data

Missing or incomplete data – difficult to find what you need
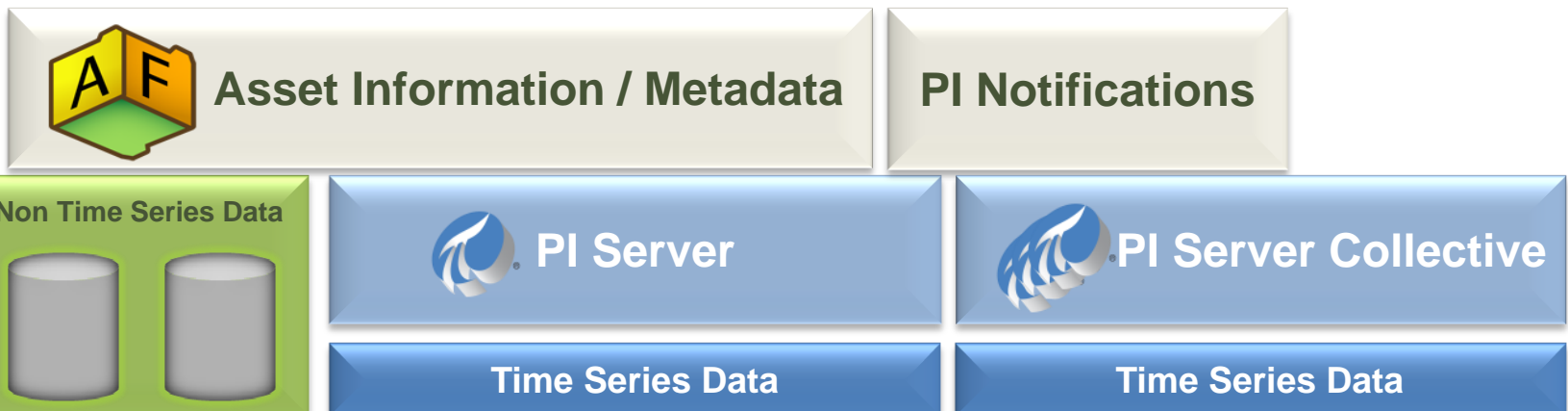P&ID

Add Context to Your Data

Associate your data to your asset, in context

Empowering Business in Real Time.

PI AF Features

- Asset centric view of your plant via elements and attributes – templates for standardization and reuse

- Build hierarchy, categories and connectivity models

- Data references to time series (PI Points) and other data

- Search across multiple PI Servers to find information

- Leverage PI Notifications

- Rich set of AF SDK functions to customize your applications

- Access your data via PI WebServices and PI OLEDB Enterprise

AF Asset Information / Metadata	PI Notifications

Relational / Non Time Series Data	PI Server	PI Server Collective
	Time Series Data	Time Series Data

PI AF Tools

PI AF Concepts and Interaction

Empowering Business in Real Time.

PI System Explorer

- Create and manage the asset hierarchy and models
  - Templates, elements, Data References, Notifications, etc.
  - Structure and relationships
- Visualization of the asset hierarchy and models

Empowering Business in Real Time.

PI AF Elements and Attributes
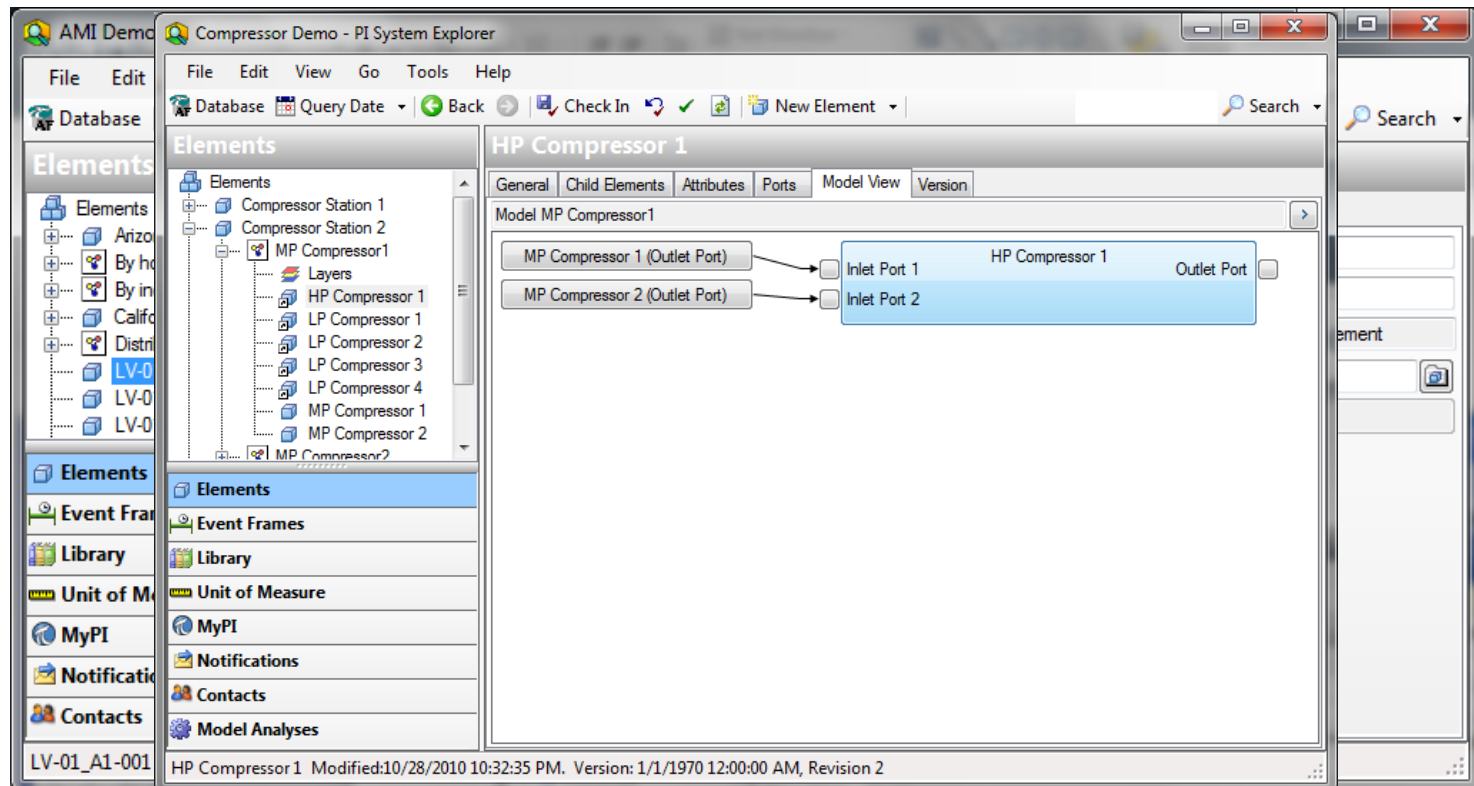
- Elements represent physical or logical entities
  - Attributes and attribute templates define properties
  - Categories for classifications
  - References to define relationship between Elements/Attributes
- Can be organized in hierarchical structure or connectivity models

Empowering Business in Real Time.

PI AF Elements and Attributes
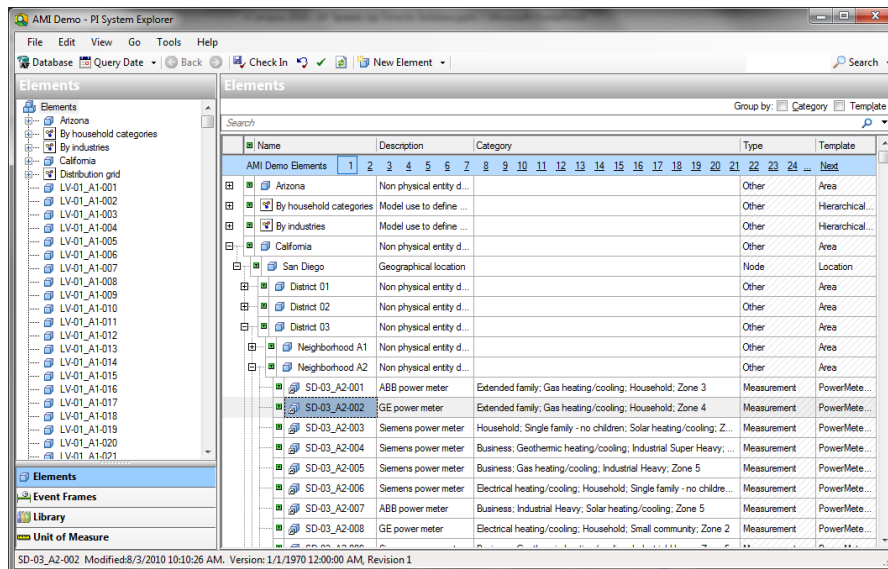
- ## AF Element Attributes:

  - Static Values

    - Name plate information

    - Operating limits

  - Data References

    - Time series data – PI Tags and PI Tag Arrays

    - Relational data

    - Tables

    - Formulas/Calculations

  - Supports Units of Measure (UOM)

    - Unit conversions within the same class
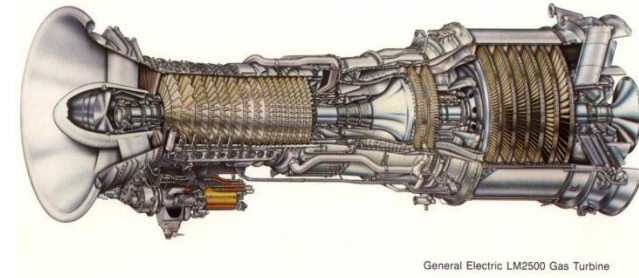
General Electric LM2500 Gas Turbine

Empowering Business in Real Time.

PI AF Elements and Attributes

- Element Templates can be created and reused for consistency – changes are propagated to each instance

- Elements can also be created without an Element Template for flexibility

Pump Template

Instances

Empowering Business in Real Time.
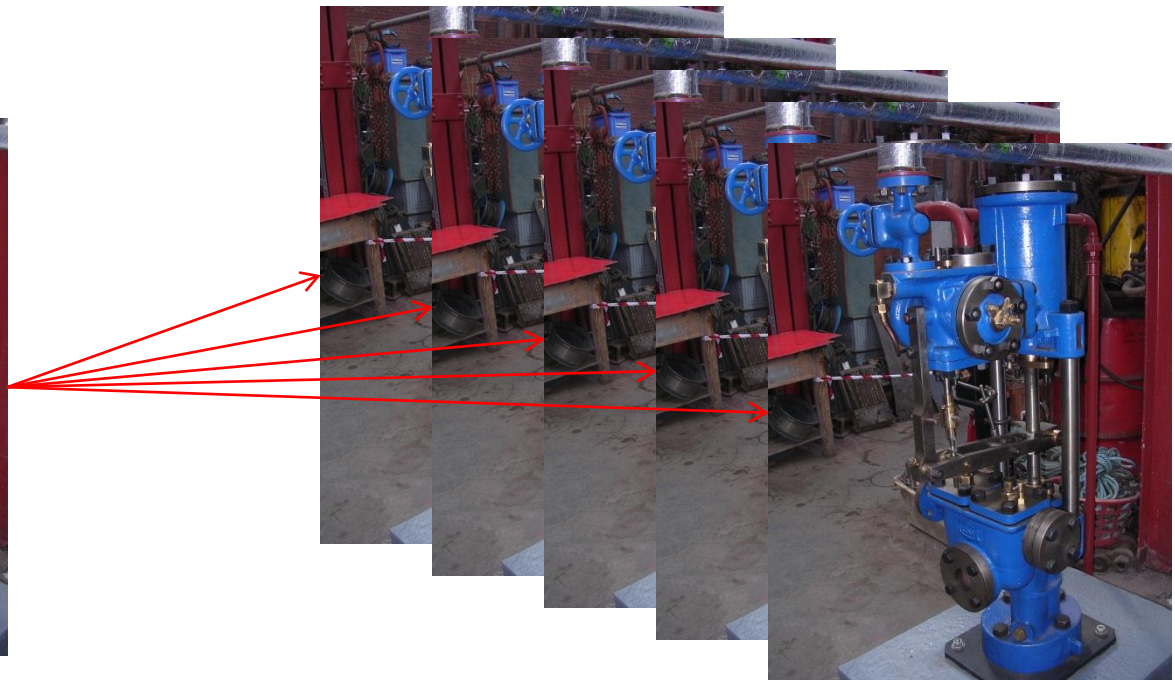
Notifications and Notification Templates

Associate a PI Notification template to an AF Element template

PI AF Example
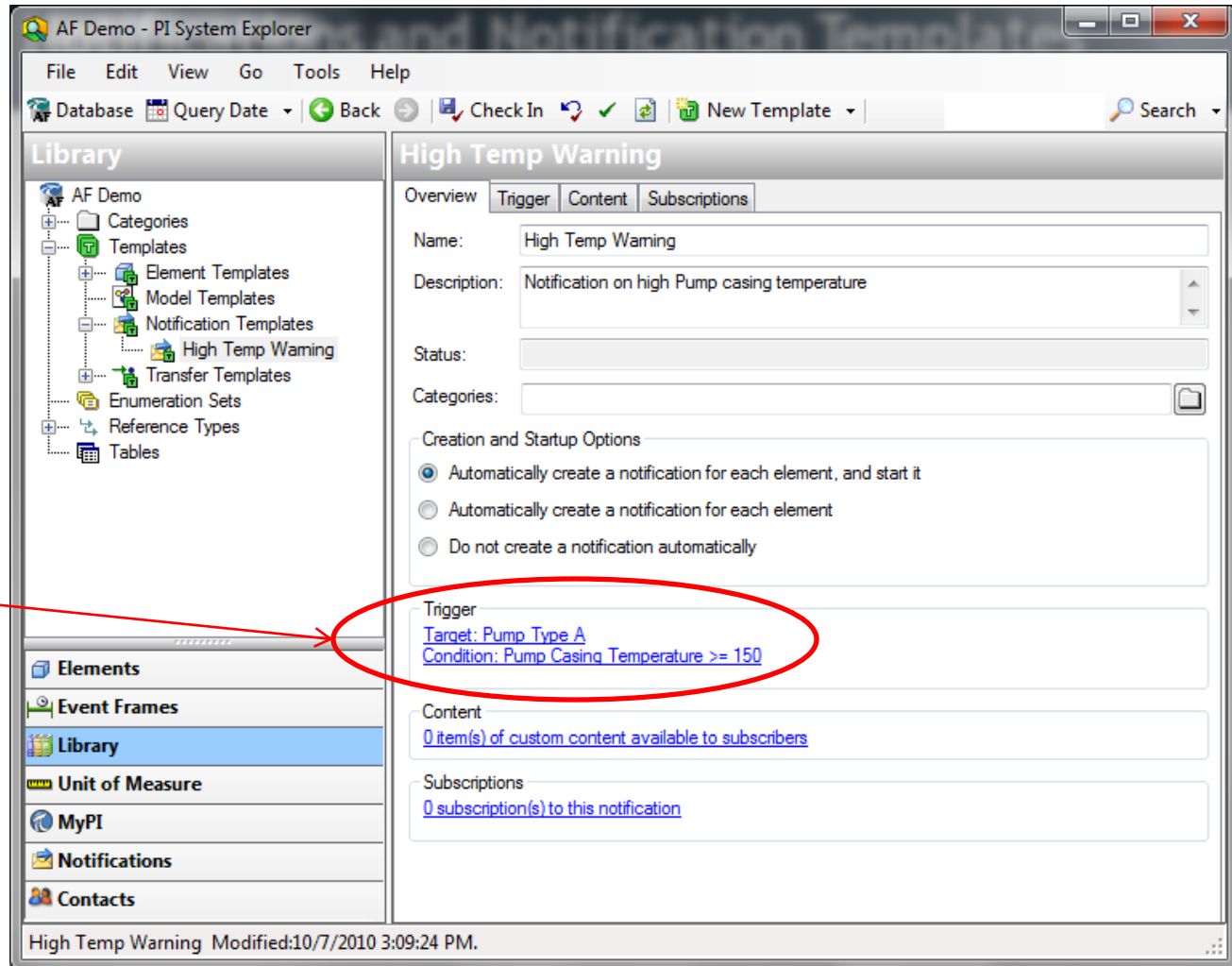
Natural Gas Compressor

- RPM
- Fuel consumption rate
- Exhaust temperature
- Oxygen sensor

PI Tags

- Flow in
- Flow out
- Pressure differential

Calculations

Different Measurement Units

- Last service date
- Service type
- Mfr documentation

External Database

Empowering Business in Real Time.

PI AF Example

- Build compressor template
- Create attribute templates
- Set default values
- Create instances of template
  - Compressor1
  - Compressor2
  - …
  - CompressorN
- Associate attributes to your data streams

Empowering Business in Real Time.

PI AF Benefits

- Locate data without needing tag names

- Search between multiple data sources

- Build just one display and show each compressor

- Include non-PI data in reports

- Estimate next maintenance

- Calculate fuel consumed

- Calculate losses to help find leaks

- Find which compressors have low pressure differentials.

- And so on...

Empowering Business in Real Time.

AFBuilder – Configure AF Attributes in Bulk

Empowering Business in Real Time.

AFBuilder

- Do you need to add an asset to PI AF?

- Did you replace an asset due to maintenance?

Export your changes   Add a new asset   Change an attribute value

AFBuilder

Empowering Business in Real Time.

© Copyright 2010, OSIsoft LLC. All rights Reserved.

PI AF Element Relative Display in PI ProcessBook

Empowering Business in Real Time.
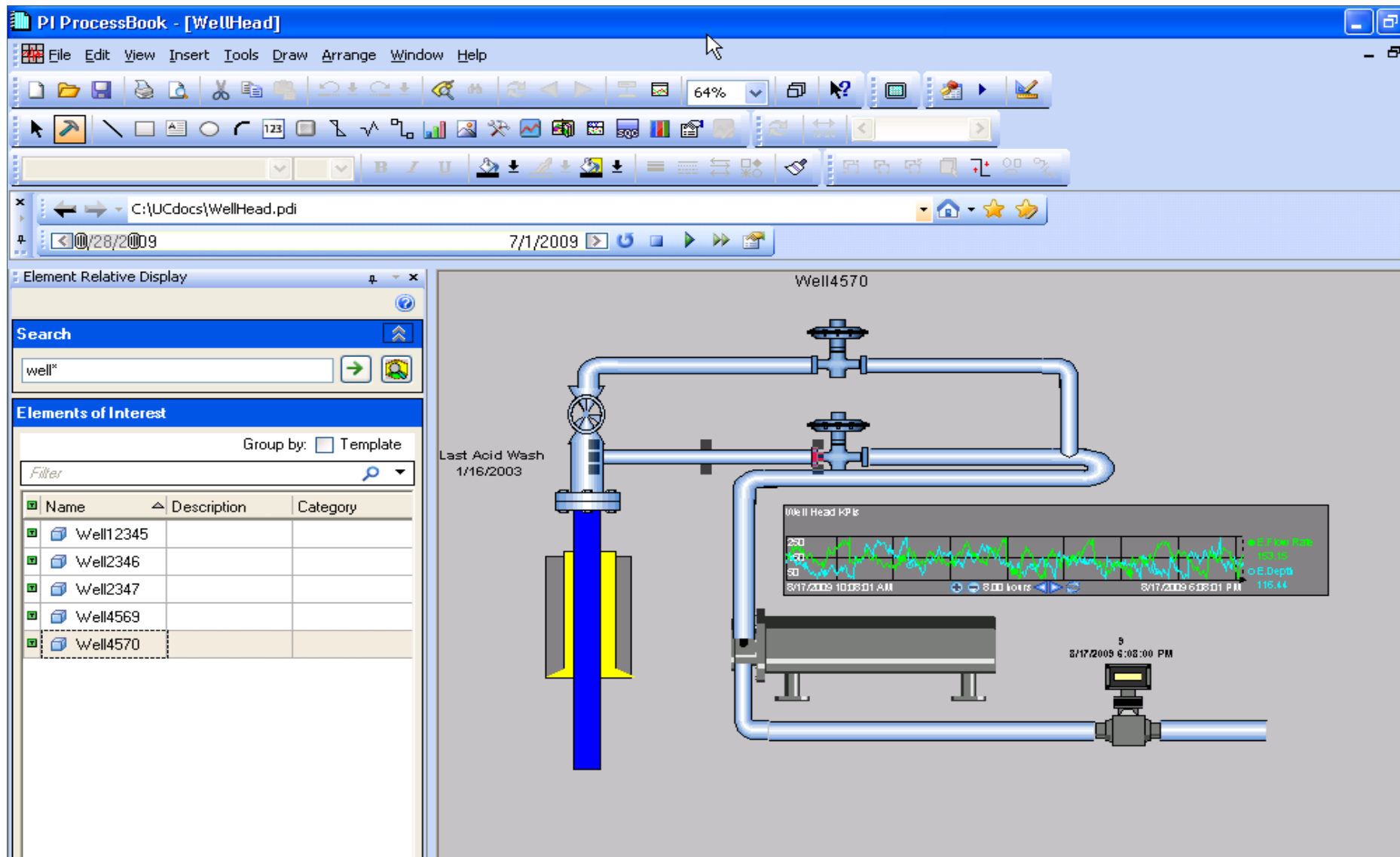
PI AF and your Data

Associate your data to PI AF

Empowering Business in Real Time.

PI Point Data Reference

- Associate an AF attribute to a PI point or a PI point array

- Substitution parameters to generically map PI tags

- Retrieve snapshot & archive values as well as summaries

- Can auto-create PI tag with full access to configuration

- UOM conversion as needed

Empowering Business in Real Time.

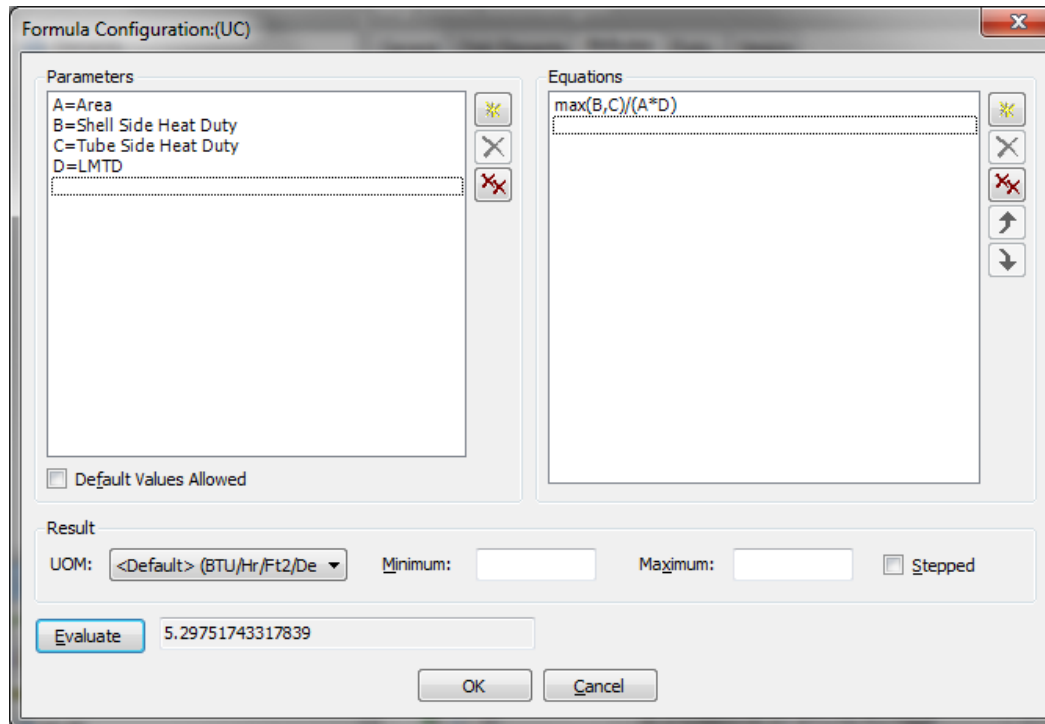# PI AF Tables Data Reference

Empowering Business in Real Time.

PI AF Formula Data Reference

- Define a calculation within PI AF acting on PI AF attributes

- Formula calculations are done on demand

- Build once, apply many times via templates to all similar assets

Units of Measure (UOM) Templates and Library

- Each attribute can have a specific UOM

- PI AF is shipped with UOM library with conversion factors

- Automatic conversions between UOMs of the same class

- UOMs are fully extensible and customizable

Protect Your Investment

- PI System tags can still be searched and used to create displays, reports and applications

- Existing PI Module Database applications will continue to work seamlessly

  - PI DataLink

  - PI ACE

  - PI Batch

  - Custom applications

- New subsystem to sync MDB with AF

Empowering Business in Real Time.

Protect Your Investment

MDB-based Products

Continue using your existing MDB-based products

AF-based Products

RtWebParts
ProcessBook
DataLink
BatchView
RtReports

PI OLEDB
PI JDBC
PI OPC Server
PI SDK

PI ACE

PI AF Link Subsystem
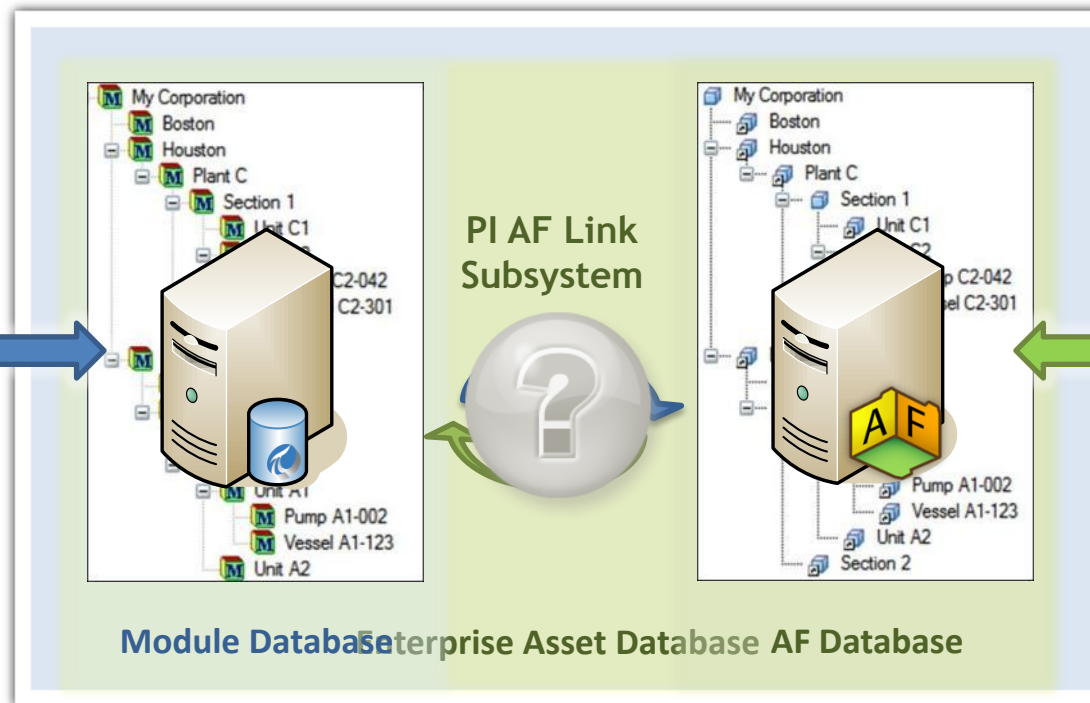
PI WebParts
ProcessBook
DataLink (future)
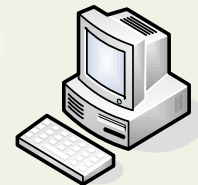
OLEDB Enterprise
PI JDBC (future)
PI Web Services
AF SDK

PI Notifications

Module Database **Enterprise Asset Database** **AF Database**

Upgrade to AF-based products when you are ready

Empowering Business in Real Time.

PI AF Deployment

- PI AF is included with PI Server 2010

- PI AF requires Microsoft SQL Server 2005 or above

- PI AF supports High Availability (HA) configuration

- With smaller systems, PI Server, PI AF Server and MS SQL Server may be installed on the same computer

Empowering Business in Real Time.

PI AF Deployment
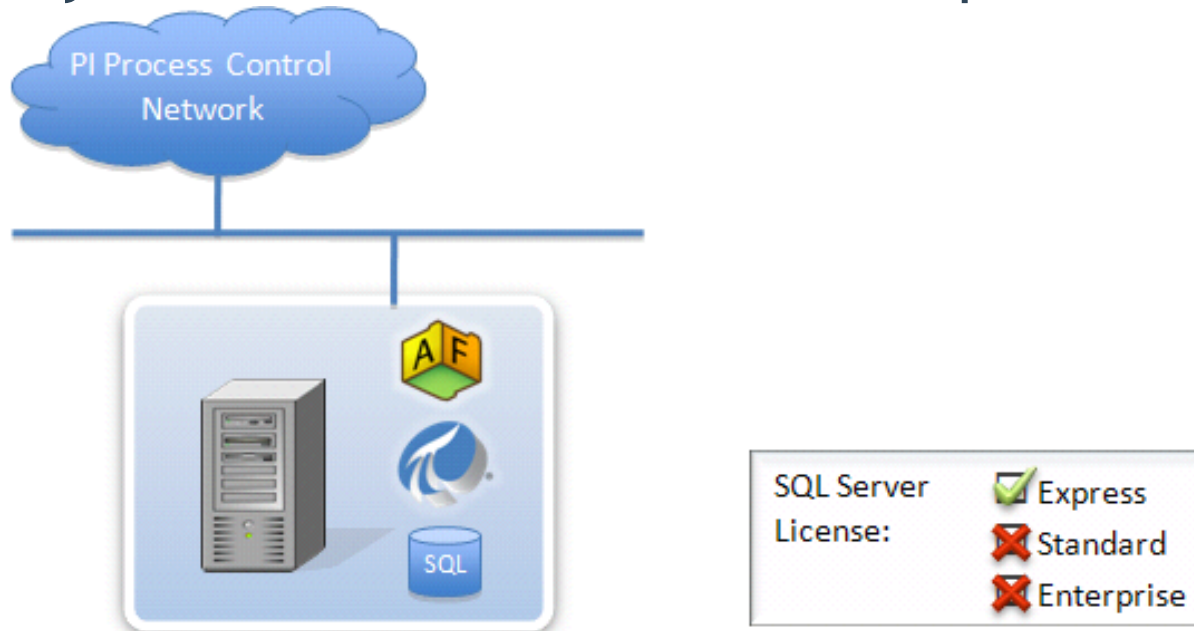
- With larger systems, PI Server, PI AF Server and MS SQL may be distributed between several computers

PI AF Deployment
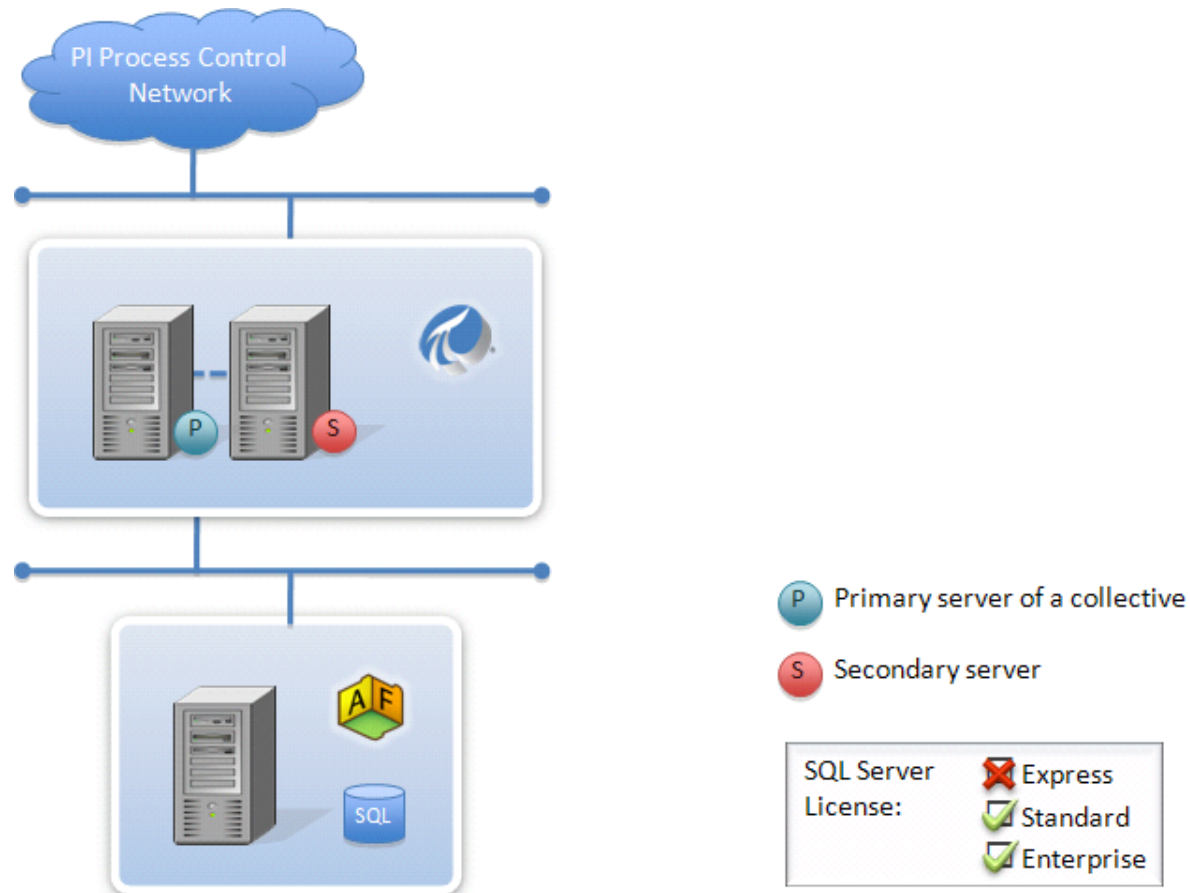
- With extremely large systems, or HA systems, PI Server, PI AF server and MS SQL Server may be installed in a highly redundant and distributed fashion

PI AF Scalability & Security
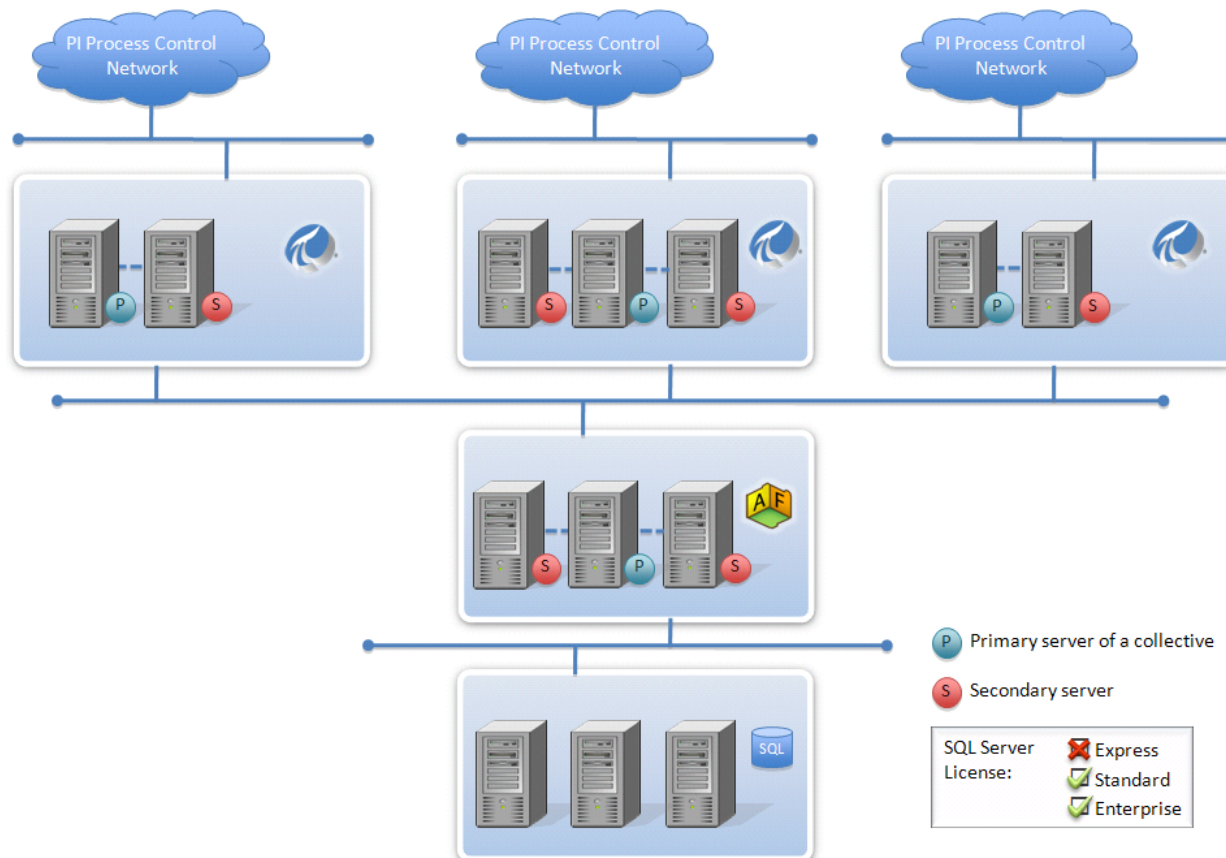
- PI AF Client and Server support 32 or 64 bits Microsoft operating systems

- Supports 32 or 64 bits Microsoft SQL Server (2005 and greater)

- Scale to millions of Elements having dozens of attributes each

- PI AF security model is integrated with Windows Integrated Security

Empowering Business in Real Time.

PI AF Benefits

- Intuitive, asset centric view of your data for everyone to consume

  - Common asset models and relationships

    - Standardize on a single definition of your assets across your enterprise

  - Connect assets to data references, apply formulas for basic analyses

  - No need to memorize point/tag names

  - Search and find information across all your data sources

  - Leverages other PI System components

    - PI Notifications

    - Element Relative Displays in PI ProcessBook and PI Web Parts

- Build your solution (i.e. display, model, analysis) ONCE and reuse on all similar assets

Empowering Business in Real Time.

Thank you