The PI System as an Infrastructure: Overview of PI System 2010

Presented by

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Infrastructure: Characteristics and Expectations

Real-time Infrastructure Delivers Opportunities

Electrical Power

Communications

Transportation

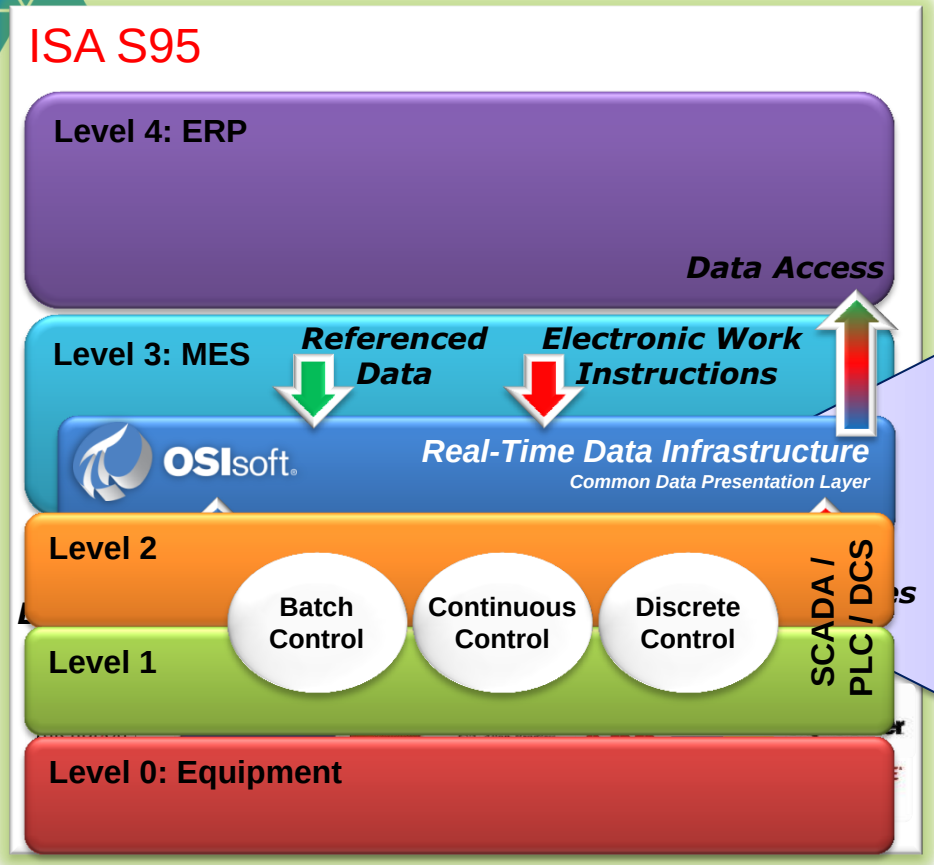
- **Valuable** – delivers a recognized benefit
- **Reliable and Secure** – always available, safe and trusted
- **Accessible** – adaptable to innovation, easy to use
- **Contextual** - organized to be effective, efficient, and extendable
- **Sustainable** – must be able to last and adapt to change

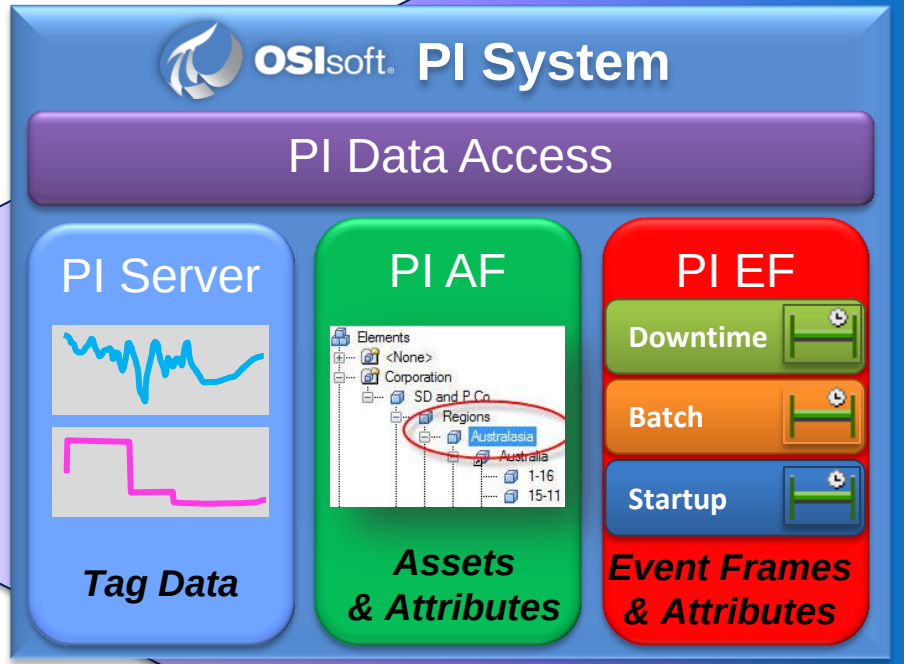
What is The PI System ?

The industry standard in enterprise infrastructure for management of real-time data and events

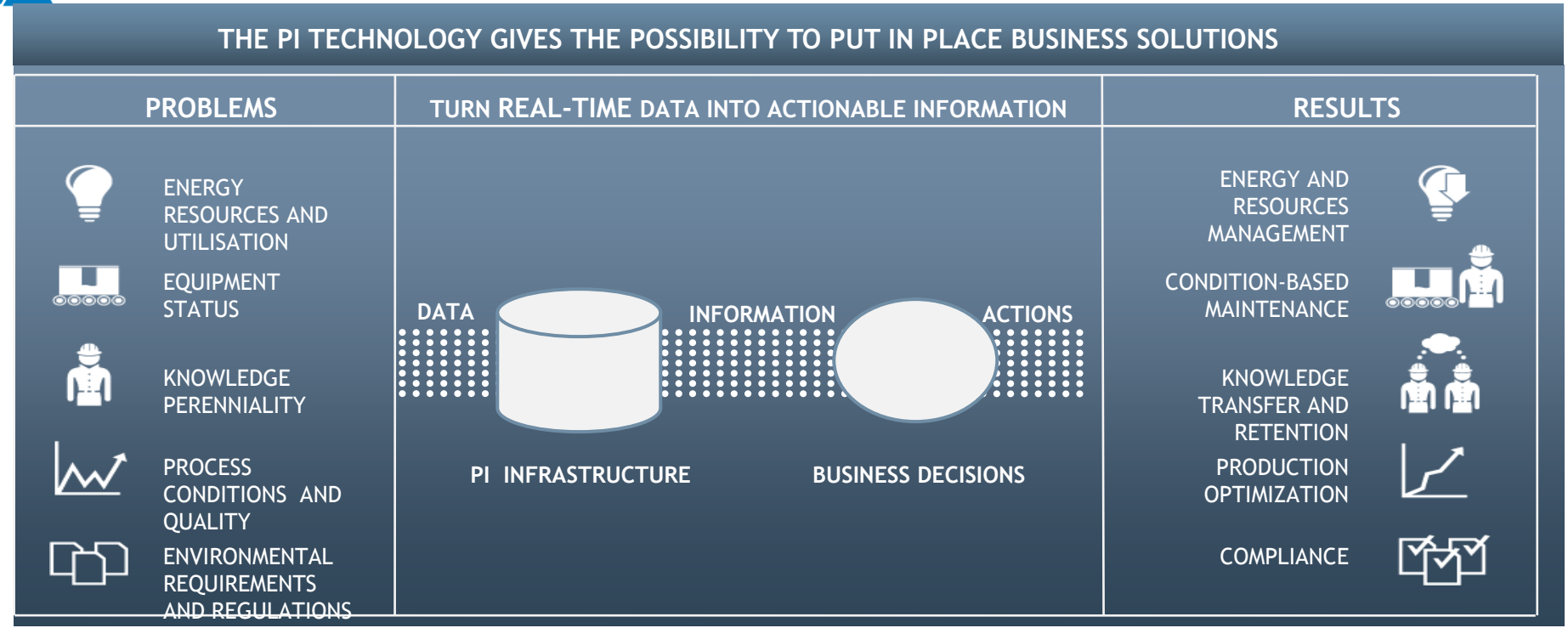
Making available data from many sources, most often databases.

Aggregation – PI System Data Infrastructure



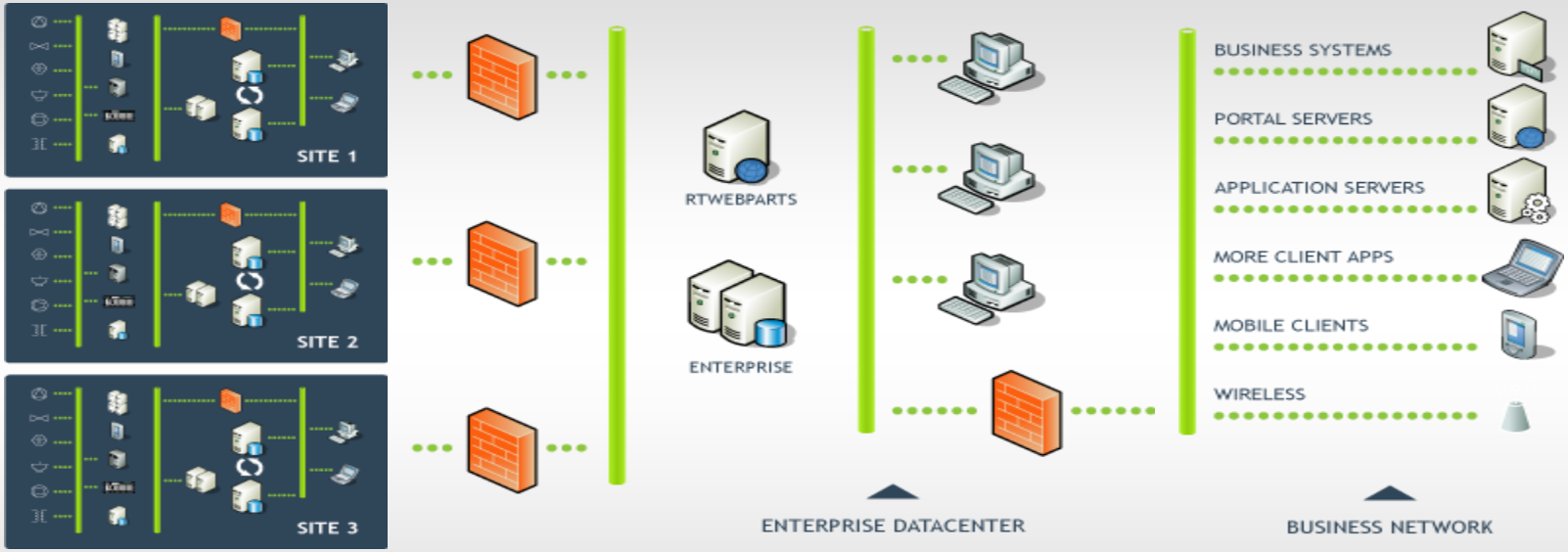


Turn Real-time Data Into Actionable Information



Typical Architecture:

Enterprise level



Various Facilities

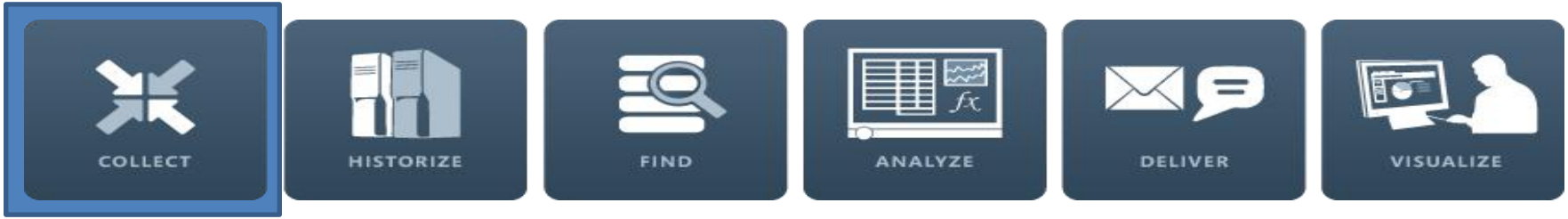
Enterprise IT

Business Connectivity

PI System Overview

The OSIsoft PI System is the highly scalable and secure real-time and event infrastructure that connects people with the right operational and manufacturing information at the right time in order to *analyze*, *collaborate*, and *make smart decisions*

The PI System: Collect

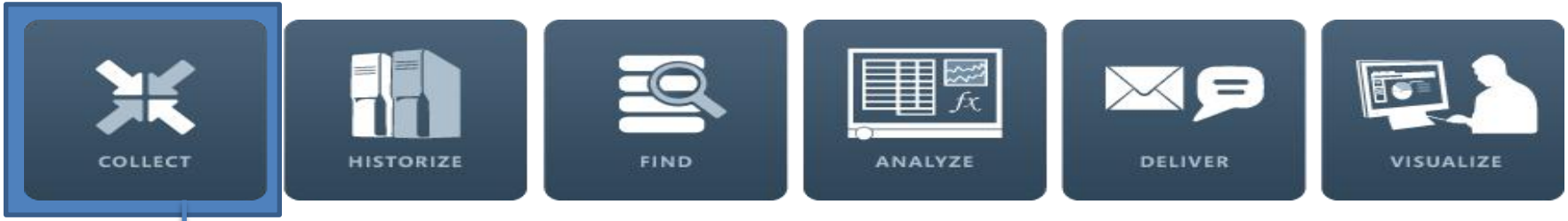


The PI System collects real-time data from multiple sources every second, minute or day and stores the values forever.

- Measures and aggregates a broad range of data types
- Handles both time-series data and events
- Secures the access and transmission of the data
- Data collection redundancy and high availability

The PI System can connect to more than 450 different systems

The PI System: Collect



Real-time
- DCS
- PLC
- SCADA
- OPC
- 3rd Party
- COM Connector

Custom
- SDK

Relational
- OLEDB
- ODBC/JDBC
- ORACLE
- SQL

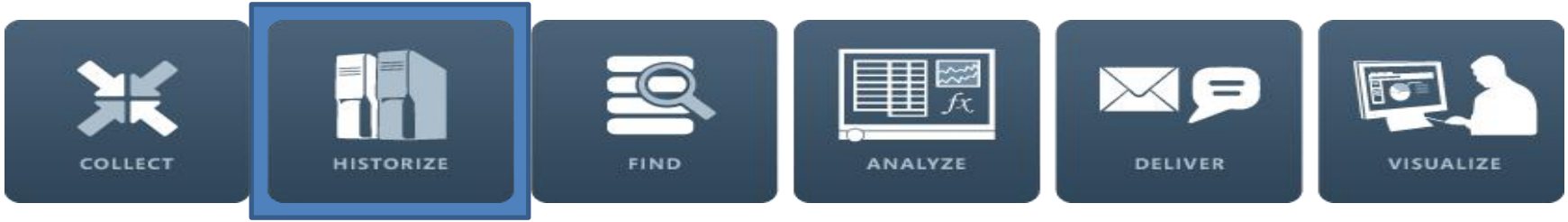
AMI
- Elect Meters
- Gas Meters
- Water Meters Interfaces

Web Services
- Enterprise Gateway
- SOA

Other
- UFL
- Manual
- HTML

IT
- MCN Health Monitor

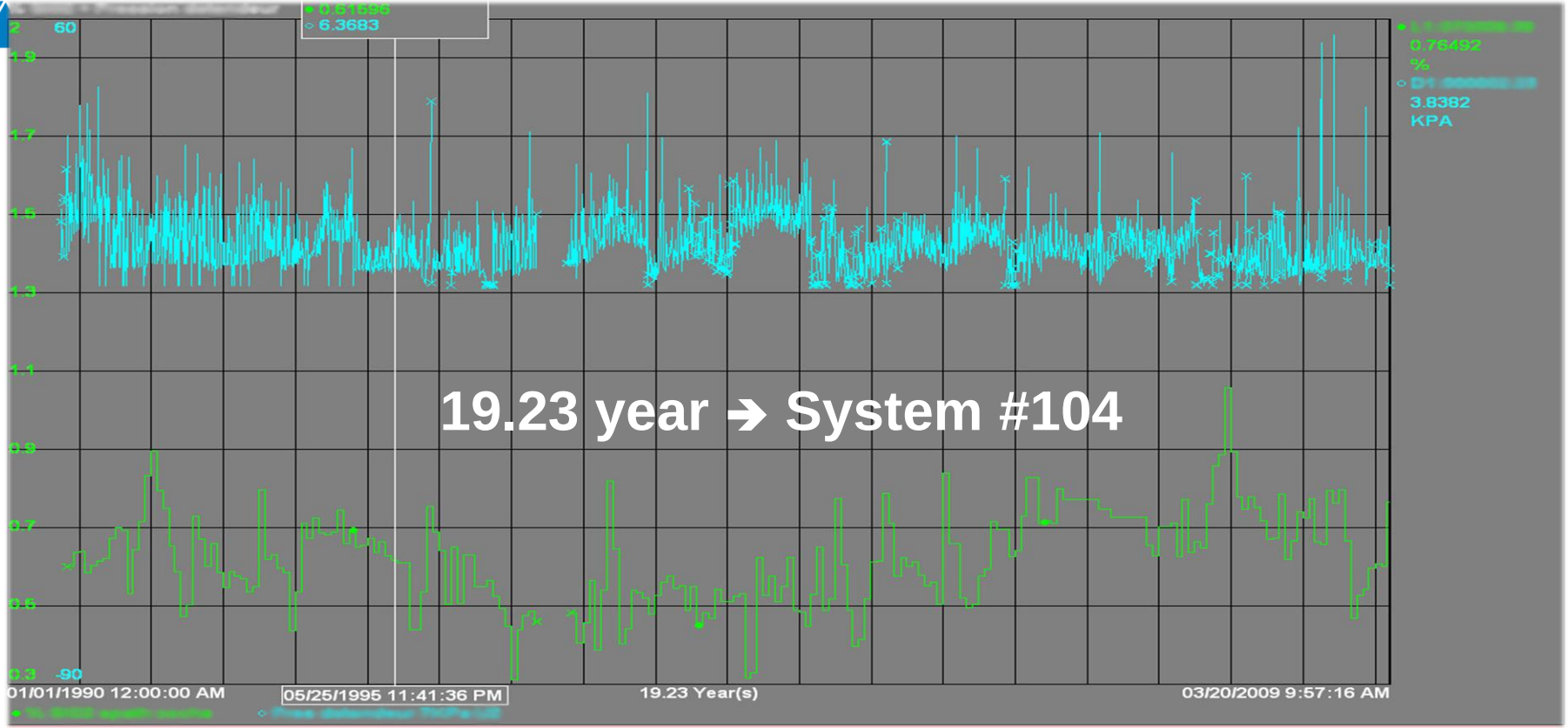
The PI System: Historize



The PI Server can

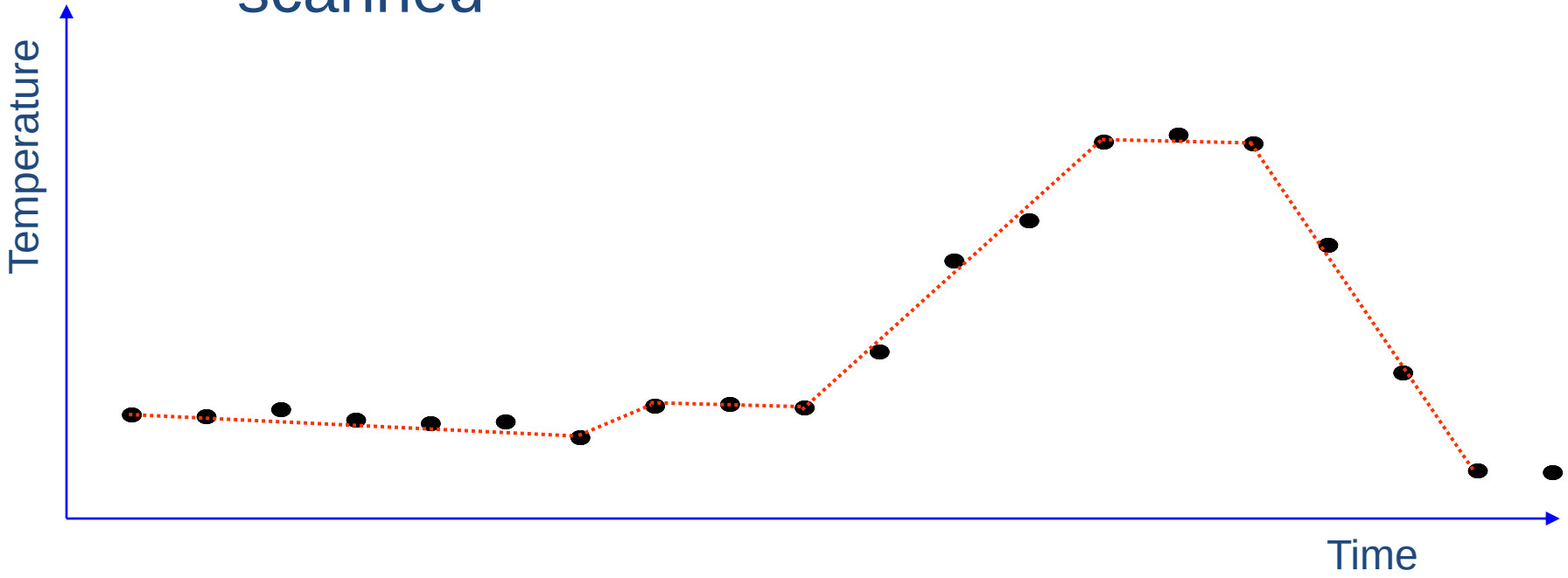
- Archive the data and keep it online for decades
- Store and retrieve the data efficiently
- Securely control access to the data
- Distribute the data to client applications
- Expose the data supporting standard communication protocols

The PI Server: Historize!

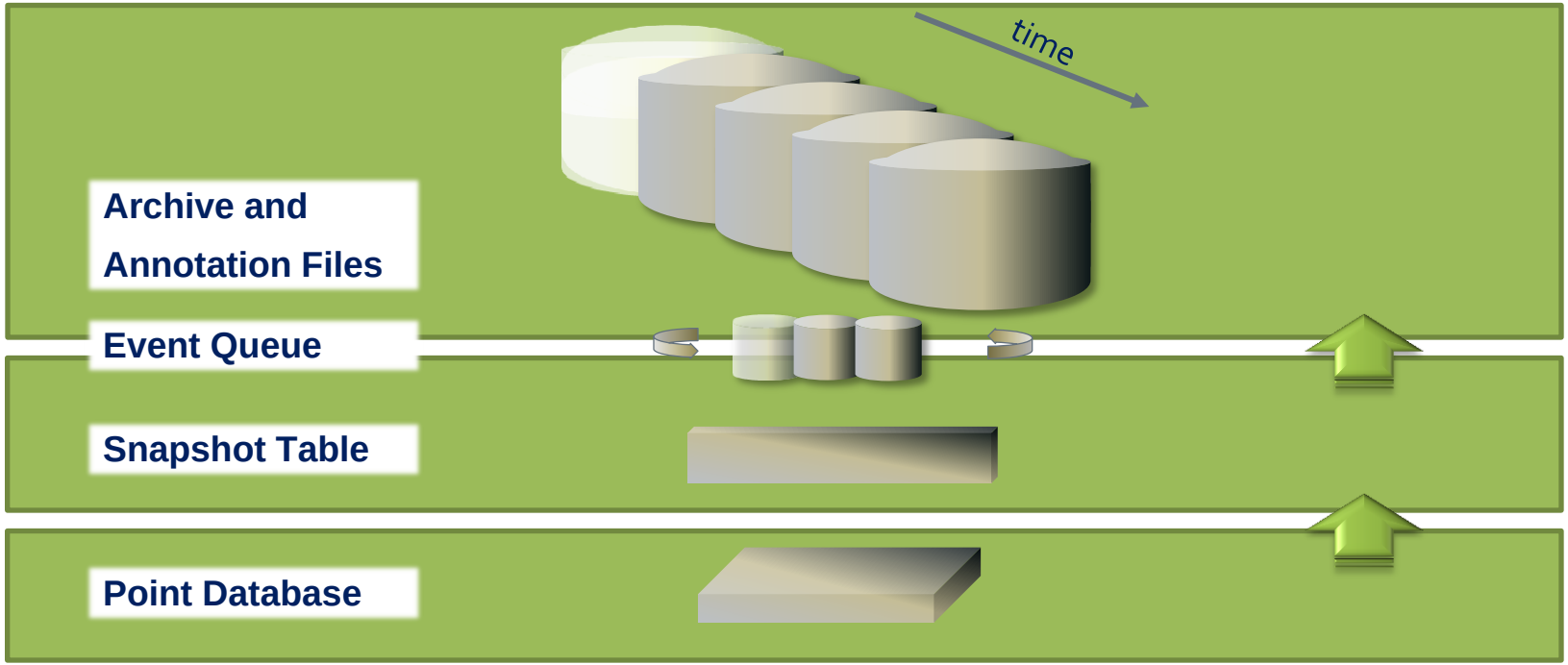


Compression

- Raw values
- After Exception
- After Compression
- Scanned

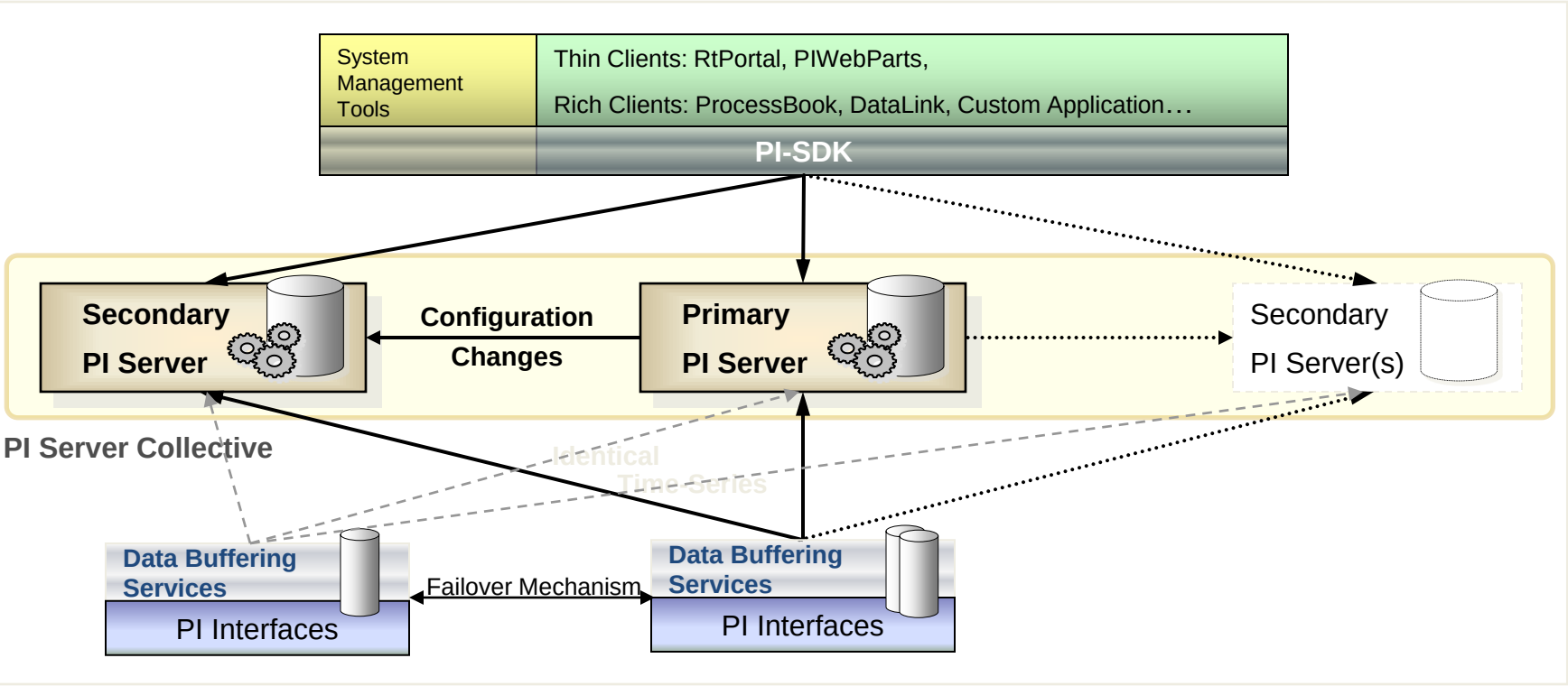


Event Storage

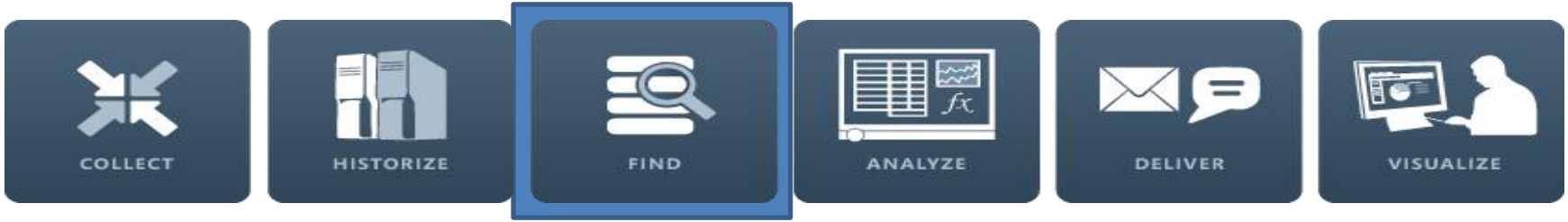


Event :=	**Tag**	**Timestamp**	**Value**	**Questionable**	**Substituted**	**Annotation**
	Where ?	When ?	What ?	Quality ?	Changed ?	Add. Bit stream

OSIsoft HA Technology

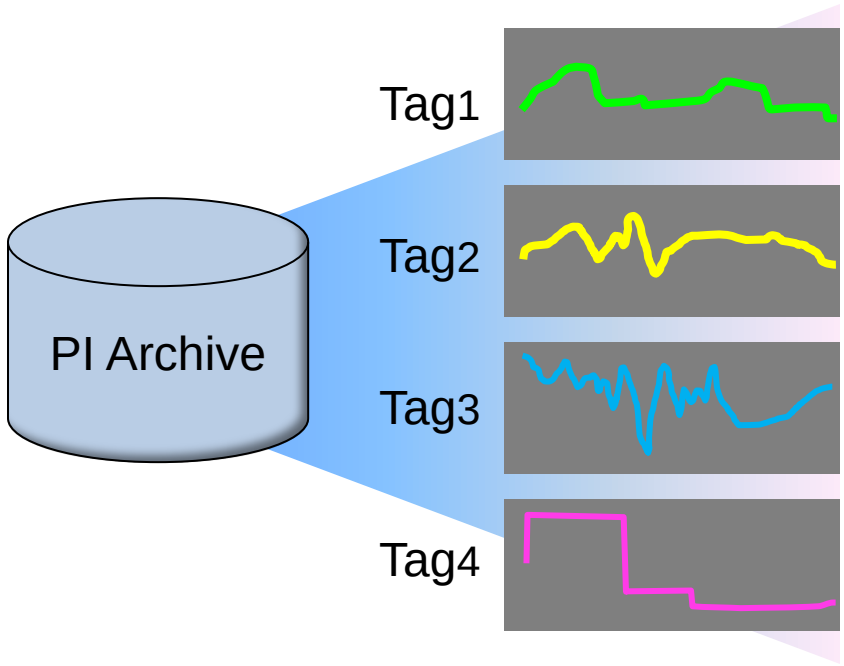


The PI System: Find

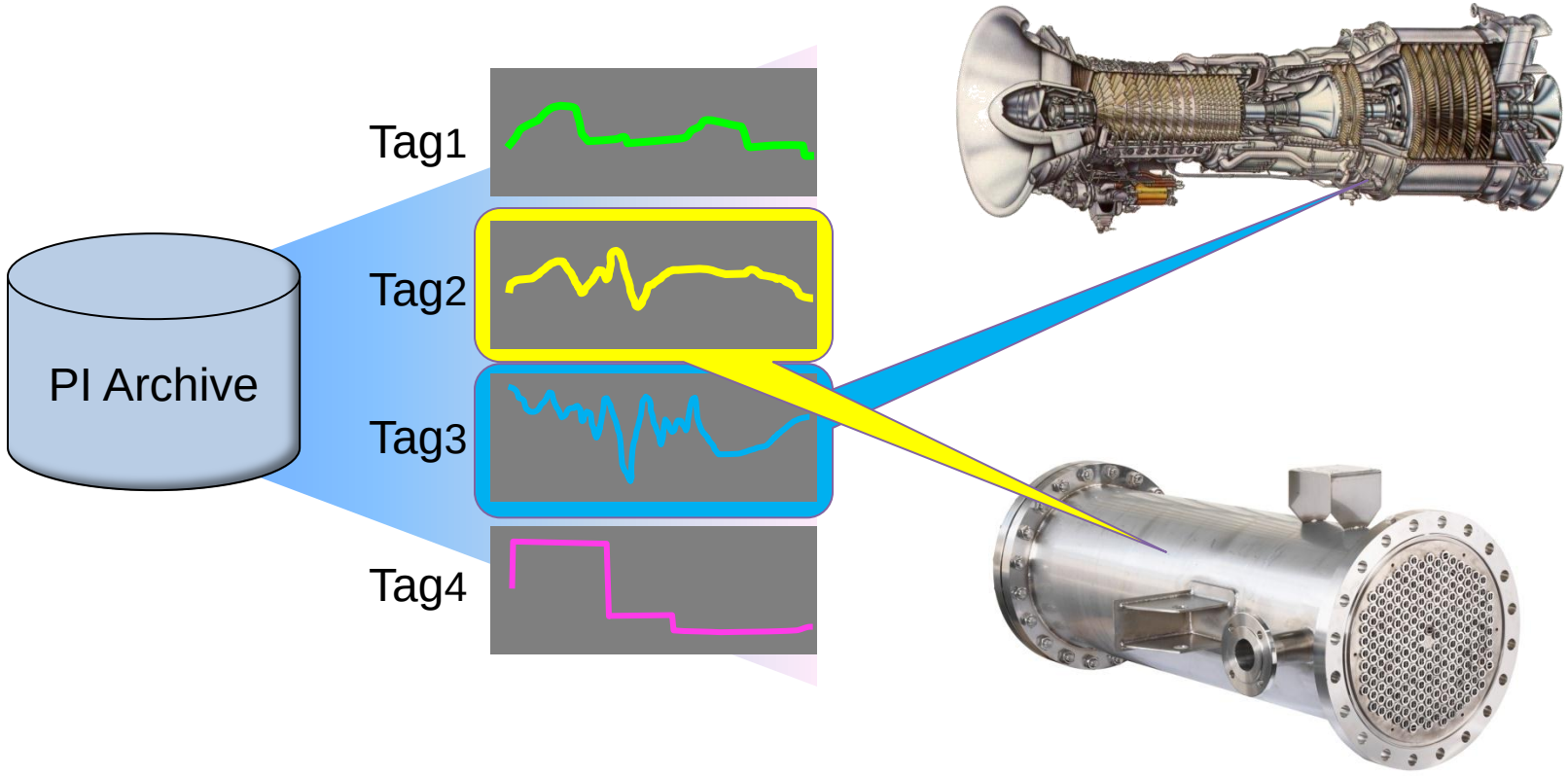


- Create and store your asset hierarchy
- Provide easily understood asset and attribute names for ease of use
- Link to multiple data sources
- Provide a platform for analysis or applications
- Securely control access to the data
- Distribute the data to client applications
- Expose the data supporting standard communication protocols

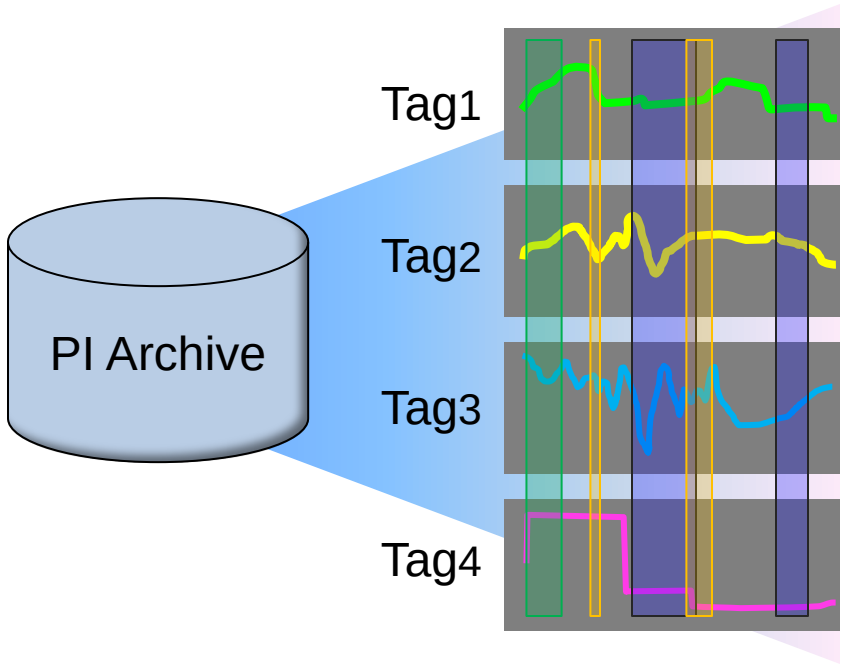
PI Server – Time series data and Tags

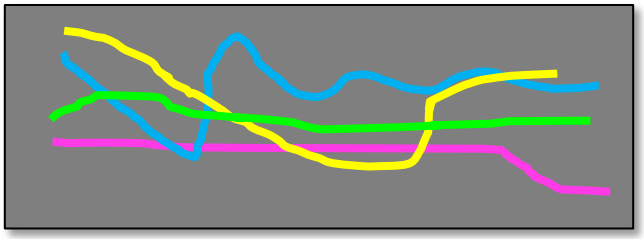


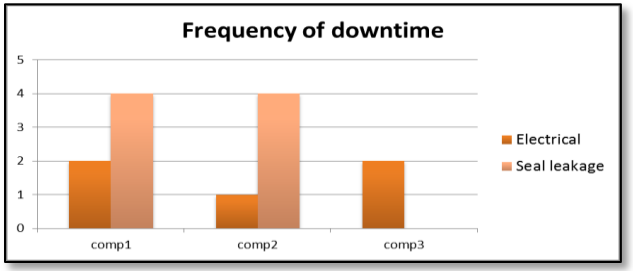
Assets help you find the right Tags



Event Frames help you find the right time periods

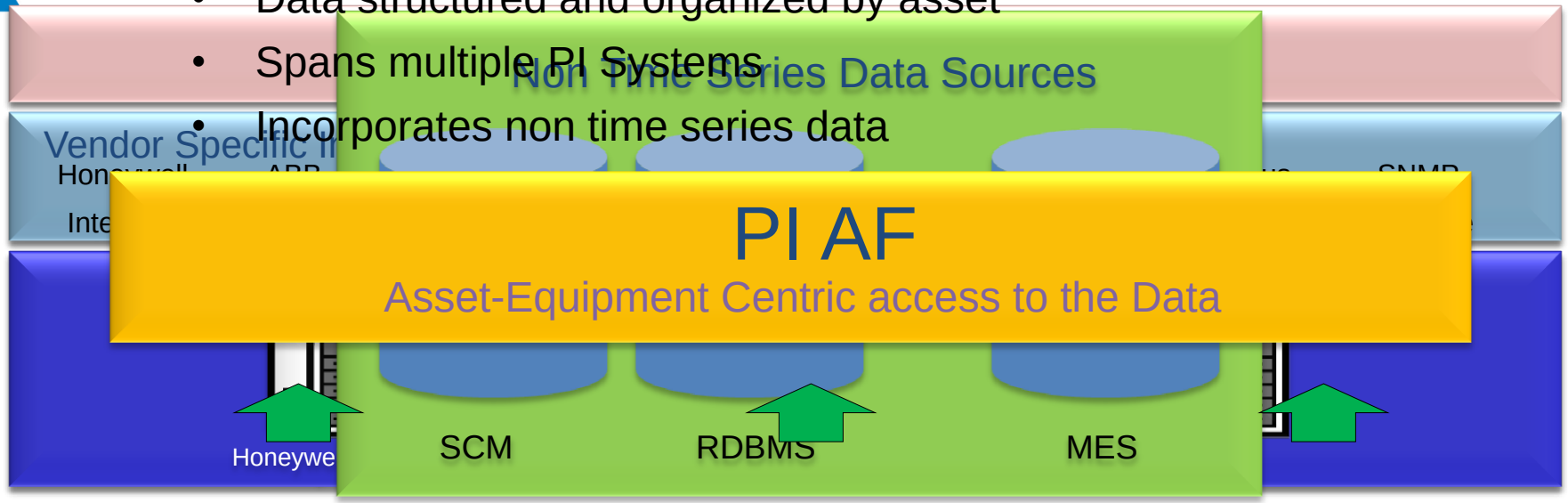






Asset centric

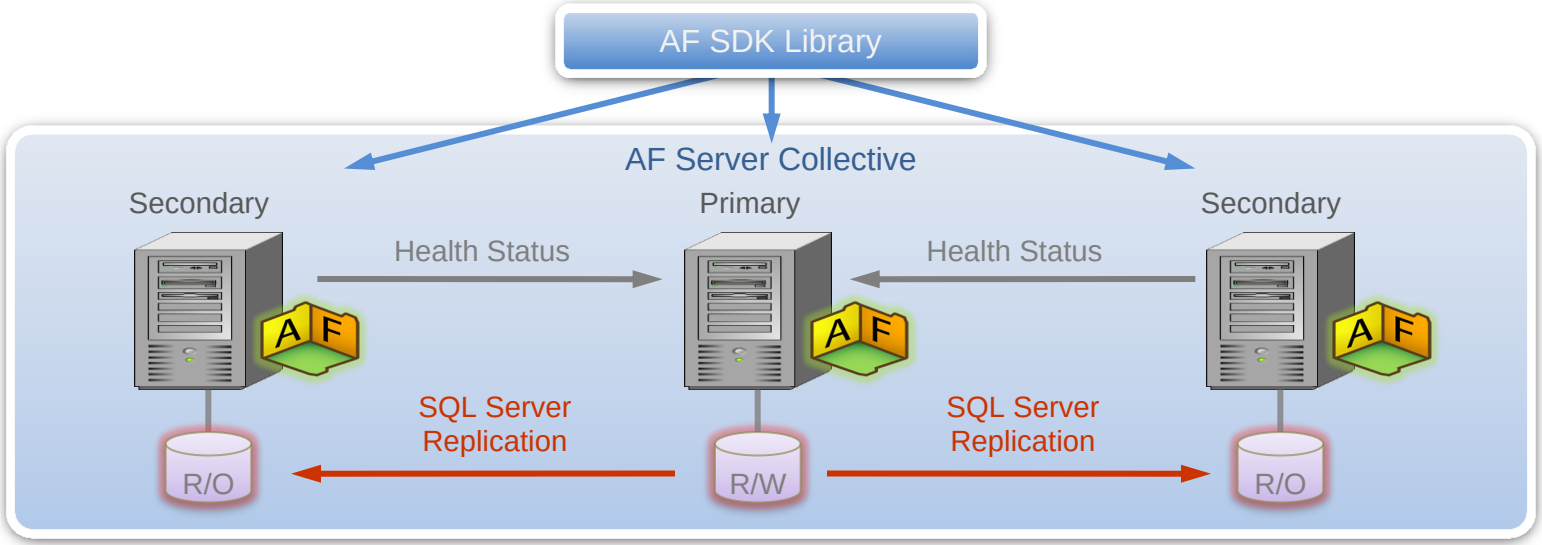
- Data structured and organized by asset
- Spans multiple PI Systems
- Incorporates non time series data



AF 2.x HA Collective

PI System Explorer

PI Notifications, AF-based PI Clients (WebParts, ProcessBook, DataLink, etc.)



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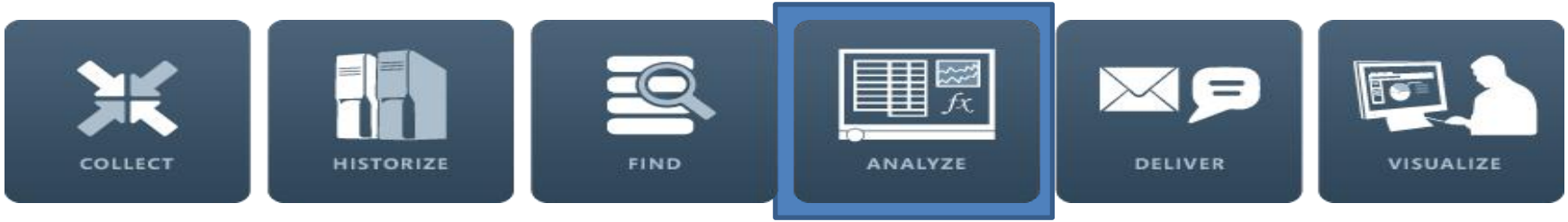
More details will be in the talk

Do“More with Less“ using PI AF & PI Notifications

The PI System: Analyze



Convert real-time data into actionable information

- CEP (Complex Event Processing) & Post processing
- Equations, calculations, aggregations, filters, business rules

Monitor business & operational performance in real time

Analyze

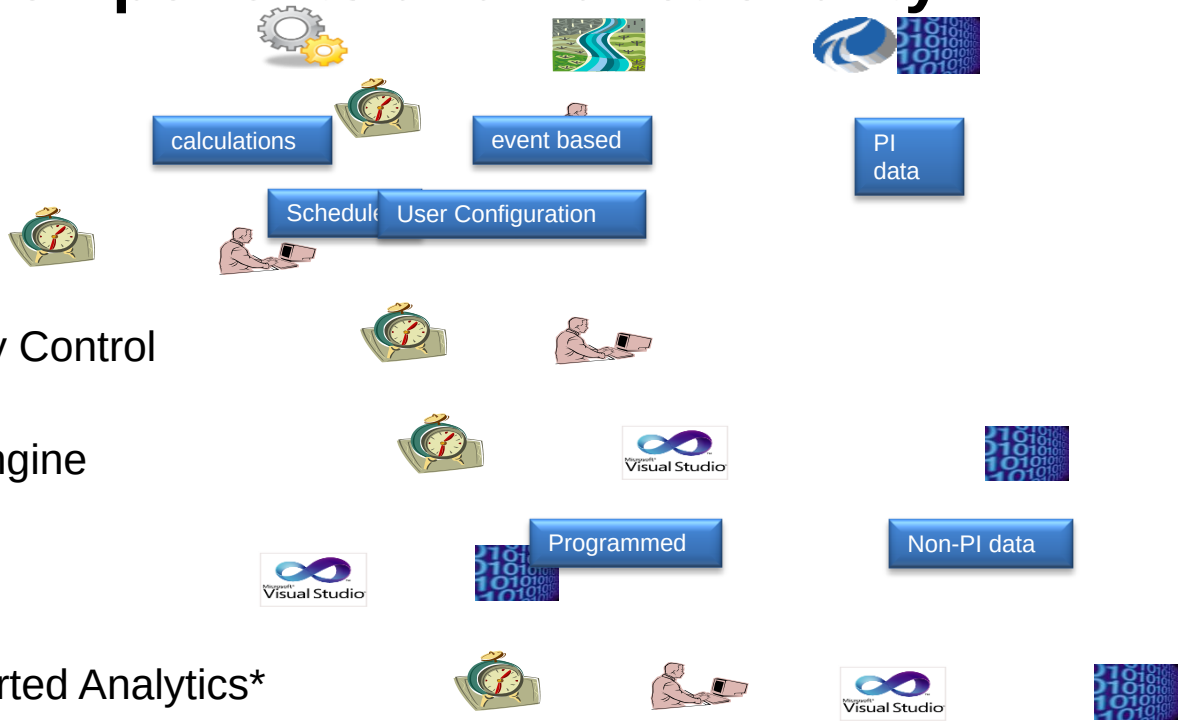
- Combine data elements together
- Aggregate totals and averages
- Filter out irrelevant data.
- Includes both configured and programmed analytics
- Enables organizations to continually improve by analyzing data and obtaining insight into their operations.

BATCH ID	PI MIN	PI AVG	PI MAX	PI RANGE	PI STDEV
MP_20090911_115632	147.1	172.6	205.6	58.5	13.6
MP_20090910_204531	266.7	316.9	366.9	100.2	26.5
MP_20090910_170536	32.8	102.5	230.0	197.2	36.4
MP_20090910_160842	141.8	188.3	220.1	78.4	21.6
MP_20090909_220449	230.0	328.4	426.3	196.3	56.2
MP_20090909_153813	201.5	256.4	289.0	87.5	18.2
MP_20090909_142545	264.1	291.1	327.9	63.8	14.7
MP_20090909_132727	295.4	338.1	377.1	81.7	25.4
MP_20090902_171845	32.3	129.7	292.8	260.5	88.1
MP_20090902_153523	108.6	184.5	251.6	143.0	35.2
MP_20090901_204325	311.9	363.5	409.4	97.4	23.4
MP_20090831_194329	340.6	361.8	396.0	55.4	13.2

MIN	AVG	MAX	MAX	MAX
32.3	252.8	426.3	260.5	88.1

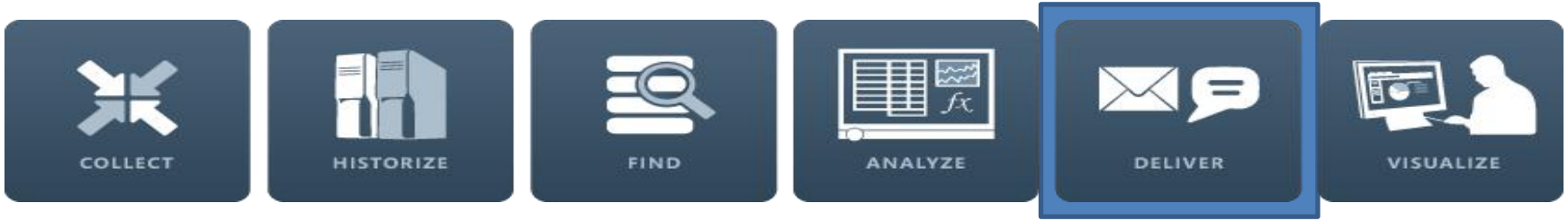
PI Analytics – Components and Functionality

- Performance Equations
- Totalizers
- Alarms/Statistical Quality Control
- Advanced Computing Engine
- PI for StreamInsight
- Asset Framework supported Analytics*



* Future products

The PI System: Deliver



- PI Notifications – deliver exceptions to humans or push to other systems
- PI Data Access – allow applications to pull data from the PI System
  - SQL Data Access
  - Web Services
  - OPC Servers
  - Software Development Kits

PI Data Access: The 2010 Wave

PI JDBC 2010 | PI Web Services 2010 | PI OLEDB Enterprise 2010 | PI OPC DA/HDA Server 2010 | OSIsoft SDKs

Asset Information / Metadata

Notifications

Analytics

Relational / Non Time Series

PI Server

PI Server Collective

Time Series Data

Development → Runtime

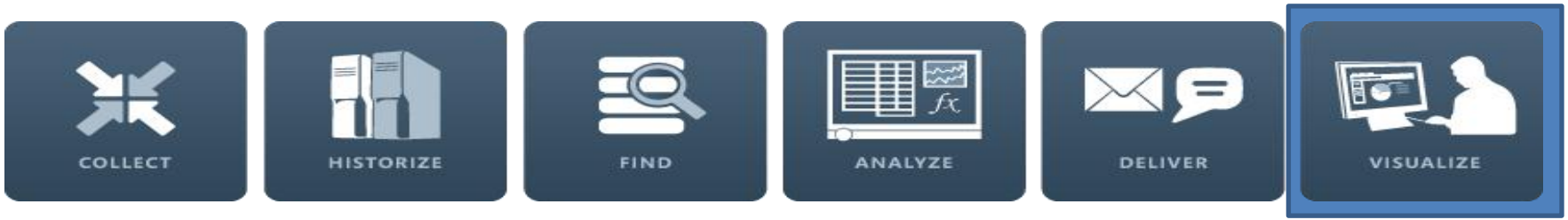
```
AFTimeRange tr = new AFTimeRange(new AFTime(tex
AFValues vals = _afDB.Elements["Pump123"].Attri

lstValues.Items.Clear();
foreach(AFValue val in vals)
{

    lstValues.Items.Add(val.Value.ToString() +
}
```

PI System Access (PSA)

Products Covered by PSA

- OSIsoft SDKs
  - PI SDK
  - AF SDK (includes AN/EF SDK)
- SQL Family + PI OLEDB Enterprise
  - PI OLEDB
  - PI JDBC
  - PI ODBC
- PI OPC DA/HDA Server
- PI Web Services
- PI API

The PI System: Visualize



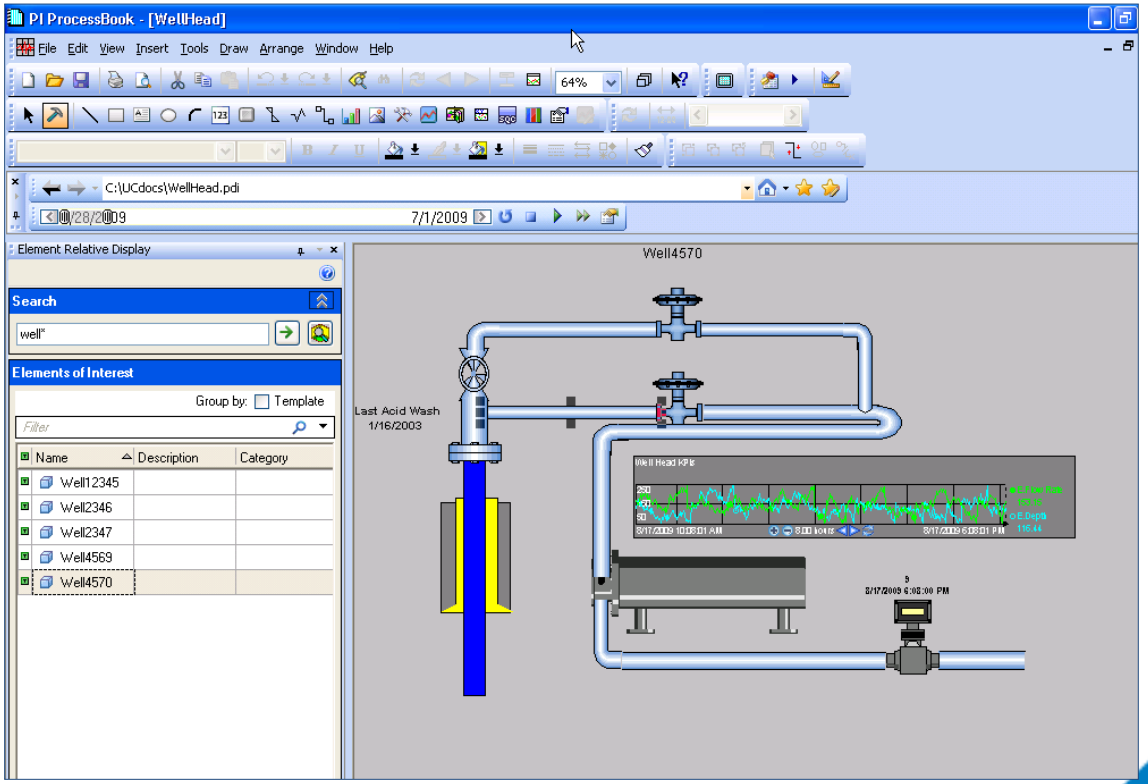
The decision makers can use the well-known tools like:

- Just Internet Browser with Silverlight
- OSIsoft PI ProcessBook
- Just Microsoft Office environment Microsoft Office Excel or Microsoft Office SharePoint
- SAP Enterprise Portal

The Visuals stimulates the creativity and gives solutions to end-users for solving business problems.

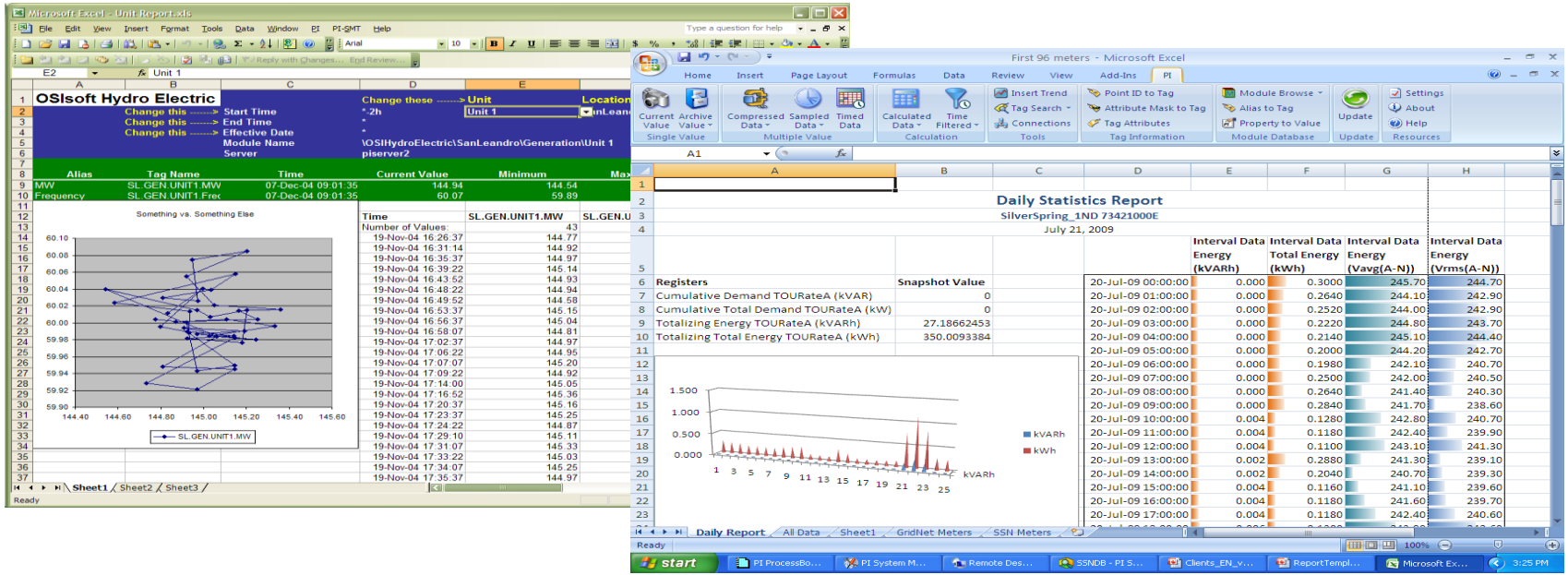
PI ProcessBook

- Draw intuitive graphical diagrams and, include live data
- Make one diagram refer to many similar units or assets
- Easily trend data
- View annotations to data points
- Intuitive “status” indicator displays health of data on the display
- Large symbol library included to make drawings quickly
- Import graphics for customized displays.



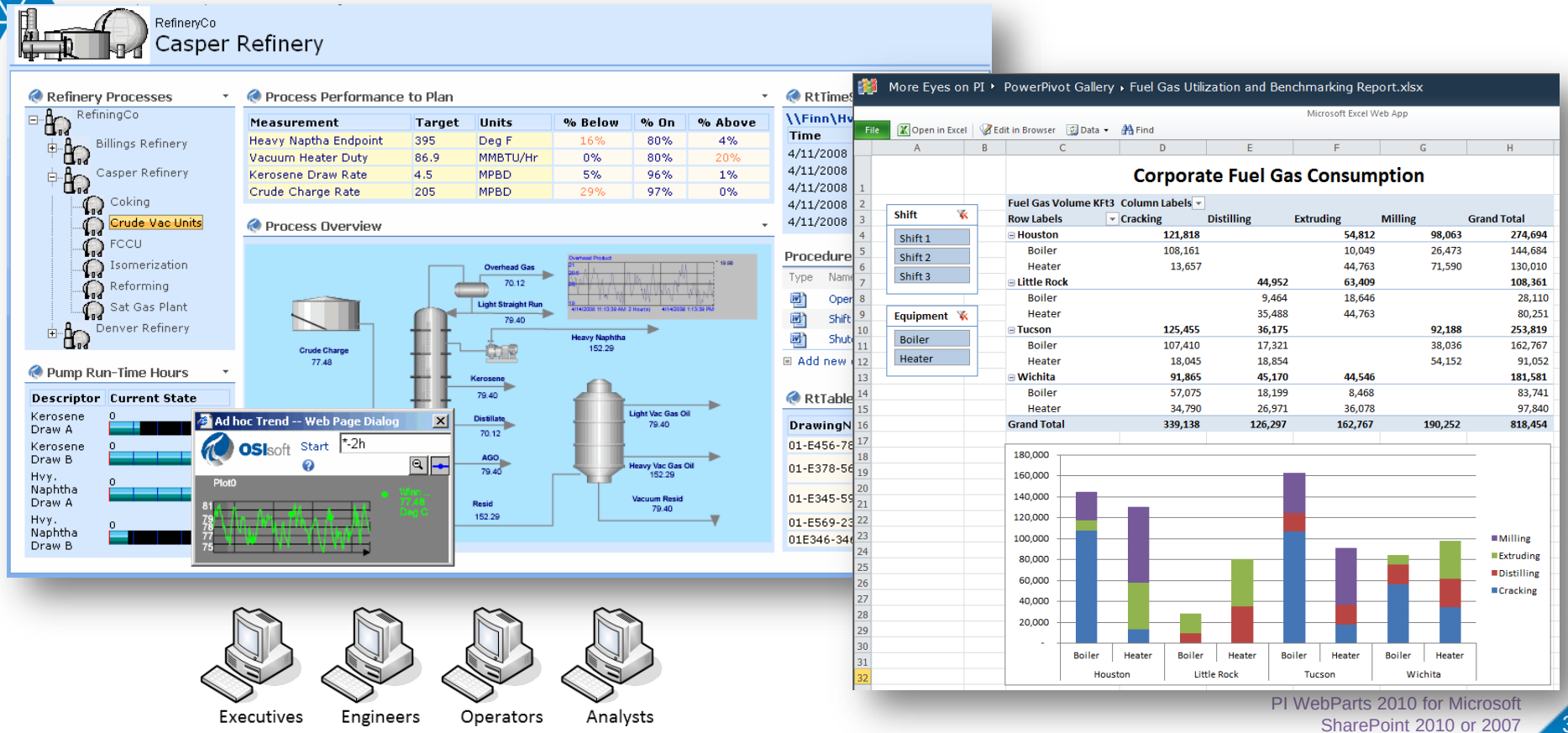
PI DataLink + Excel 2010 + PowerPivot

- PI System Add-In for Microsoft Excel
- Create interactive reports and analyses in a spreadsheet
- Worksheets update
- Worksheets can be published
- SharePoint workflow integration

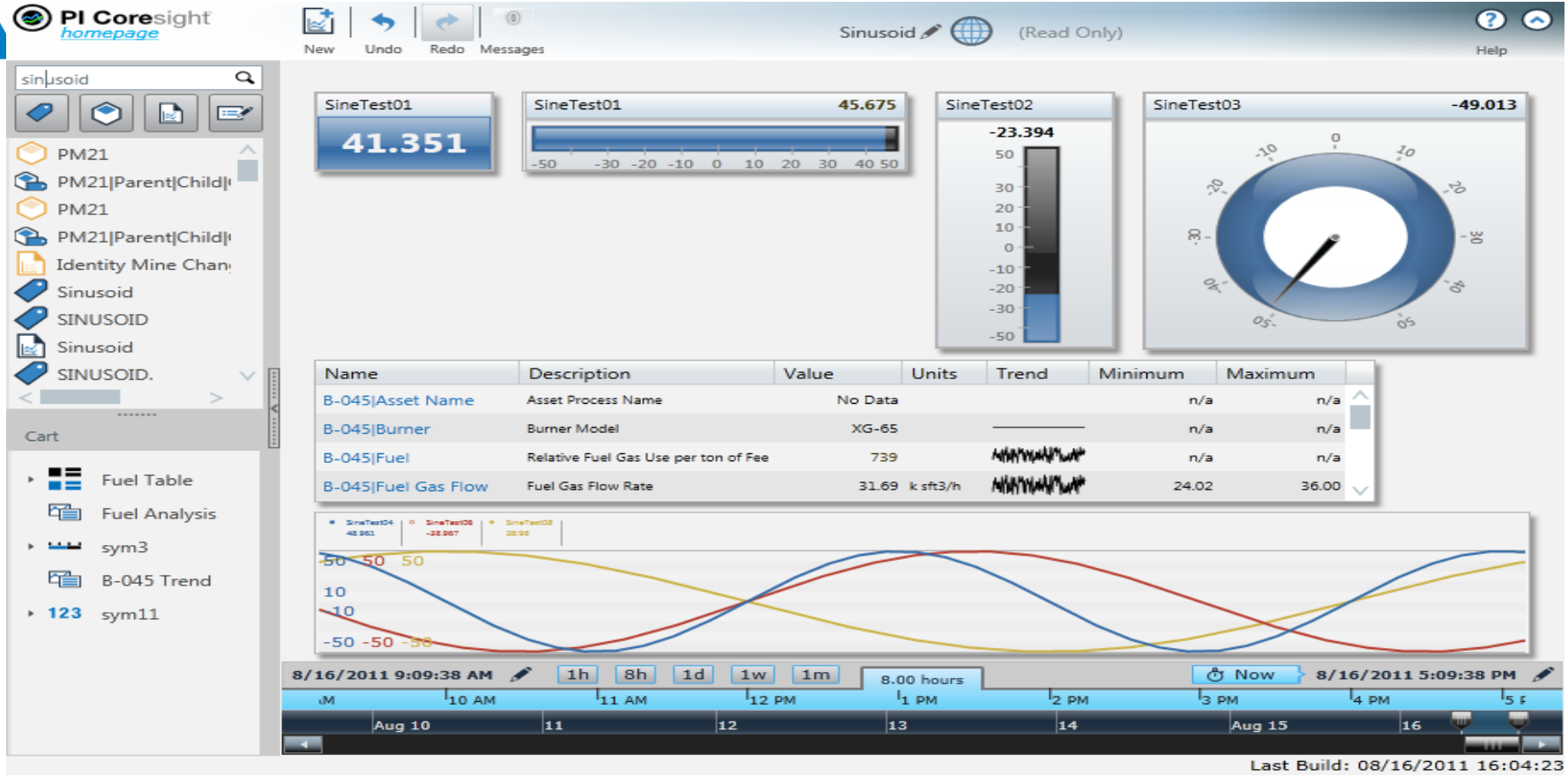


Providing tools to create visual summaries of the data to alert decision makers and call attention to the most important information of the moment.

Visualization – PI WebParts & Microsoft SharePoint



PI Coresight User Interface



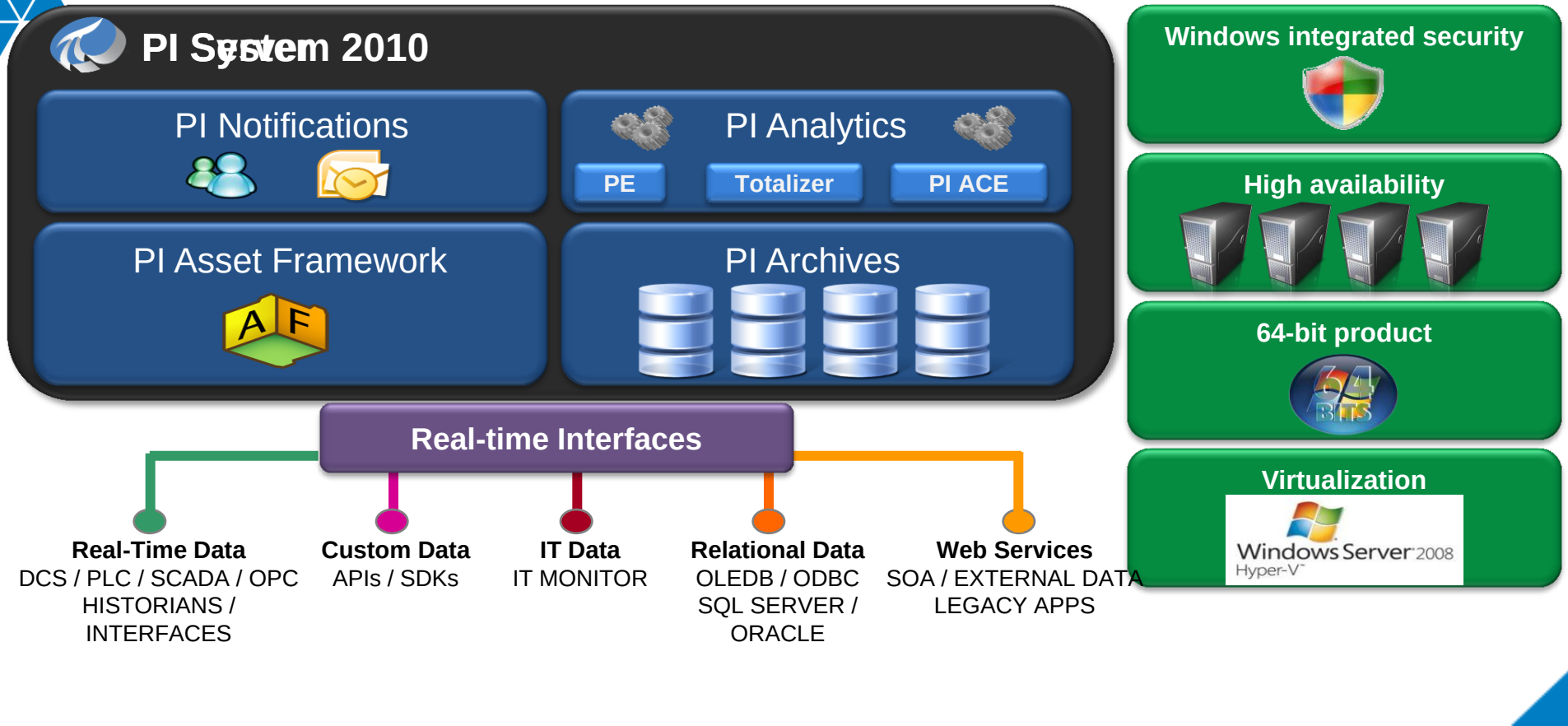
AZ SONRA.....

More details will be in the talk

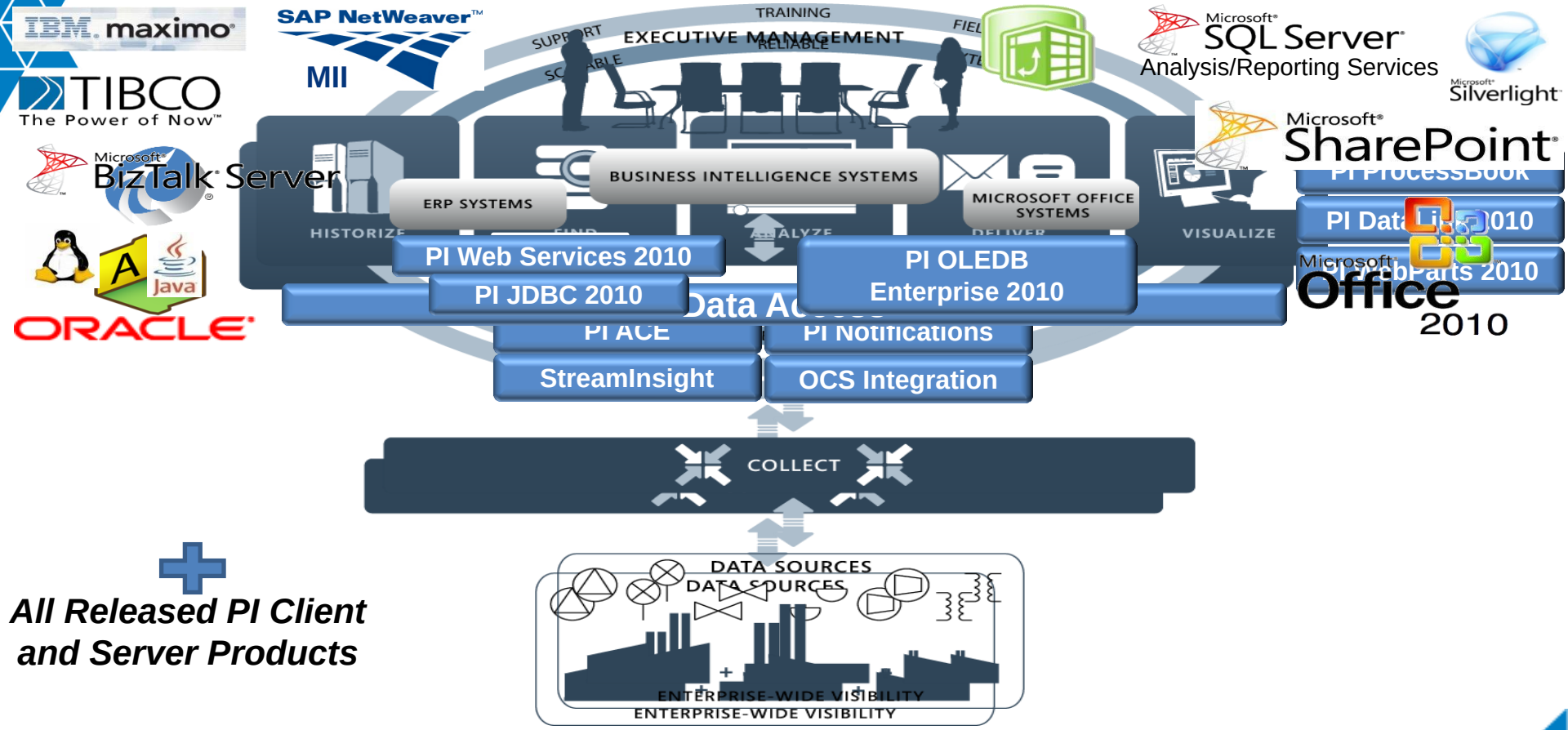
The Fastest, Easiest Way to Visualize Your PI System Data with PI Coresight

Summary

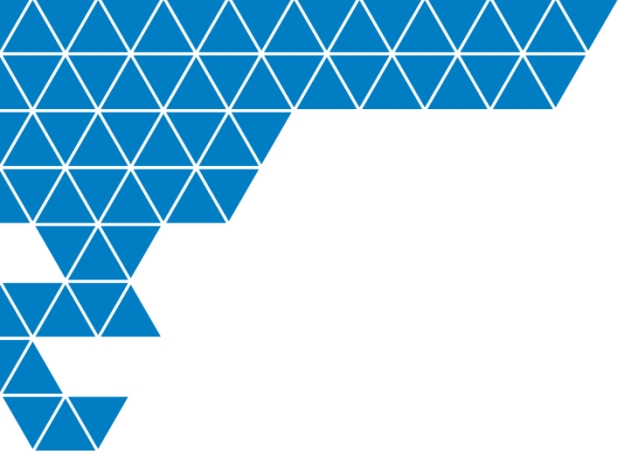
PI System 2010



PI System 2010



All Released PI Client and Server Products



Thank you