

REAL-TIME PERFORMANCE MANAGEMENT FOR THE ENTERPRISE

RtPM



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RtPM

Analysis Framework

The Foundation of Foundation

Richard Beeson



Analysis Paralysis



- Difficulty Gathering Information
- Inconsistent Data Naming and Data Definitions/Structures
- Timely Information
- Lack of Configurable Toolsets
- Inconsistent Analyses
- Isolated Data and Analyses

Analysis Framework Benefits

- **Visibility**
 - Information about data, assets, models and analysis is available to visualization suite of tools
- **Single Version of the Truth**
 - Creates unified assets and connectivity-based models
 - Assets and models become basis for consistent visualization and analyses
- **Communication & Collaboration**
 - People use the same asset and model reference for their visualization and analyses
- **Knowledge Management**
 - Synchronize and eliminate disparate assets, models and analysis to improve traceability and accountability

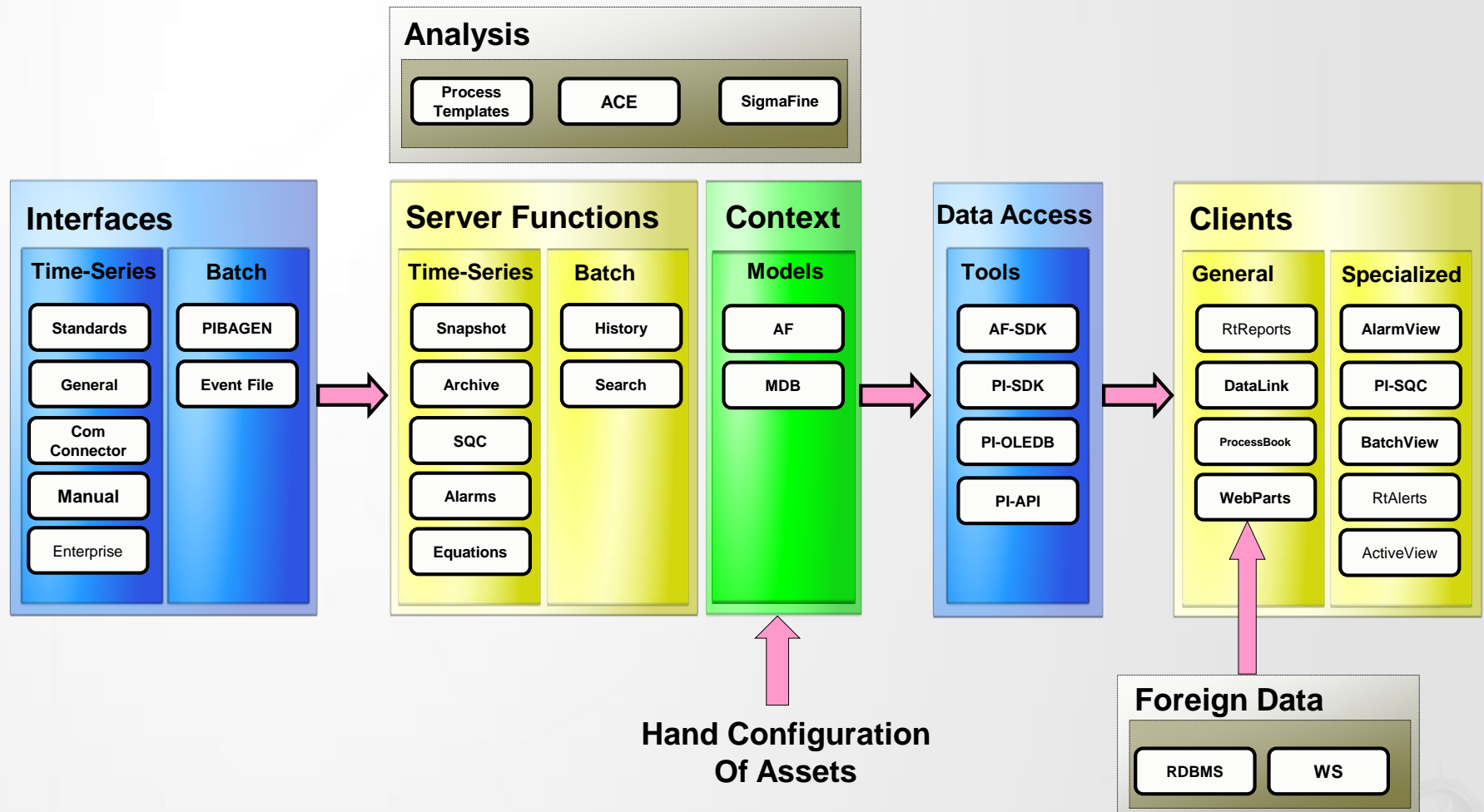


OSIsoft's Analysis Framework Is...

- A framework that ties data to assets
- A set of tools for relating and organizing data around your processes, operations, facilities and organization
- A way to templatize and configure the assets within your organization
- An infrastructure for analysis, visualization and reporting



AF's Position in the RtPM Platform

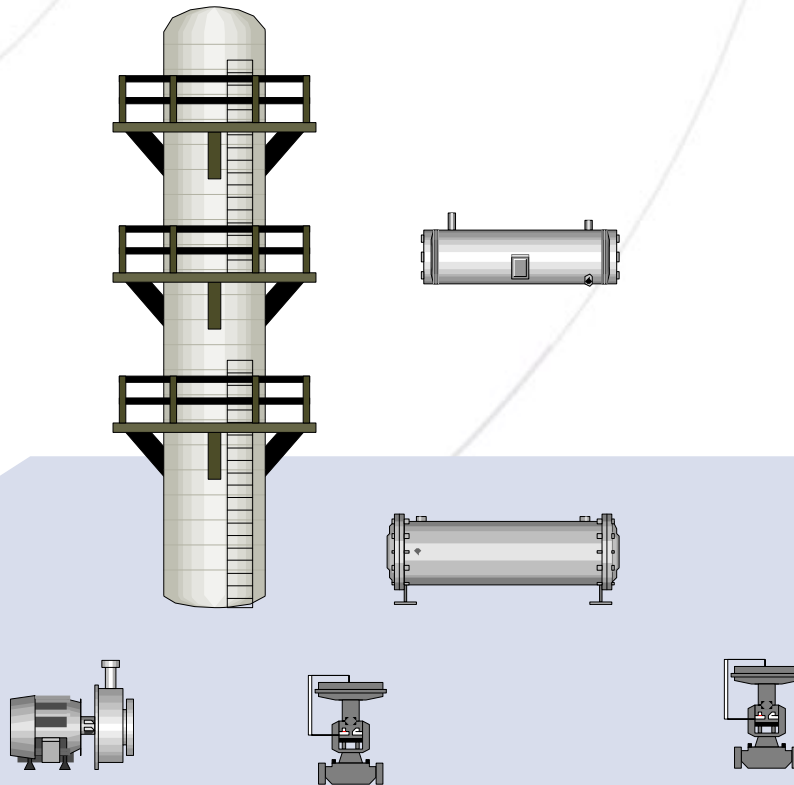


So how does Analysis Framework work?



Start with a Collection of Assets

Tower 1



Associate Data with Assets

These assets can be made into a template for reuse.

Asset Attributes:
Name plate information
Trays
Related data references
Limits

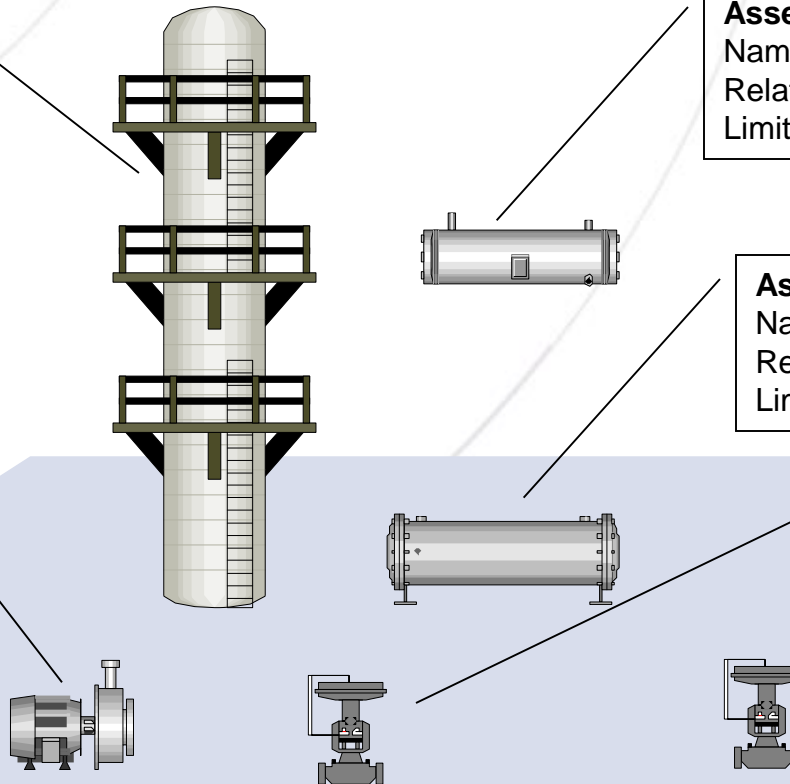
Asset Attributes:
Name plate information
Related data references
Limits

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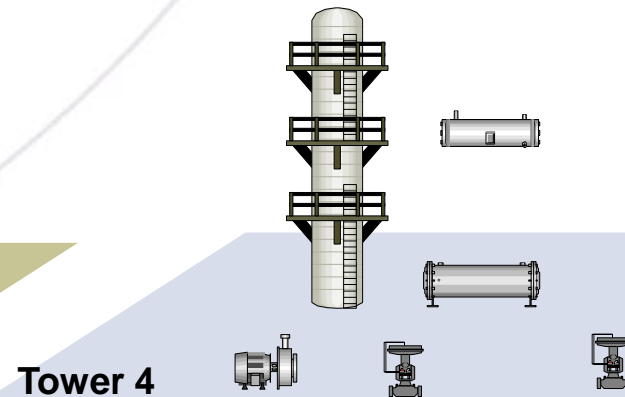
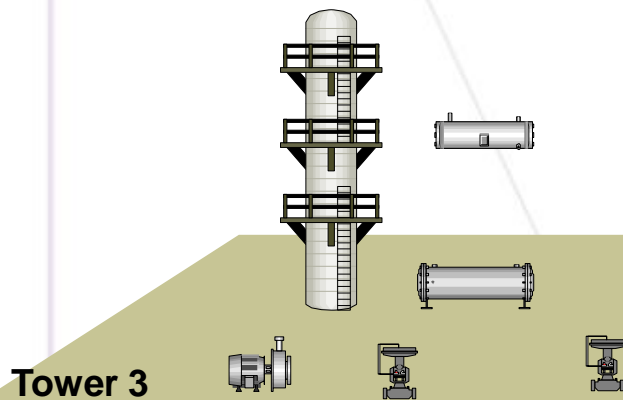
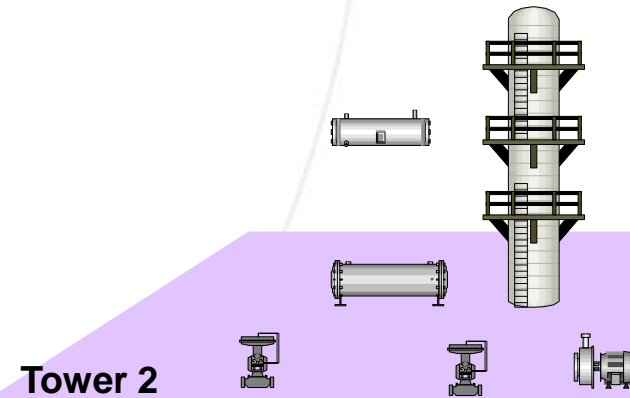
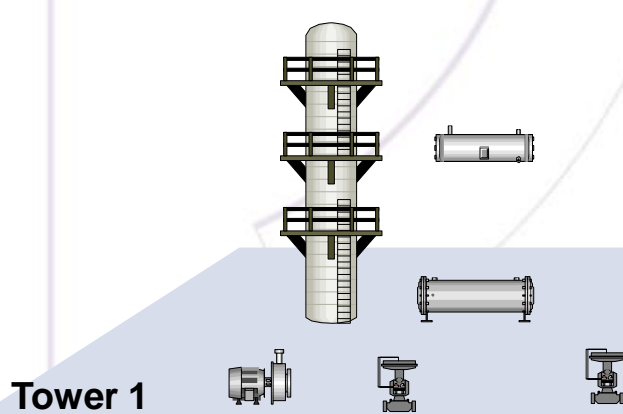
Asset Attributes:
Name plate information
Related data references
Operating limits

Asset Attributes:
Name plate information
Related data references
Maintenance information

Tower 1

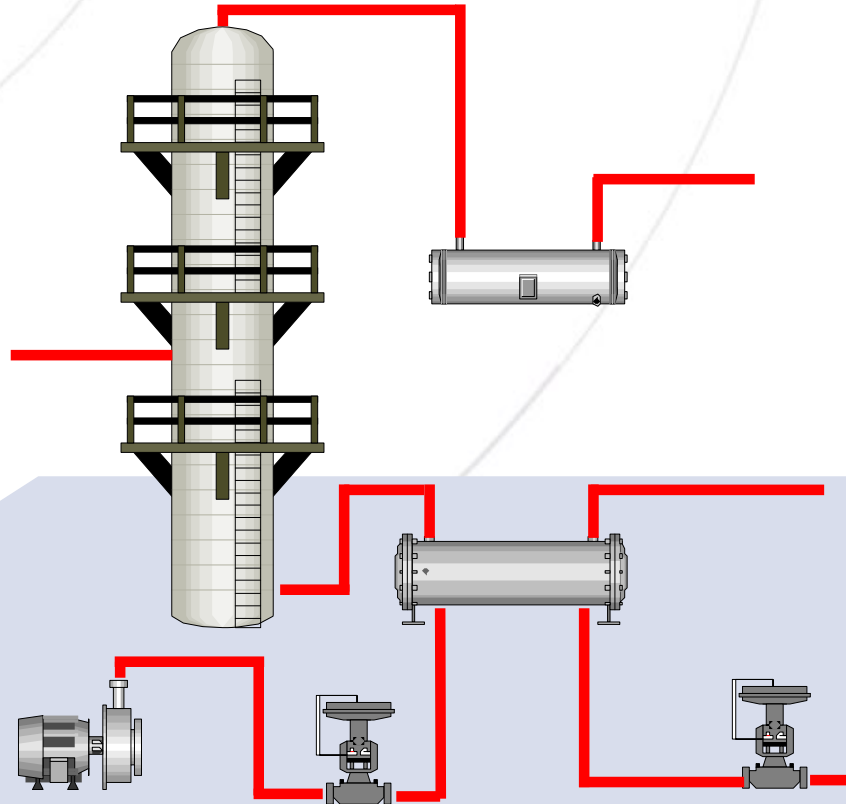


New Assets Are Based on Templates



Assets Can Be Connected

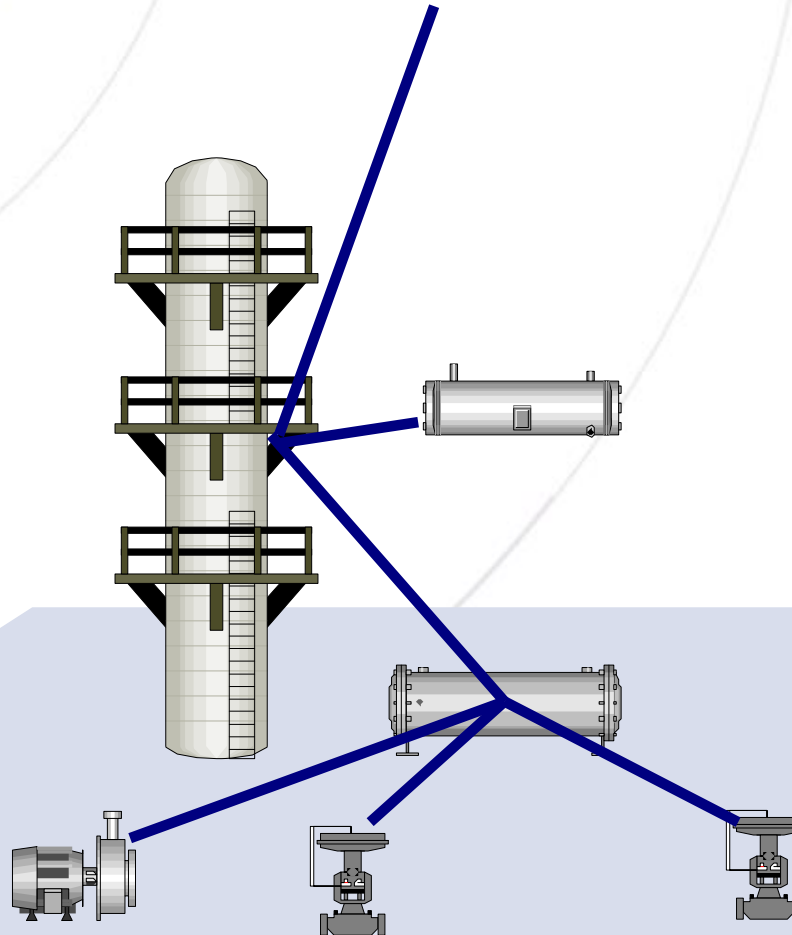
Tower 1



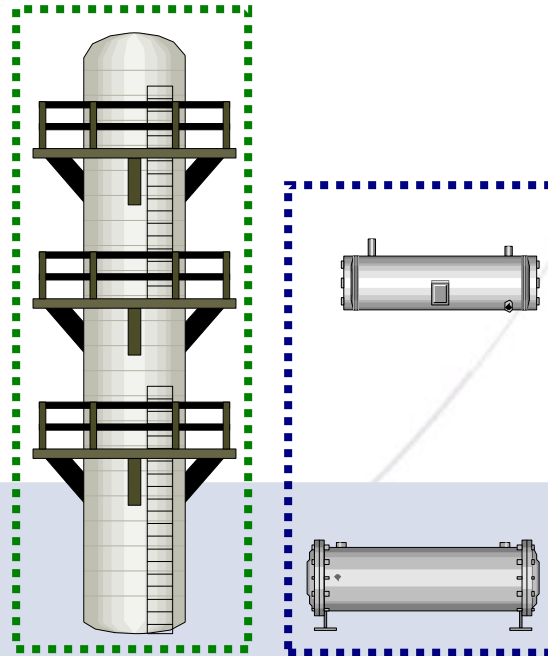
Assets Can be Grouped

Plant 1

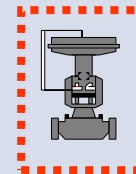
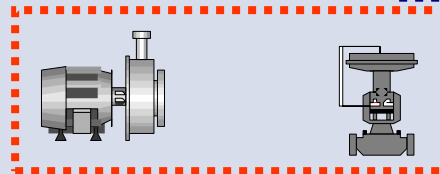
Tower 1



A Function-based Group of Assets

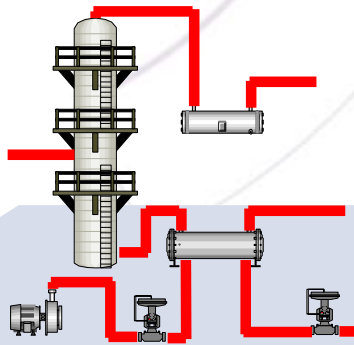


Tower 1

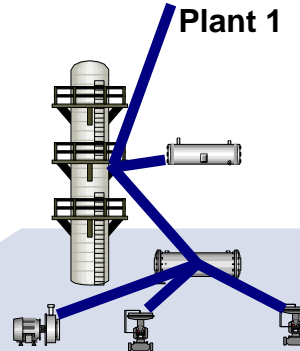


Relationships Sourced from Assets

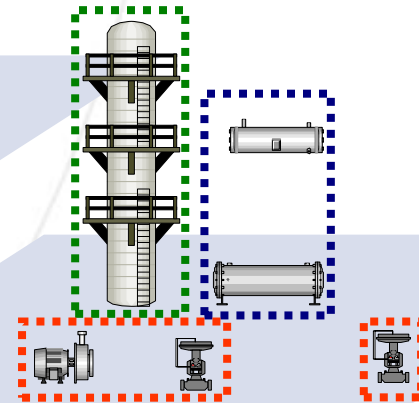
Connectivity



Hierarchy



Role-based



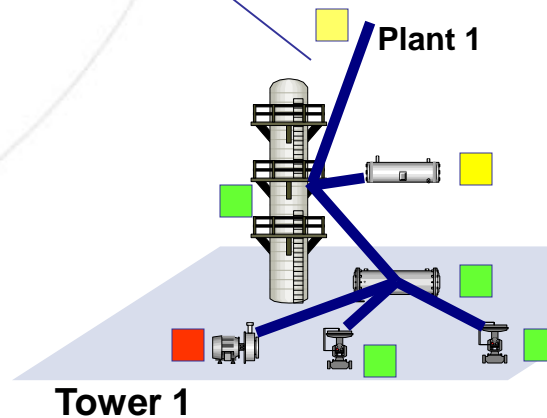
Tower 1

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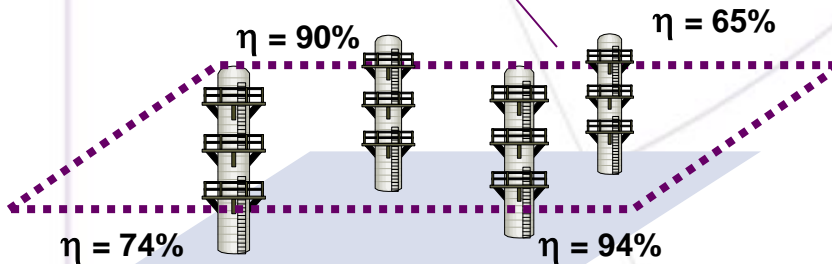
Tower 1

Apply Analyses

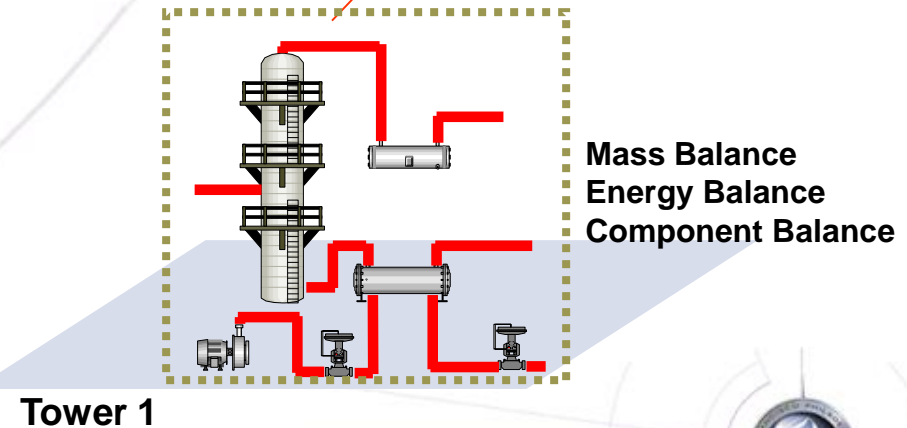
Collection
Based Analyses



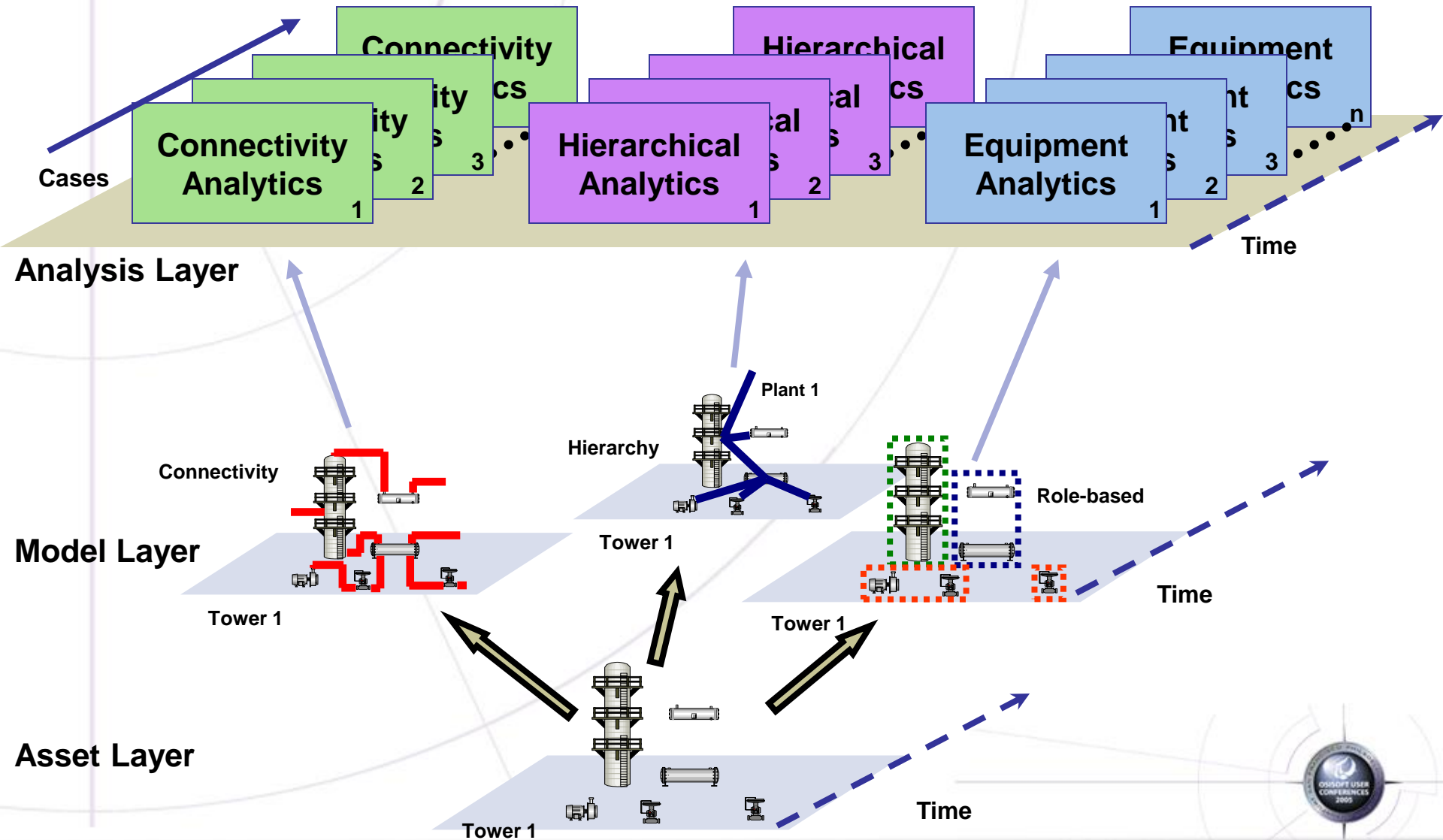
Equipment
Based Analyses



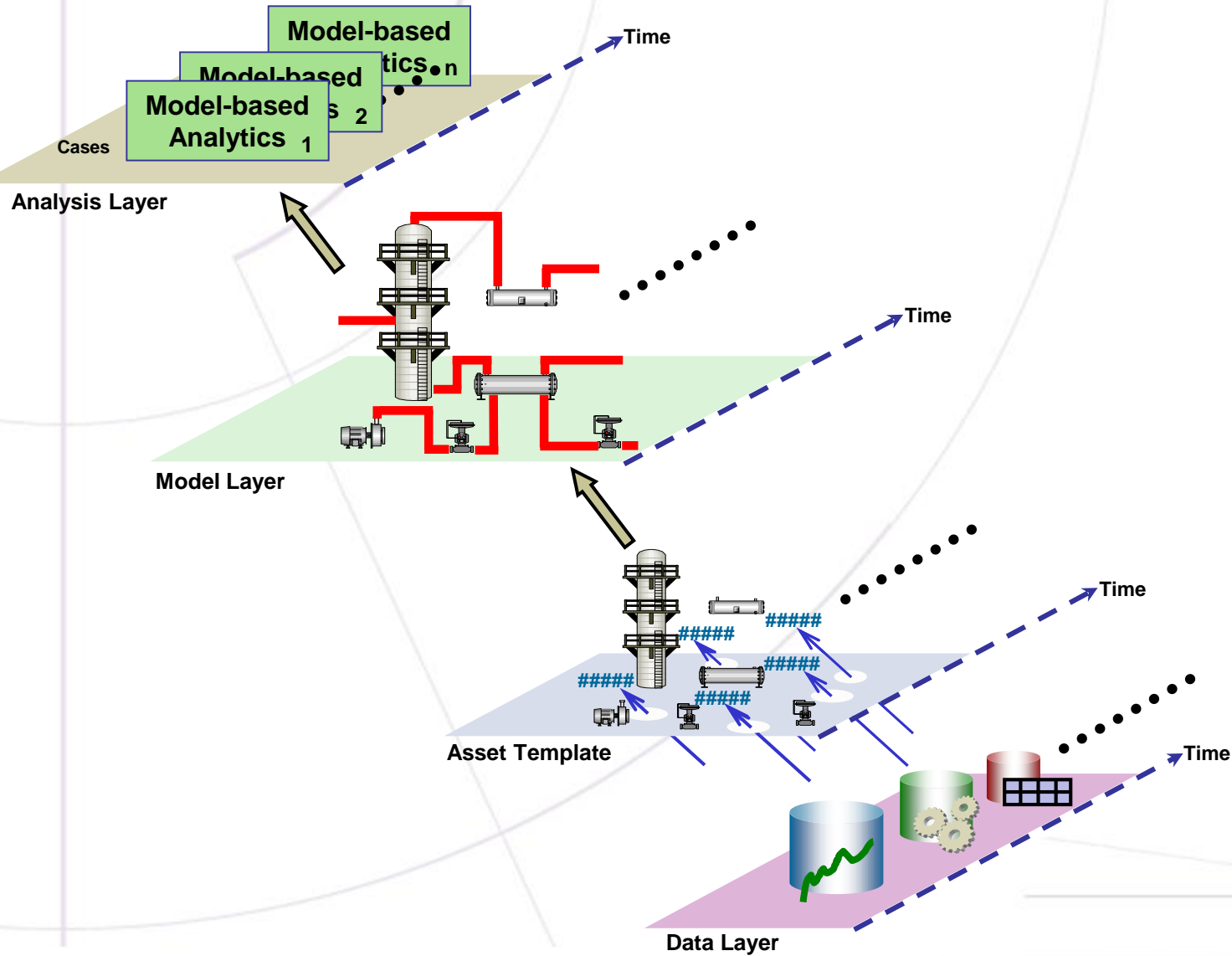
Connectivity
Based Analyses



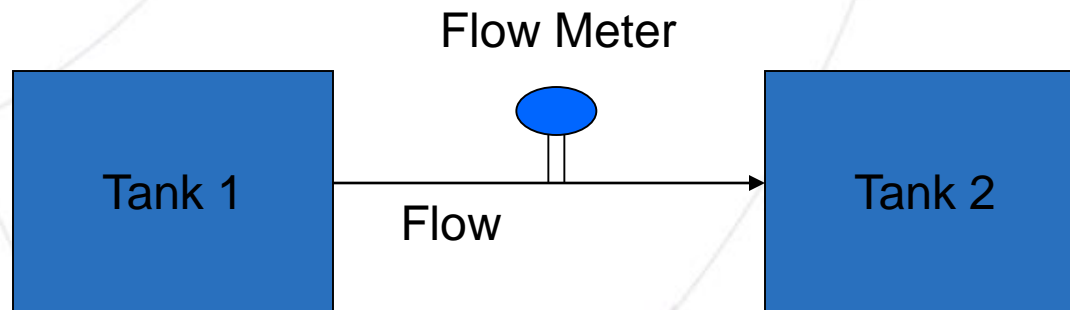
Analyses are Run as “Cases”



Visualization

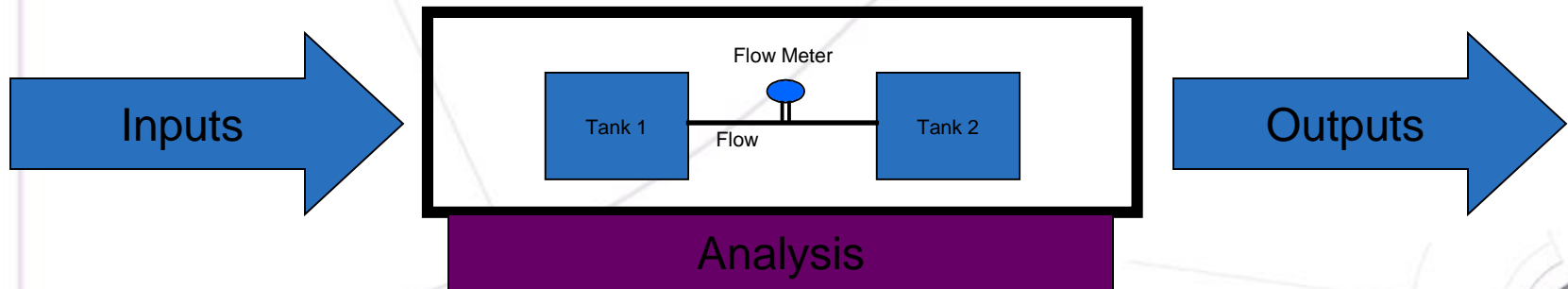


A Simple Model



Model Analysis

- Evaluate or run a model
 - Assign an Analysis
 - Read attribute values of elements
 - Inputs
 - Evaluate the data
 - Generate new attribute values
 - Outputs



What Drives the Model

- Data references
 - Specify how to get data into, out of, or calculated in an element
 - E.g., through PI, Calculations, Business Systems, Maintenance Systems, Web Services, etc.
- Analysis rules
 - Specify what logic to apply to the model or case
 - E.g., Mass balance, Failure prediction, Performance analysis
- Time rules
 - Control case creation (period of time to analyze)
 - Periodic, overlapping, or on event (via ACE)
 - Custom periods based on product runs, batches, reels, shifts, etc.



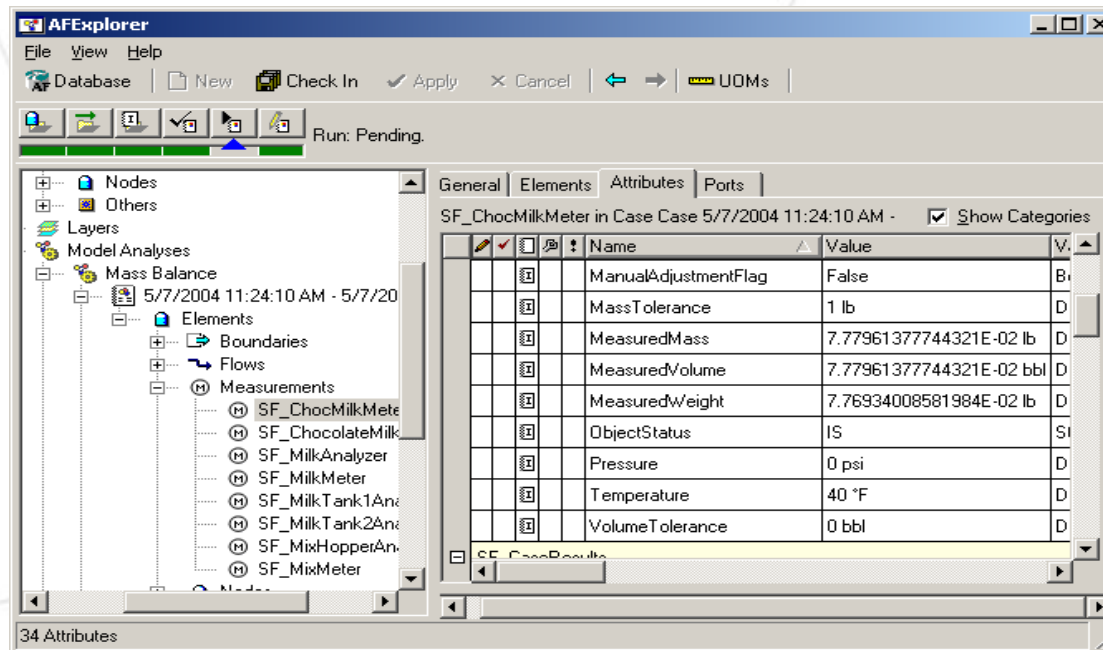
Working with Analysis Framework

- AF Explorer
 - Manage and browse models, elements, etc.
- ProcessBook Modeler
 - Build, analyze and present models graphically
 - Associate graphical representations with element types
- Excel Add-in
 - Data, analysis and connectivity retrieval
- AF SDK
 - Programmatic interface
- Administration
 - PI SMT 3.1
 - Excel Add-in (element creation and configuration)

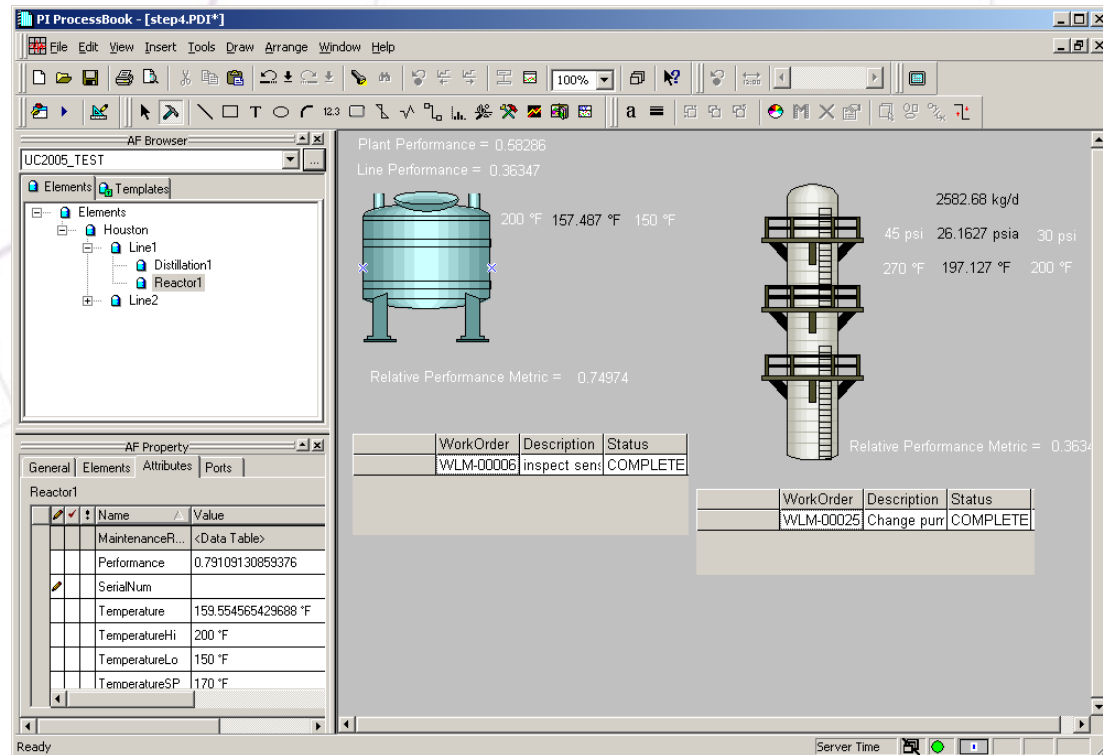


Features: AF Explorer

- View the structure of the database
 - Elements, templates, models, tables, analyses
- Create new content (e.g., elements, templates, etc.)
- Rename items
- Configure items (e.g., assign data references)
- Run analyses to validate proper function



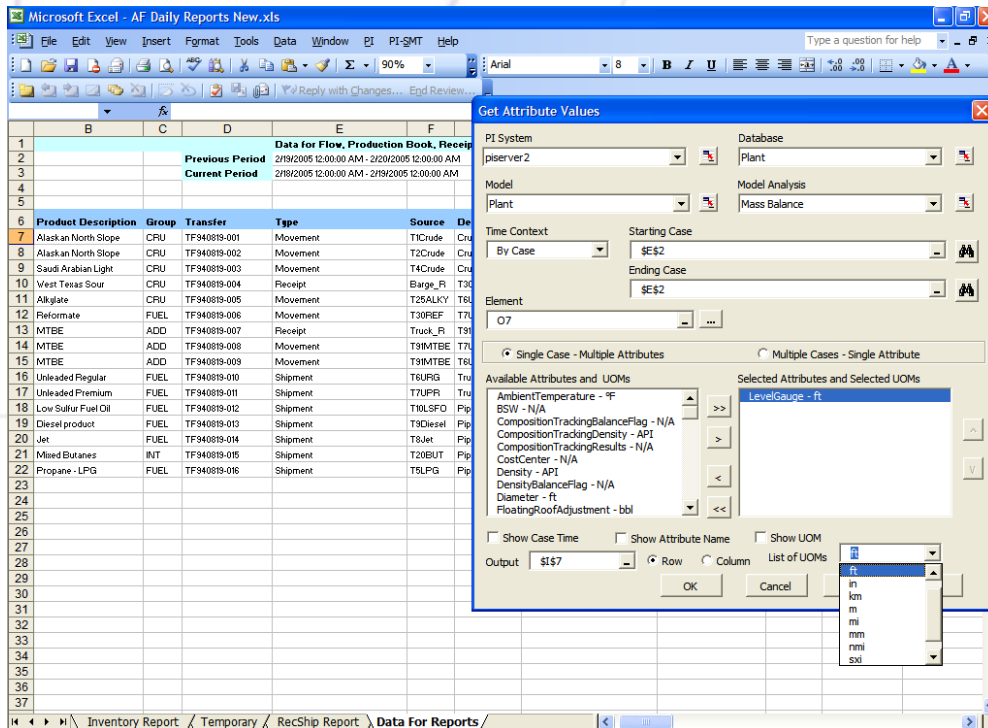
Features: ProcessBook Modeler



- Provides a complete visual representation of the model
- Access general information about the model (through AF Explorer Window)
- Toolbar and controls facilitate case study management and analysis



Features: Excel Add-in



- Manage configuration
 - Specify data references for attributes that will override the template definition
- Retrieve and report information
 - Create report templates in Excel similar to using DataLink
 - Retrieve information regarding model connectivity and context



Features: AF SDK

- Comprehensive Managed Code Class Library
 - Access to AF Database
- Common UI Components
 - ActiveX / COM
- Visual Studio Wizards
 - Data References, Time Rules and Analysis Rules
- Extensive User Guide and Programmer Reference
 - Tutorial Guiding Developer Through AF Programming Experience



Features: Administration

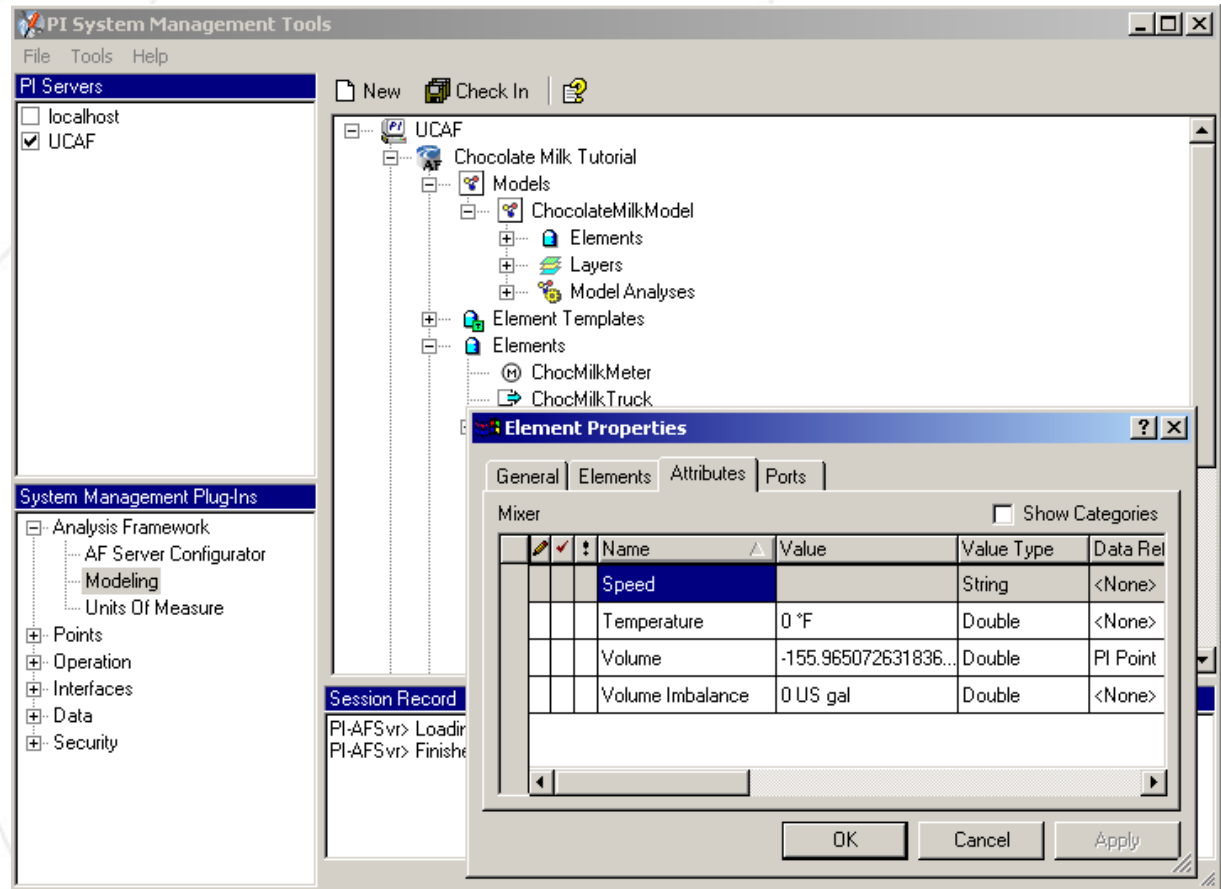
- Excel Add-in

The screenshot shows the Microsoft Excel - Book2 window. The Excel interface includes a menu bar (File, Edit, View, Insert, Format, Tools, Data, Window, PI, PI-SMT, Help), a toolbar, and a worksheet grid. The active cell is A8. The worksheet contains data organized in columns A through F. Column A has a header 'Select (x)' and rows 2-7 have 'x' in the first column. Columns B through F contain various data including file paths, unique IDs, and formulas. An 'Export Elements' dialog box is open in the bottom right corner, showing fields for 'PISystem' (localhost), 'Database' (UC2005), and 'Mode' (Create or Edit). The dialog has 'OK', 'Cancel', and 'Help' buttons.

	A	B	C	D	E	F
1	Select (x)	Name	Unique Template	OverheadFlow		Performance
2	x	Houston\Line1\Distillation1	5b3a5	Distillation	PI Point=\UCAF\Houston.Line1.Distillation1.F;UOM=kg/mi	Formula=A=PressureSP;B=Pressure;
3	x	BatonRouge\Line1\Distillation1	fb1567	Distillation	PI Point=\UCAF\BatonRouge.Line1.Distillation1.F;UOM=kg	Formula=A=PressureSP;B=Pressure;
4	x	BatonRouge\Line2\Distillation2	0fdb5	Distillation	PI Point=\UCAF\BatonRouge.Line2.Distillation2.F;UOM=kg	Formula=A=PressureSP;B=Pressure;
5	x	Houston\Line2\Distillation2A	4716f	Distillation	PI Point=\UCAF\Houston.Line2.Distillation2A.F;UOM=kg/n	Formula=A=PressureSP;B=Pressure;
6	x	Houston\Line2\Distillation2B	2479a	Distillation	PI Point=\UCAF\Houston.Line2.Distillation2B.F;UOM=kg/n	Formula=A=PressureSP;B=Pressure;
7	x	BatonRouge\Line3\Distillation3	22998	Distillation	PI Point=\UCAF\BatonRouge.Line3.Distillation3.F;UOM=kg	Formula=A=PressureSP;B=Pressure;
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Features: Administration

- PI SMT



Requirements

- What do you need to run AF (1.2.2)?
 - PI Server 3.4.363.68 or greater
 - PI SDK 1.3.1.237 or greater
 - Microsoft .Net Framework, Release 1.1.4322
 - Optional Administrative
 - PI SMT 3.1, Excel 2000/XP/2003
- Do You Already Have AF?
 - PI Enterprise Systems
 - Framework Pack
 - Sigmafine



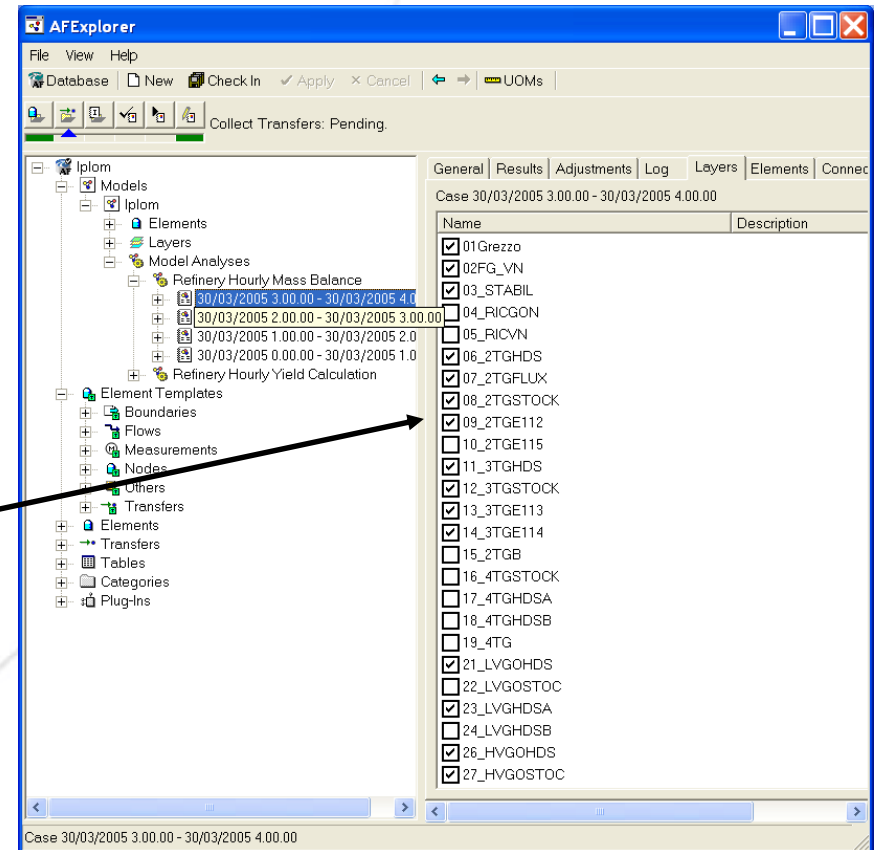
Advantages of Analysis Framework

- Allows organization of all of your data—1000s of points—in a meaningful way
 - According to naming convention
 - According to the way you would use it in analyses
- Create relationships between collections or organizations (e.g., assets)
- Allows you to bring in relational and complex data into the same context as your real-time data
- Custom domain knowledge can be re-used in new analyses because it's in one central place (not in an Excel spreadsheet)
- Replaces programming with configuration
- Protects your investments in your displays, reports, and business logic



Case Study: IPLOM - Reconciling Measures

- Reconciliation is the first step to consolidate process data before calculating performances
- Refinery plant model (Sigmafine) designed for yield reconciliation
- The model is composed of several (50) layers which can be combined to represent different plant configurations
- Reconciliation is done automatically every hour



Case Study: IPLOM - ROI Increasing Yield Profitability

- Diesel yield

- Analyzing homogeneous data related to “sweet” crudes:
 - 2003 actual average diesel yield 37,4%
 - 2004 actual average diesel yield 39,6%
- Average actual diesel yield increased due both to investments on plants and to performance management
- Historical analysis on diesel yield showed that the average increase due to performance management amount to about 0.8% in the period 2003-2004
- This lead to a profit increase estimated in 1 M\$ per year



Analysis Framework: The Foundation of Foundation

- What is Foundation?
 - An internal development project
 - Will merge and extend Analysis Framework with Module Database to an enterprise asset model
 - Foundation will be...
 - A logical enterprise asset model
 - Will allow relationships between the assets
 - Will accommodate associations to
 - Data we own
 - Data we don't own



Related Sessions

- Introducing Foundation – The RtPM Integration Infrastructure
 - General Session, Wednesday 4:30 PM
- Lunch Expo – Q&A Pod 3
 - Wednesday 12:45 – 2:00



Summary

- Analysis Framework is
 - A framework that organizes data around assets and models
 - A set of tools for modeling your process
 - A framework for analysis, visualization and reporting
- Analysis Framework
 - Allows you to bring in relational and complex data into the same context as your real-time data
 - Replaces programming with configuration
 - Protects your investments in your displays, reports, and business logic
- Analysis Framework is the Foundation of Foundation
 - Next version of AF-SDK is programmatic interface to Foundation
- Analysis Framework 1.2.2 is shipping today

