



2002
OSISOFT USERS CONFERENCE



**EXPANDING
THE POWER OF PI**

MONTEREY CALIFORNIA



OSIsoft™

PI Application Framework

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March 2002

Overview

- PI Application Framework Introduction
- PI Application Framework Key Features
- Building a PI-AF Application/Solution
- Wrap Up
 - Schedule
 - Related UC2002 Sessions
 - Resources
 - Call to Action

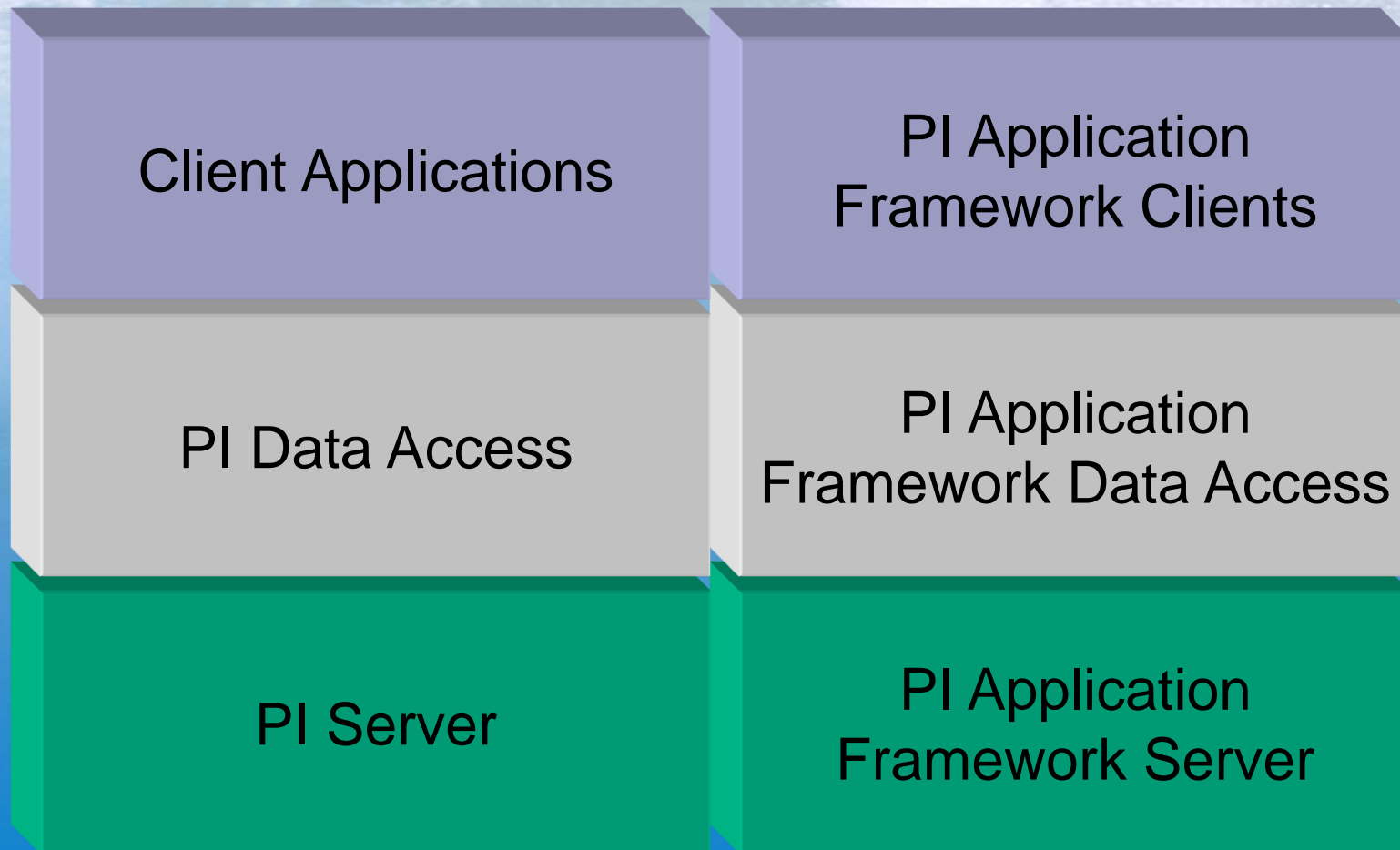
Introduction

- What is the PI Application Framework?
 - A Brief History
- Extends the PI System
 - Builds on technology and architecture of the PI System
 - Fully Programmable
 - All data is exposed

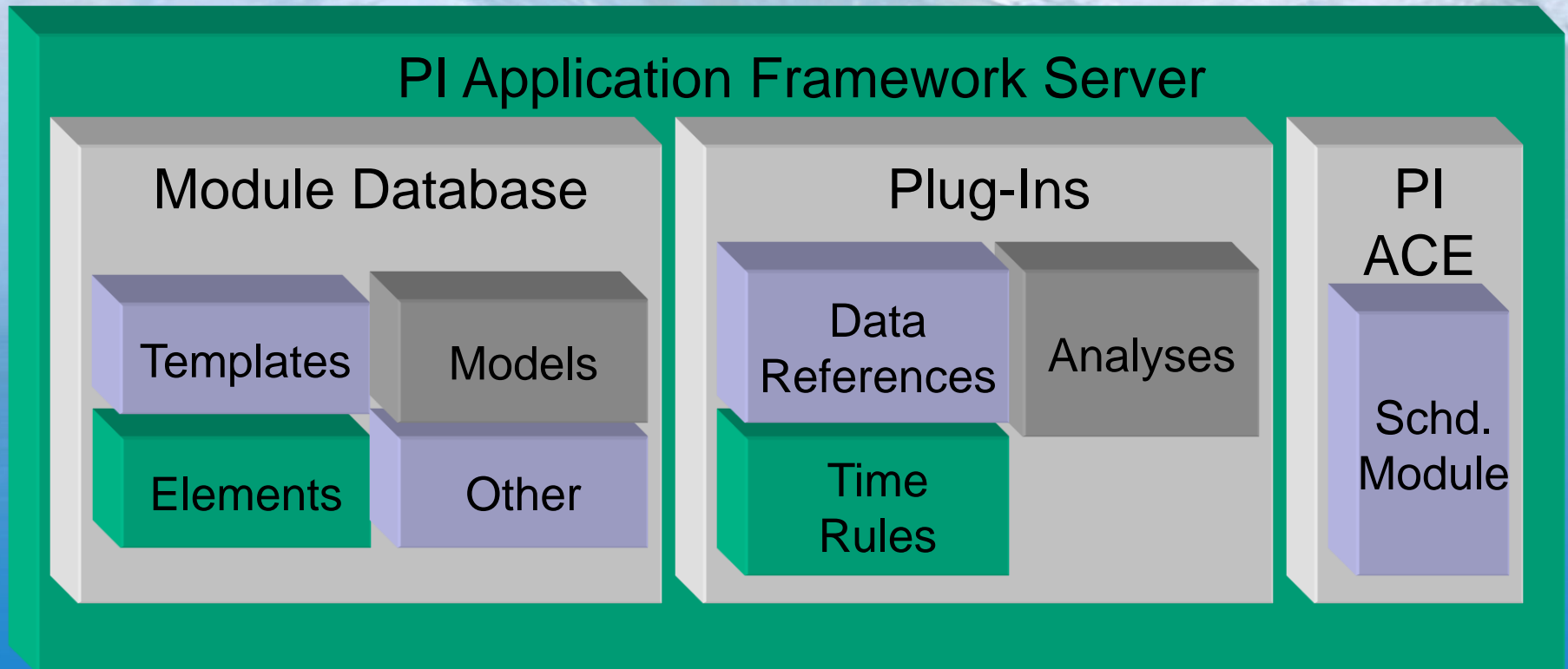
Introduction

- Adds New Features and Functionality
 - Organizational and Structural Information
 - Model Analysis
 - Business, Process, Manufacturing Rules/Logic
 - Contexts

PI Application Framework



PI Application Framework Server



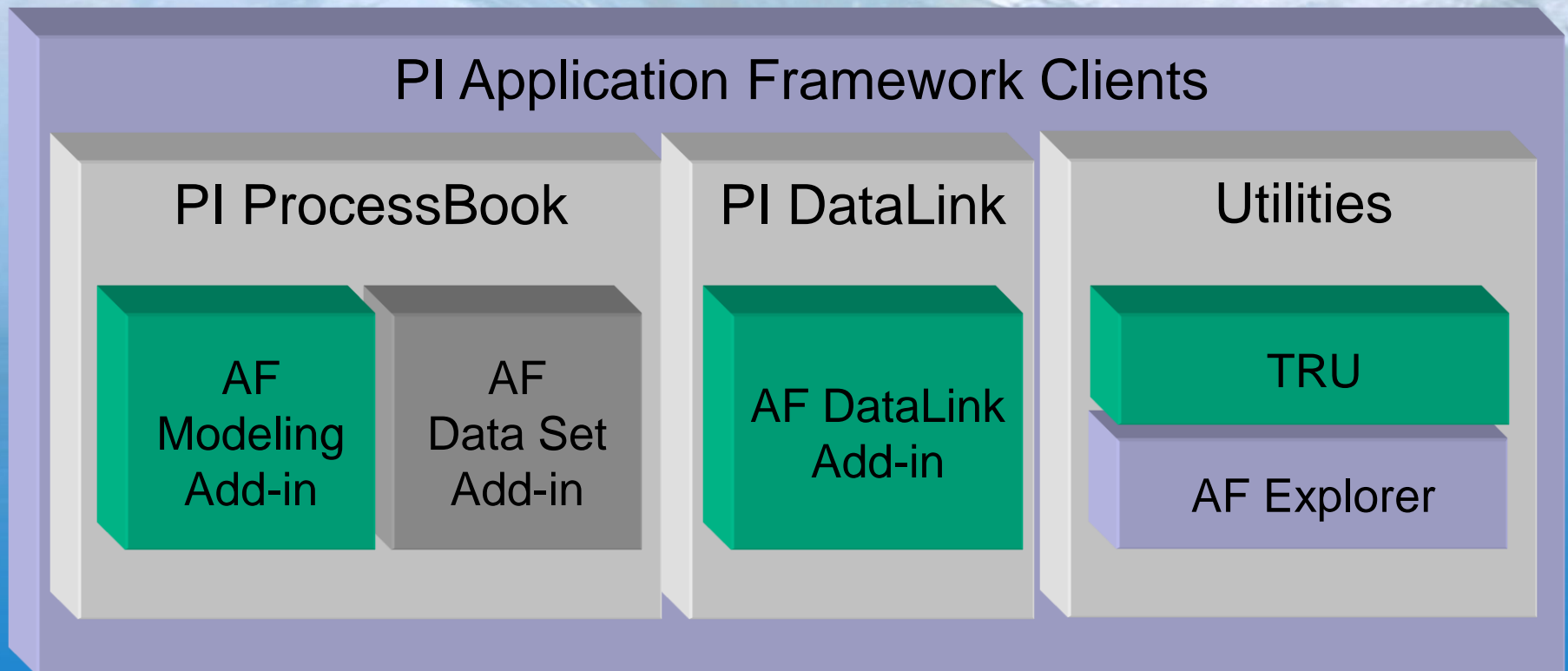
PI Application Framework Data Access

PI Application Framework Data Access

AF SDK

AF Common
Controls

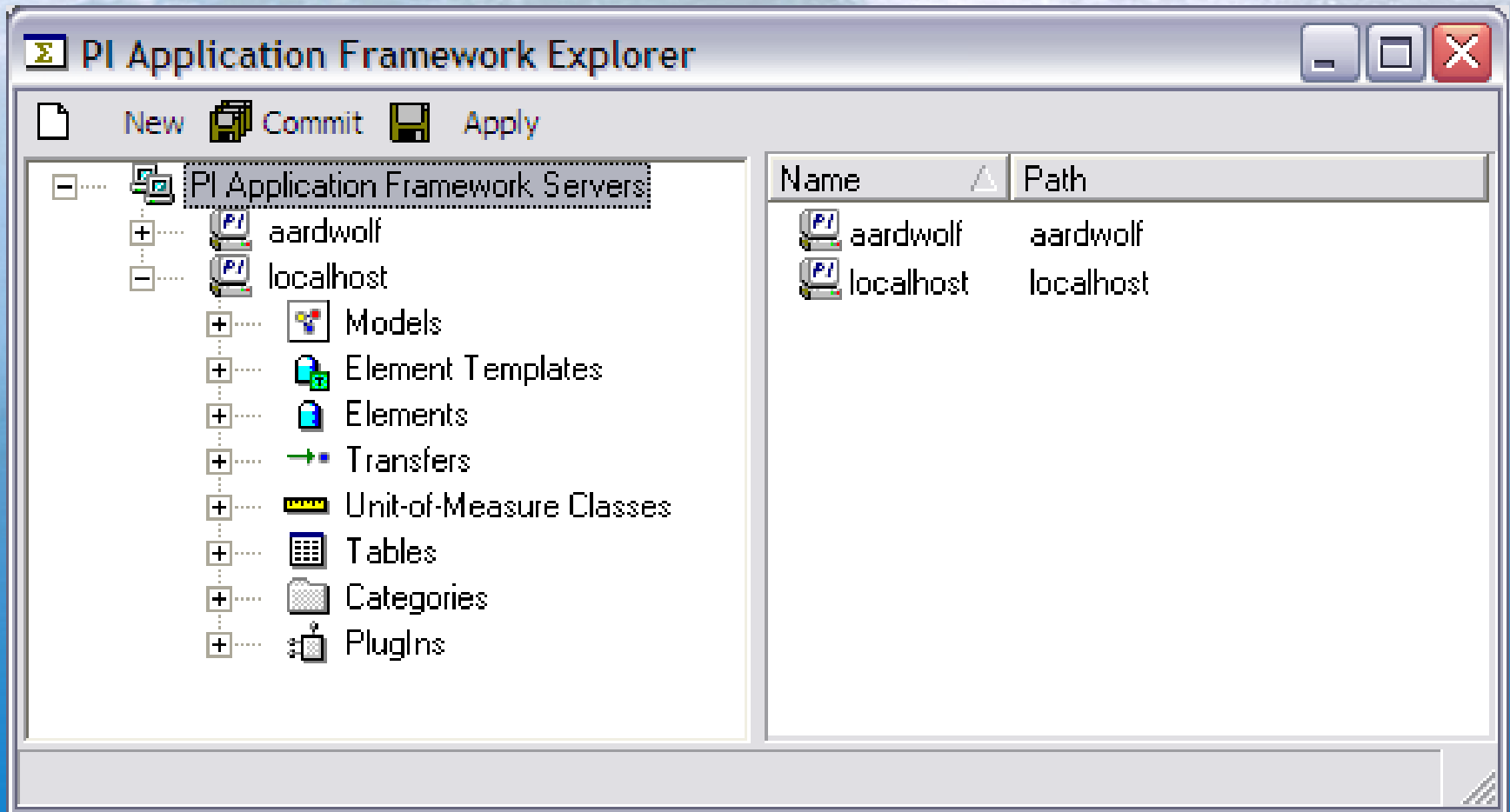
PI Application Framework Clients



Key Features

- PI-AF Explorer
 - Common Controls
- Element Templates
 - Elements
- Models
 - Connectivity
 - Cases
- Plug-Ins
 - Data References
 - Time Rules
 - Analysis Rules
- Units of Measure
- Transfers
- Tables
- Context
- .NET
 - COM Interoperation
- Application Development
- Client Integration
- Utilities
 - TRU

Key Features – PI-AF Explorer



Key Features – Element Templates

Element Template Properties

General | Elements | Attributes

Name: Tank

Description: Tank Element Template

Parent: Category: Tutorial

Type: Node Modifier: Storage

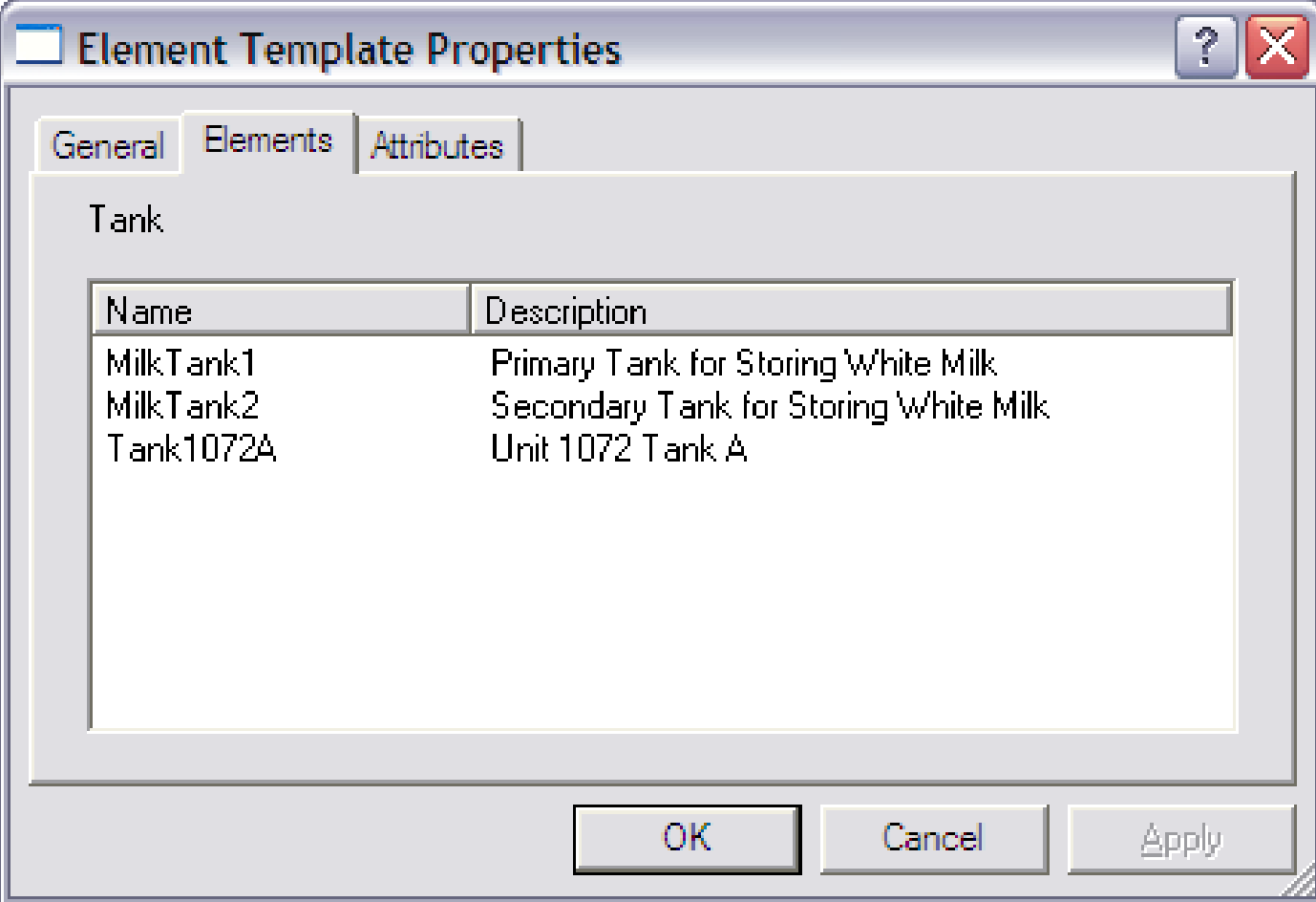
Default Attribute:

Unique ID: 74a57330-3bb7-4481-b863-73bc850ff226

Version: 12/31/1969 4:00:01 PM Rev 5

OK Cancel Apply

Key Features – Element Templates



Element Template Properties

General Elements Attributes

Tank

Name	Description
MilkTank1	Primary Tank for Storing White Milk
MilkTank2	Secondary Tank for Storing White Milk
Tank1072A	Unit 1072 Tank A

OK Cancel Apply

Key Features – Element Templates

Element Template Properties

General Elements Attributes

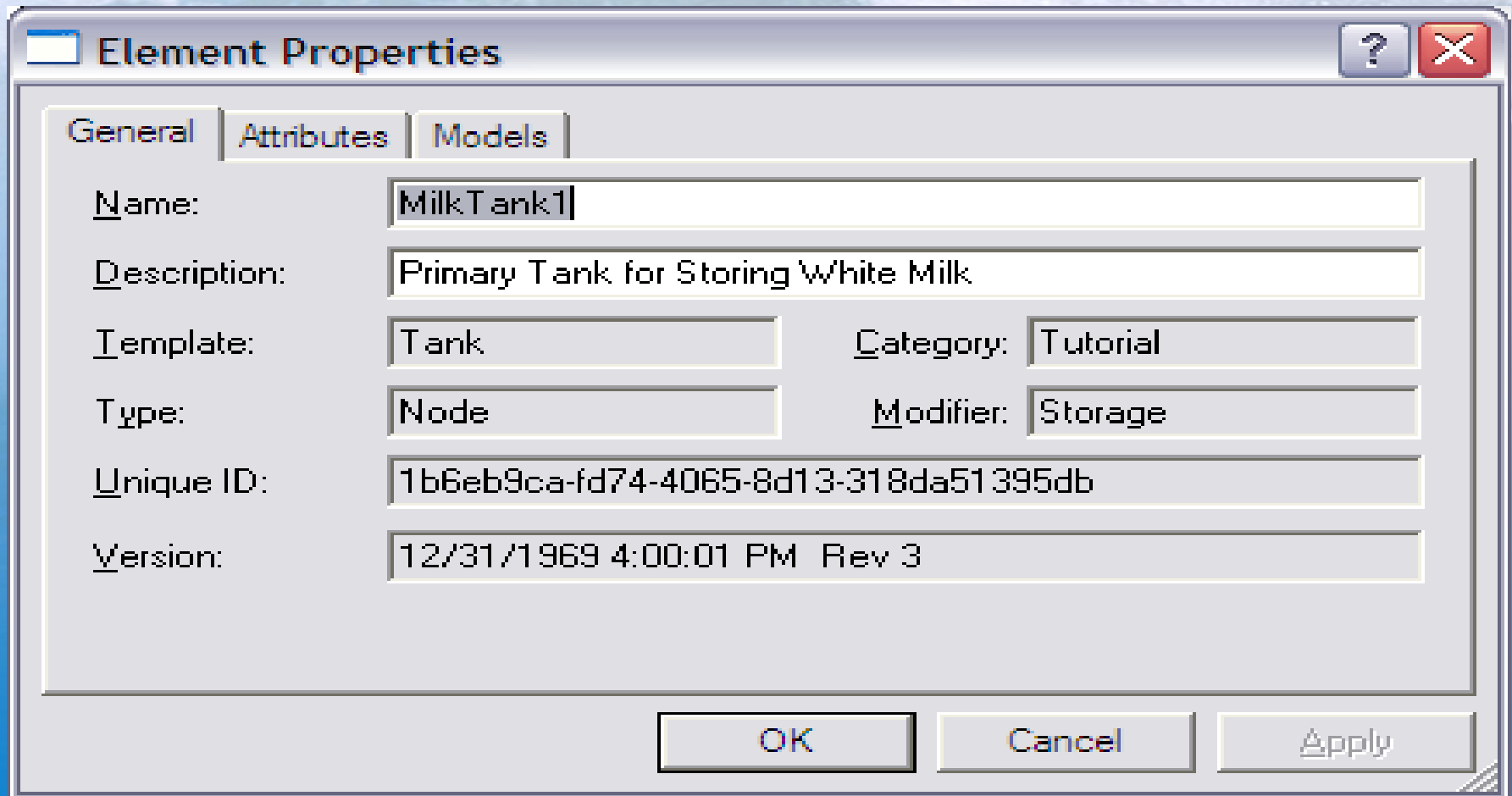
Tank

	Name	Description	Track ...	Category	Value
*	Level	Level of Liquid in the Tank	False	Tutorial	Doubl
	Volume	Volume of Liquid in the Tank	False	Tutorial	Doubl
	Volume Imbalance	Difference in Volume of Liqu...	False	Tutorial	Doubl
			False		

< ||| >

OK Cancel Apply

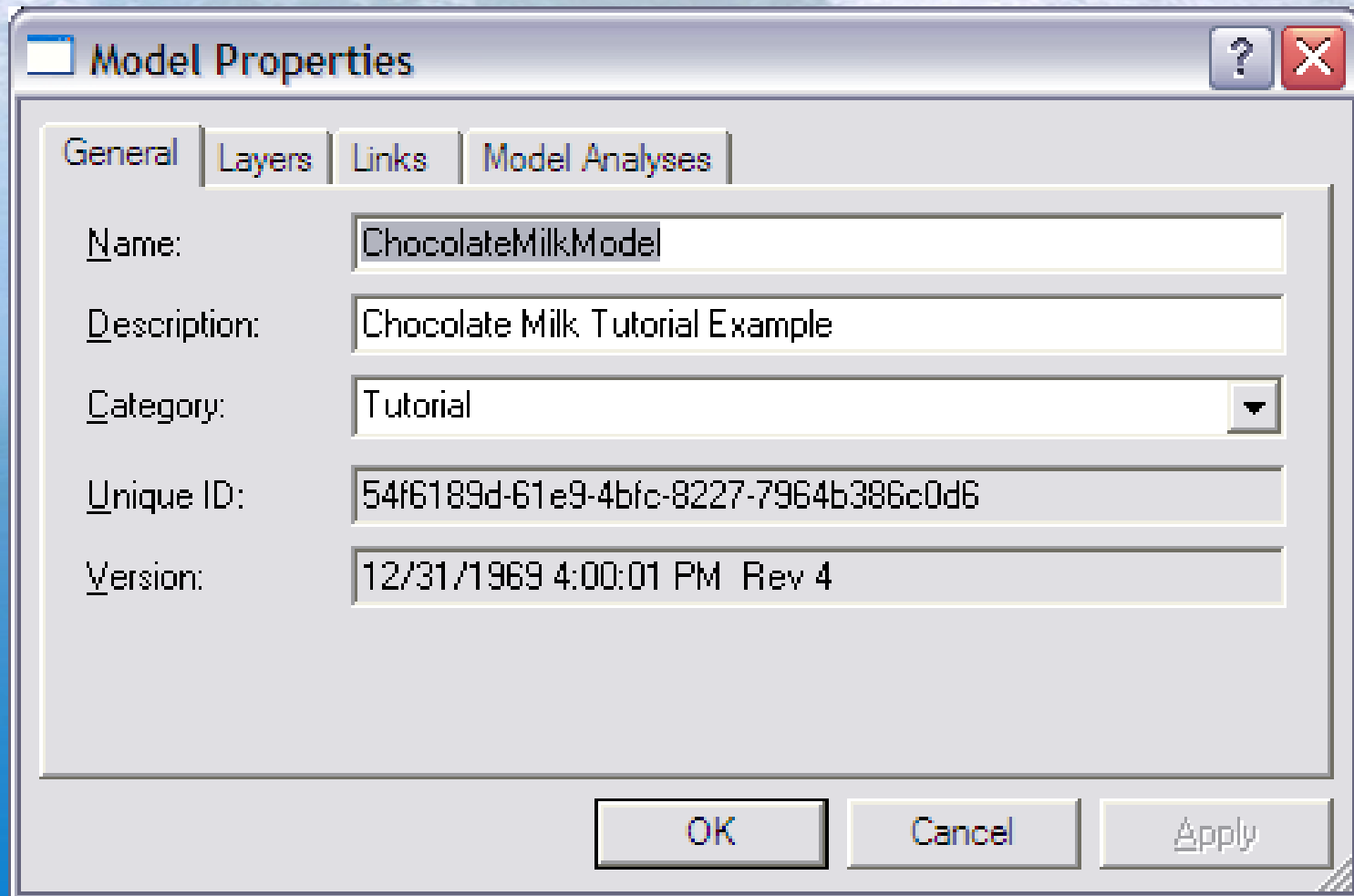
Key Features - Elements



The screenshot shows a standard Windows-style dialog box titled "Element Properties". It has a tabbed interface with three tabs: "General" (selected), "Attributes", and "Models". The "General" tab contains several labeled text input fields. The fields are arranged in a form where some are single-line and others are multi-line. The "Name" field is a single-line text box containing "MilkTank1". The "Description" field is a multi-line text box containing "Primary Tank for Storing White Milk". The "Template" and "Category" fields are single-line text boxes containing "Tank" and "Tutorial" respectively. The "Type" and "Modifier" fields are single-line text boxes containing "Node" and "Storage" respectively. The "Unique ID" field is a single-line text box containing a long alphanumeric string. The "Version" field is a single-line text box containing a date, time, and revision number. At the bottom of the dialog, there are three buttons: "OK", "Cancel", and "Apply".

Field	Value
Name:	MilkTank1
Description:	Primary Tank for Storing White Milk
Template:	Tank
Category:	Tutorial
Type:	Node
Modifier:	Storage
Unique ID:	1b6eb9ca-fd74-4065-8d13-318da51395db
Version:	12/31/1969 4:00:01 PM Rev 3

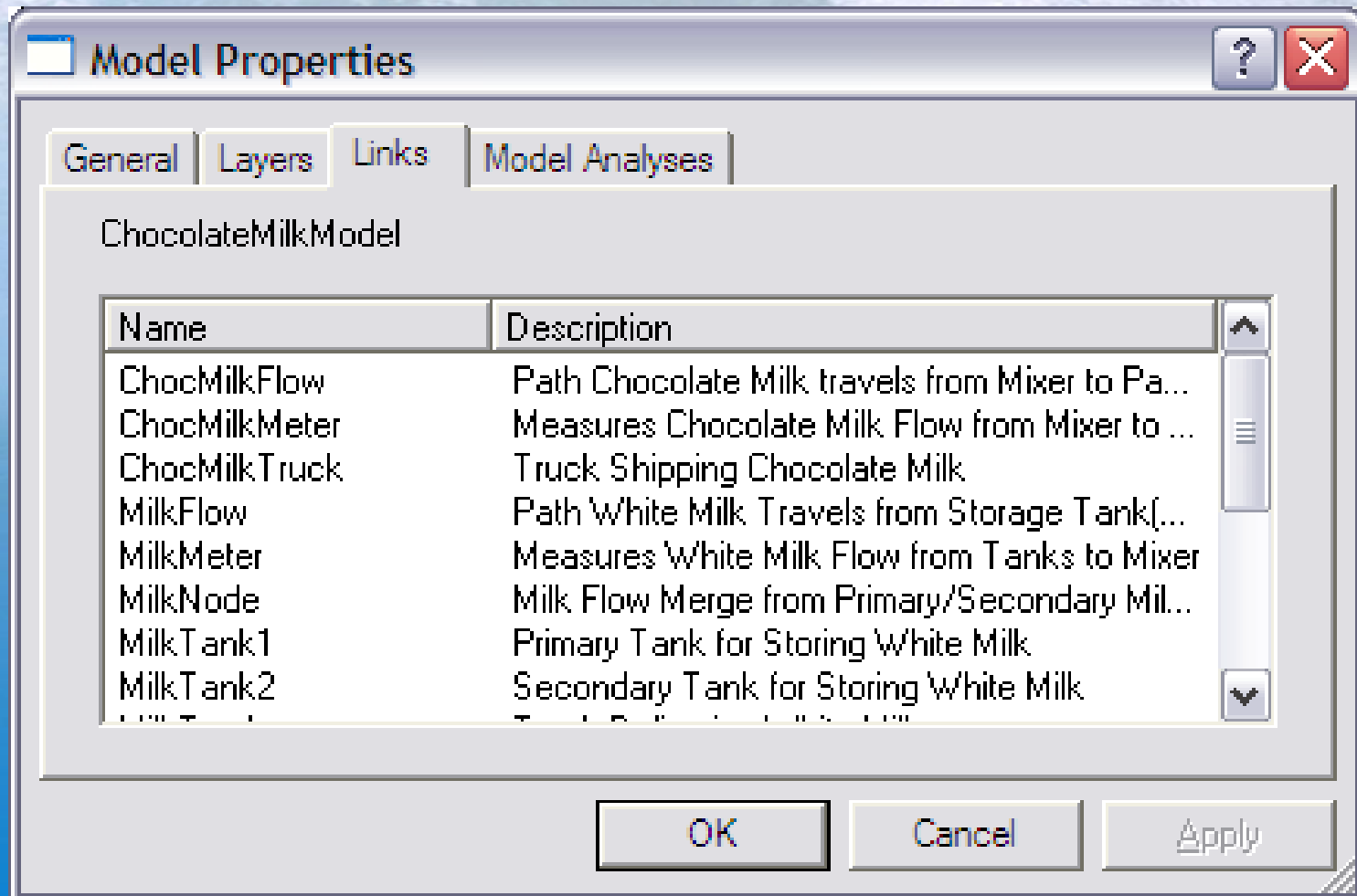
Key Features – Models (General)



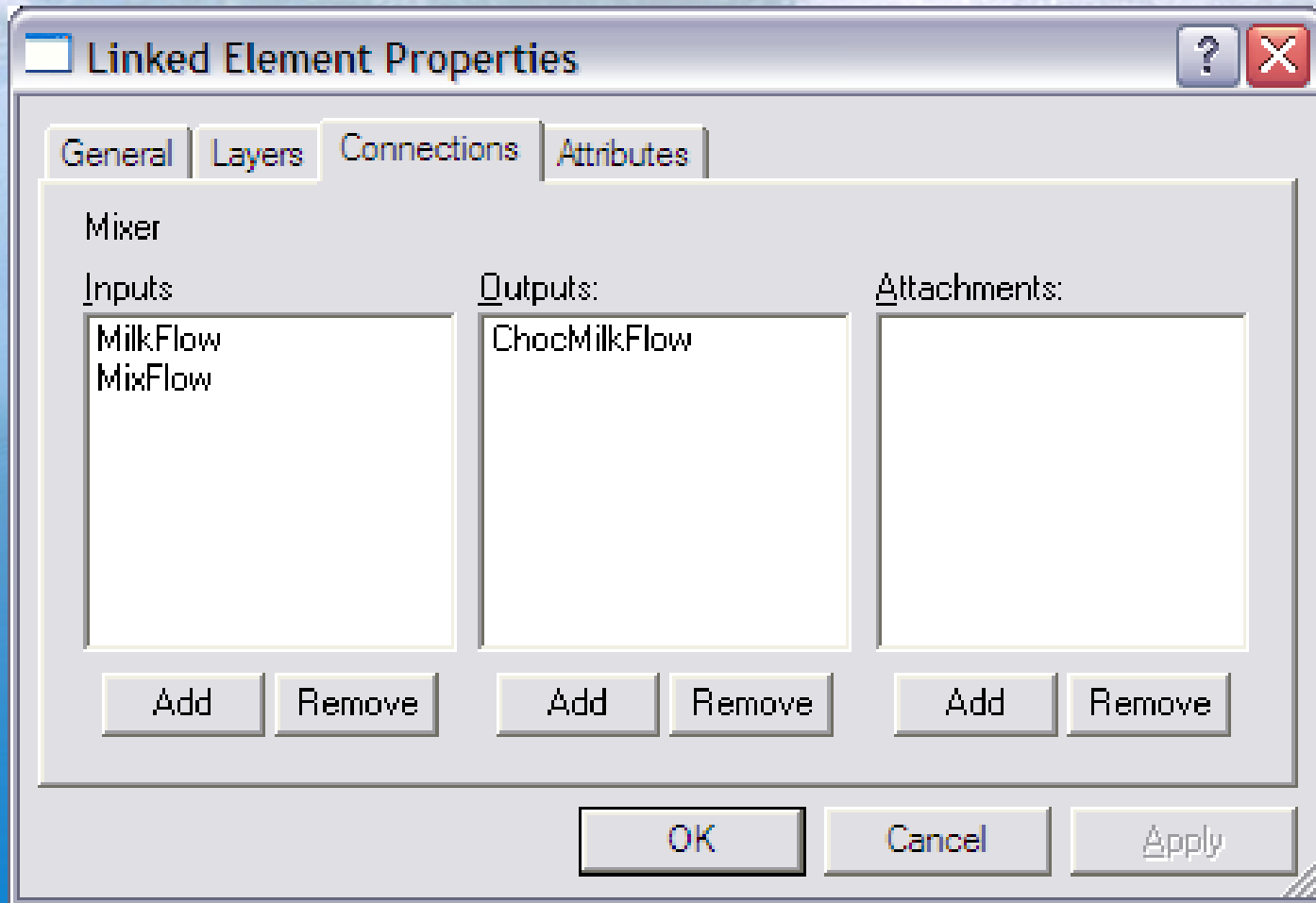
The screenshot shows a 'Model Properties' dialog box with a title bar containing a question mark and a close button. The 'General' tab is selected, showing fields for Name, Description, Category, Unique ID, and Version. The 'Name' field contains 'ChocolateMilkModel', 'Description' contains 'Chocolate Milk Tutorial Example', 'Category' is a dropdown menu set to 'Tutorial', 'Unique ID' contains a long alphanumeric string, and 'Version' contains '12/31/1969 4:00:01 PM Rev 4'. At the bottom are 'OK', 'Cancel', and 'Apply' buttons.

Property	Value
Name:	ChocolateMilkModel
Description:	Chocolate Milk Tutorial Example
Category:	Tutorial
Unique ID:	54f6189d-61e9-4bfc-8227-7964b386c0d6
Version:	12/31/1969 4:00:01 PM Rev 4

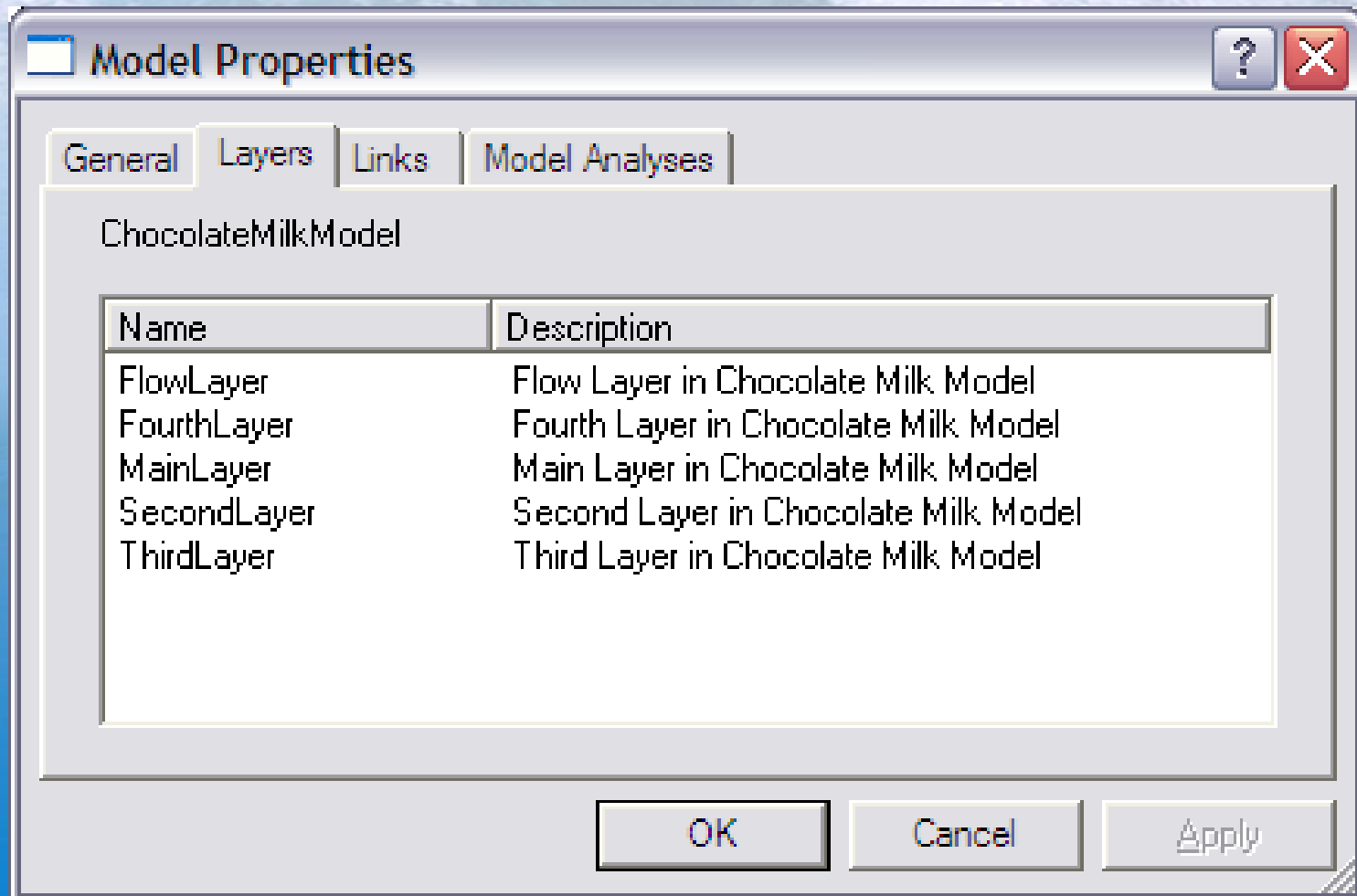
Key Features – Model (Connectivity)



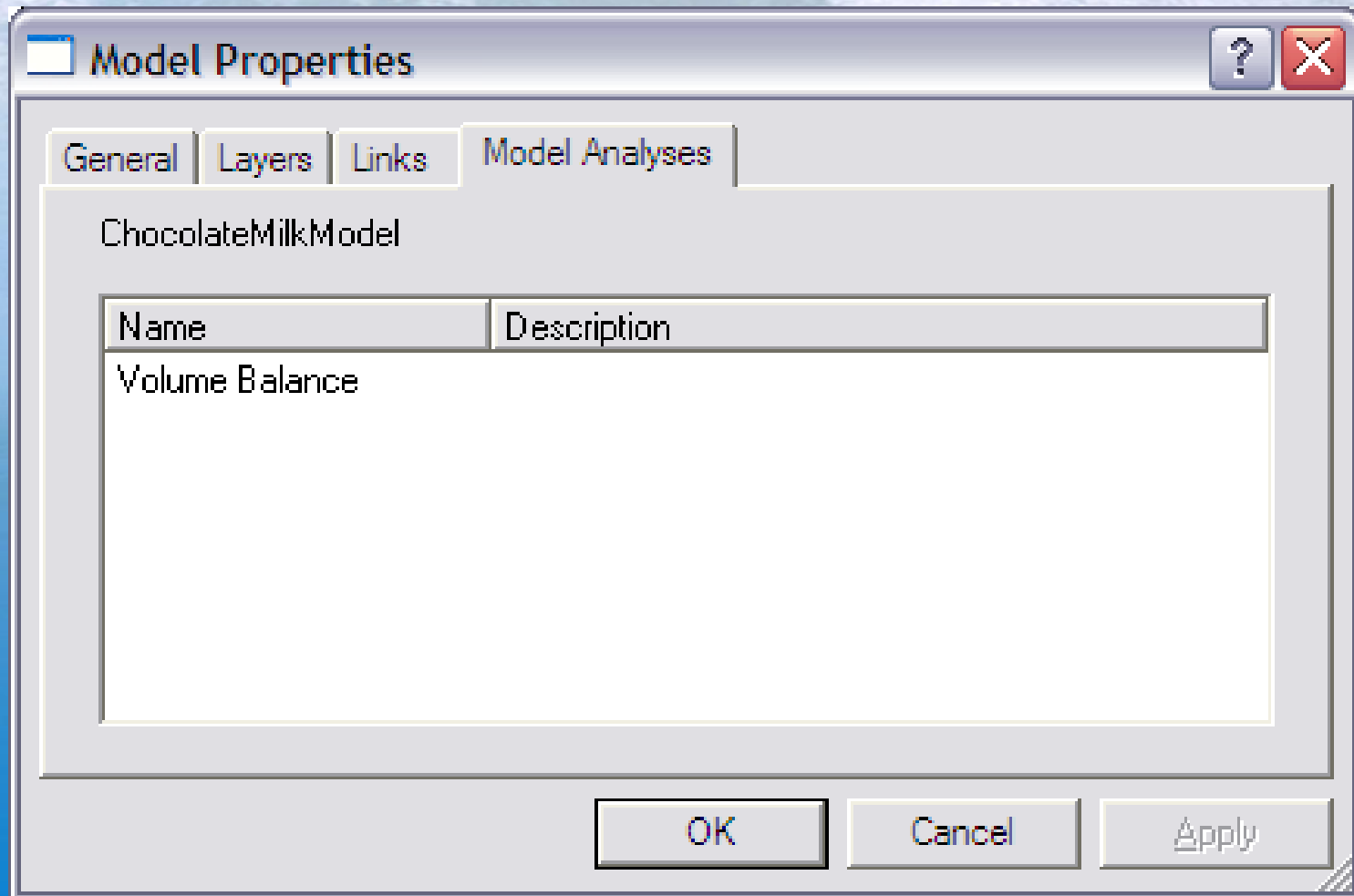
Key Features – Model (Connectivity)



Key Features – Models (Layers)



Key Features – Models (Analyses)



Key Features – Model (Cases)

Case Properties

General | Results | Layers | Results Log | Adjustments

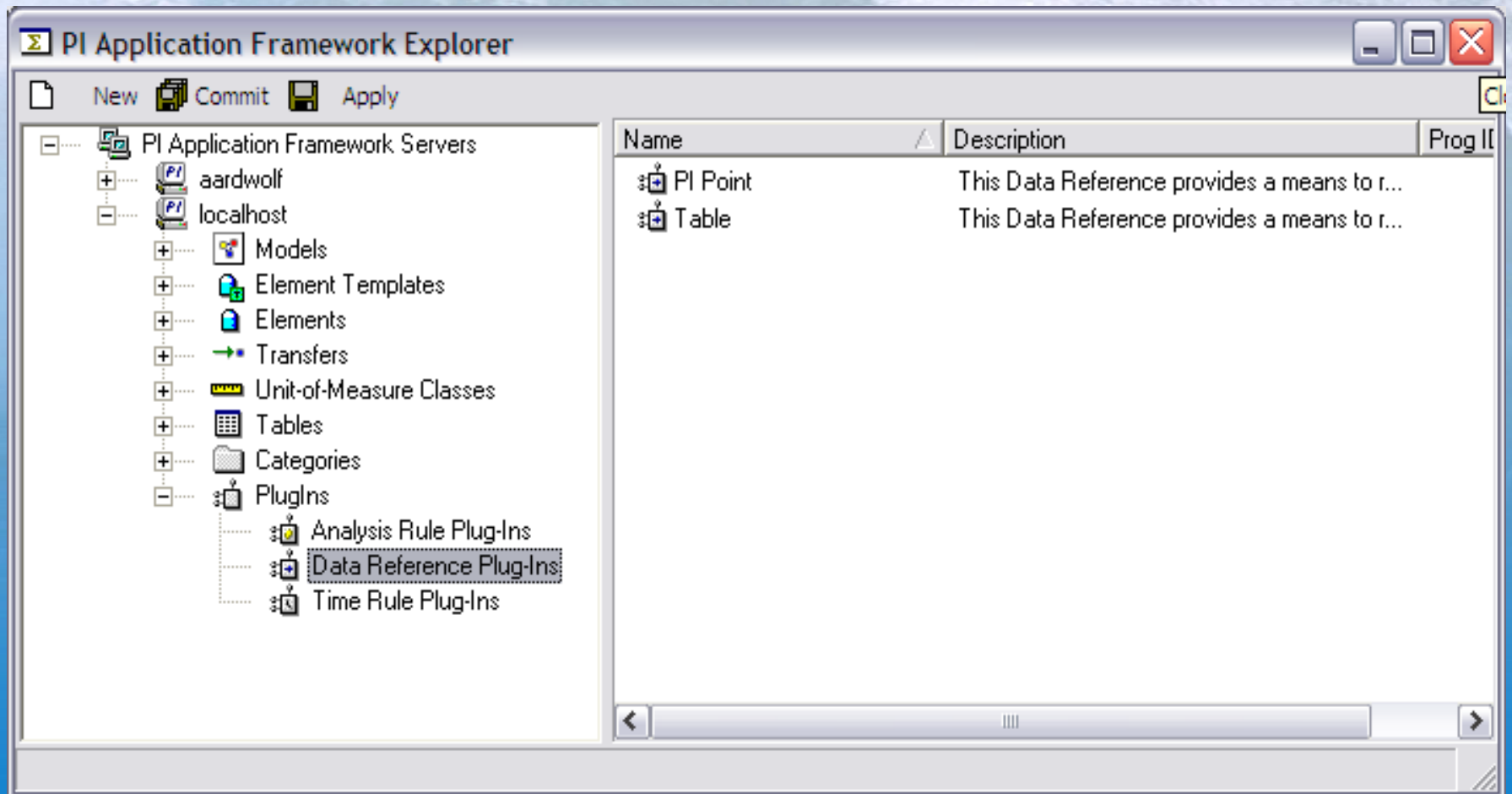
Start time: 3/4/2002 2:00:00 PM End: 3/4/2002 3:00:00 PM

Collect Inputs	Complete: 3/5/2002 1:25:52 PM
Validate	Complete: 3/5/2002 1:25:52 PM
Run	Complete: 3/5/2002 1:25:52 PM
Commit	Complete
Publish	Pending

Reset All Reset Outputs

OK Cancel Apply

Key Features – Plug-Ins



Key Features – Data References

- Provides Logic Associating Attributes and Data
 - Purpose is to return data (single or history) for a specific time or time range
- Simple “Mapping” Data References
 - Constant
 - PI Point
 - AF Table
 - Relational Database
 - Product Database

Key Features – Data References

- Computational Data References
 - Tank Volume Calculations
 - Correctional Calculations
 - Other non linear Transformations
 - Calculations which are functions of other attributes
 - Product, Batch, Operating Mode
 - Anything ever put in a PI-PE or PI Equation Library

Key Features – Data References

- Context Sensitive Data References
 - Model Sensitive Data
 - Case/Analysis Sensitive Data
 - Time/Time Range Sensitive Data
 - Values of other Attributes
 - Product, etc.

Key Features – Time Rules

- Provides logic for determining the start time and end time for a presentation or evaluation context
- Examples
 - “*-1d” to “*”
 - Retrieve start and end time of a batch
 - Retrieve start and end time of a transfer
 - Retrieve shift start and end time from production database
 - Get next period relative to current time or period

Key Features – Analysis Rules

- Provides logic for operating on model (collection of elements)
- Primary activity is to collect data for a time rule and output results
 - Data Reconciliation
 - Down Time Analysis
 - Composition Tracking
 - Gross Error Detection
 - Efficiency Calculations
 - Simulations or Predictions

Key Features – Units of Measure


The screenshot shows the PI Application Framework Explorer window. The left pane displays a tree view of the application structure, including 'PI Application Framework Services', 'aardwolf', 'localhost', 'Models', 'Element Templates', 'Elements', 'Transfers', and 'Unit-of-Measure Classification'. The right pane shows the 'UOMs' tab for the 'Length' category, displaying a table of units and their conversions.

Na...	A...	Description	Canonical	Reference
foot	ft		0.3048 m	12 in
inch	in		0.0254 m	0.0254 m
meter	m		1 m	
mile	mi		1609.344 m	63360 in
yard	yd		0.9144 m	36 in

Key Features - Transfers

- Transient Connectivity
- Characteristics
 - Source Element
 - Destination Element
 - Start Time
 - End Time
 - User Defined Attributes (“Element”)
- Context Searches (Filters)

Key Features – Transfers


Transfer Search 


Search name:

Search start: ☐ Only transfers which begin in search range

Search end: ☐ Only transfers which end in search range

Maximum duration: days

Where Source is: 

Destination is: 

Key Features – Transfers

Transfer Properties

General Atributes

Name: MilkTransfer1

Description: Transfer from Milk Truck to Milk Tank 1

Start time: 3/4/2002 2:37:23 PM End time: 3/4/2002 3:49:24 PM

Source: MilkTruck Destination: MilkTank1

Template: Transfer Category: Tutorial

Unique ID: 3d0b9f06-0443-4df8-b58f-b02f875472b6

OK Cancel Apply

Key Features - Tables

- ADO.NET Records Sets
 - Place to store simple tables of associated information
 - Strapping Tables
 - Composition
 - Reason Codes
 - Etc.

Key Features - Context

- Presentation
 - Model
 - Case
 - Time Range
 - Time

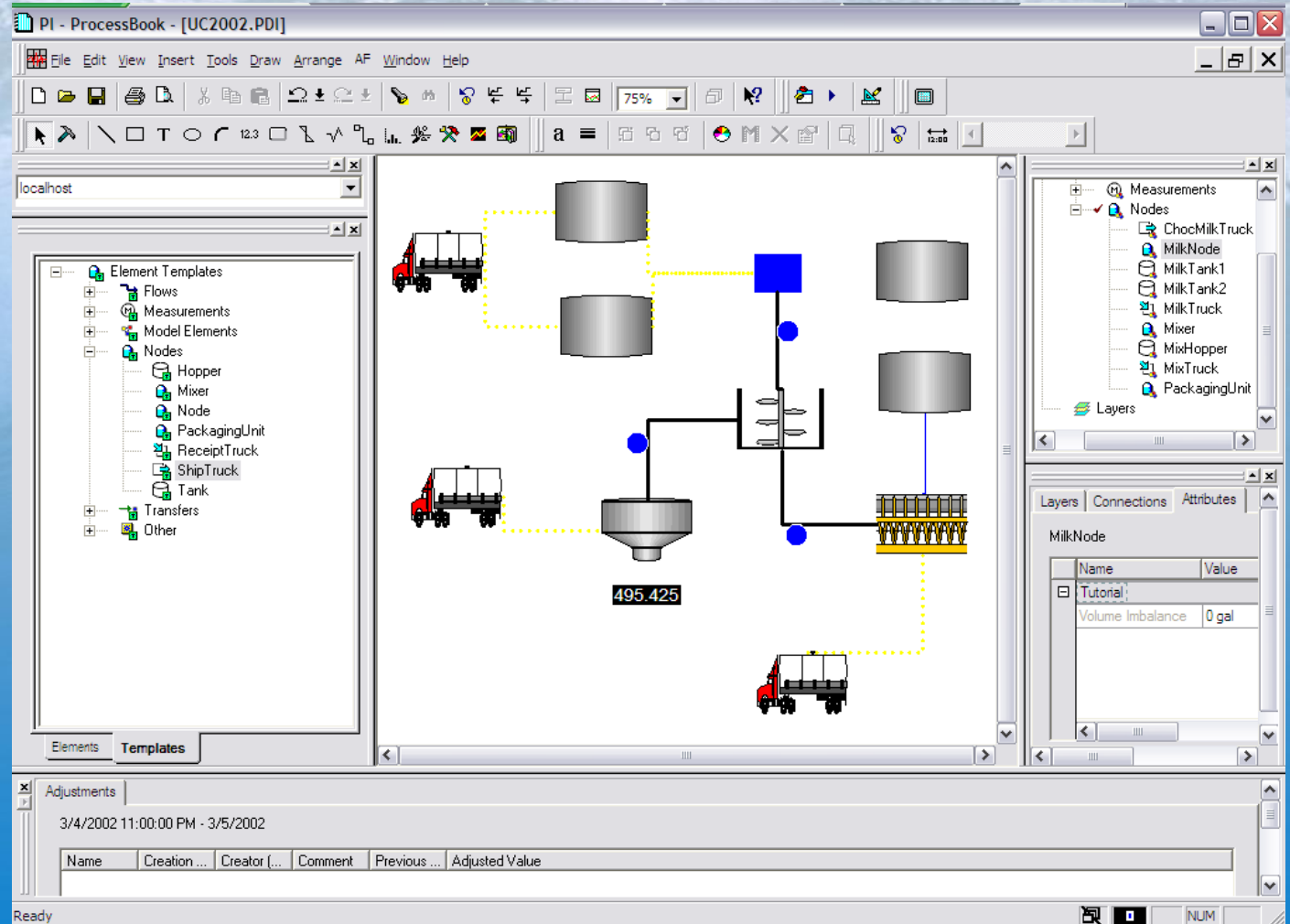
Key Features - .NET

- .NET
 - AF SDK written in C#
 - .NET Classes
- COM Interoperability
 - DLL provided
 - ProcessBook, AF Common Controls depend on interop.

Key Features – Client Integration

- ProcessBook
 - AF Data Set Add-In
 - AF Modeler Add-In
- DataLink
 - AF Add-In to Excel
- Utilities
 - AF Explorer
 - AF Common Controls
 - TRU
- (FUTURE) ICE Integration

Demo



Building Applications and Solutions

- Identify Schema
 - Element Templates
- Identify Key Abstractions
 - Data References
 - Time Rules
 - Analysis Rules
- Identify Presentation Needs
 - Reports, Displays, etc.
- Plumbing and Integration are Covered

Wrap Up

- Summary
- Schedule
- Related UC2002 Sessions
- Resources
- Call to Action

Summary

- Provides Organizational and Structural Integration with the PI System
- Provides Infrastructure for Deploying and Sharing Business, Process and Manufacturing Rules in the PI System
- Integrates with Client Applications
- Provides Framework for Building Generalized and Reusable Solutions

Schedule

- Early Adopter Program
 - Now
- Beta Program
 - Early summer 2002
- Release
 - Late fall 2002

Related Sessions

- Presentations
 - PI Application Framework
 - (111) Monday 1:00 PM, (351) Wednesday 8:00 AM
 - .NET Experiences
 - (215) Tuesday 10:50 AM
 - Application Module Example Using the Application Framework
 - (112) Monday 1:50 PM, (352) Wednesday 8:50 AM

Related Sessions

- Presentations
 - Sigmafine 4.0
 - (**NEW TIME**) (145) Monday 3:50 PM
 - (342) Wednesday 8:50 AM
 - PI SQC
 - (154) Monday 3:00 PM
- Demo Room (Tuesday 1:00 PM - 6:00 PM)
 - PI Application Framework
 - Application Framework Applications
 - Sigmafine 4.0

Resources

- PI Application Framework Beta
 - Web Site
 - General information and access to early adopter and beta downloads – watch <http://support.osisoft.com> for announcements
 - Early Adopter Program
 - Targeting application developers with immediate development or design plans
 - Contact Richard Beeson richard@osisoft.com for Information
 - Beta Program
 - Targeting application developers and end users looking to evaluate, learn about and provide feedback for the PI Application Framework
 - First beta early summer 2002

Call to Action



- Application Developers
 - Sign up for early adoption beta program
 - Begin porting or developing applications on the PI Application Framework
- Corporate Developers
 - Begin design process for integrating PI Application Framework
 - Sign up for beta program (or early adoption if immediate needs are present.)
- IT / Administrators
 - Plan resources - white papers to be provided on beta website

Call to Action



- All Users
 - Start to think about and identify
 - Organizational / Structural Abstractions
 - Equipment
 - Units
 - Physical/logical Models
 - Data References
 - Business/Process/Manufacturing rules or logic
 - Integration with existing (non temporal) data
 - Analyses
 - Time domain operations on organizational or structure information
 - Time Rules
 - Identify time scopes relevant to business