A Look Into the Future of Technology – PI Today and Tomorrow

J. Patrick Kennedy, President

OSIsoft

San Leandro, CA 94577

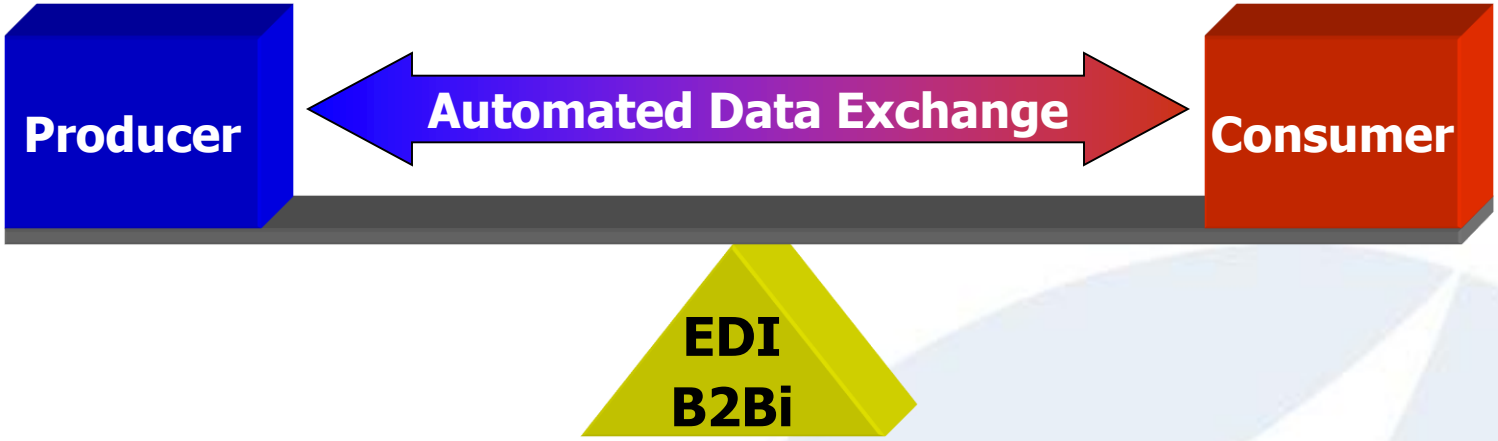
Business Lifetime

- Dr. Arie de Geus
- Average Life of a Company – 40 yrs
- Also Studied 25 Companies > 100 Yrs Old
- Single Shared Attribute – Flexibility and Speed of Response

Web Services are the Key

- Run Smarter not Harder
- Rapid and Dramatic Change in Delivered Functionality
- Software Works Around the World
- Like Electricity – Used Properly can Power the World

Existing EDI Model



- Large investments by both parties
- Push/Replication Architecture
- Benefits come from automation

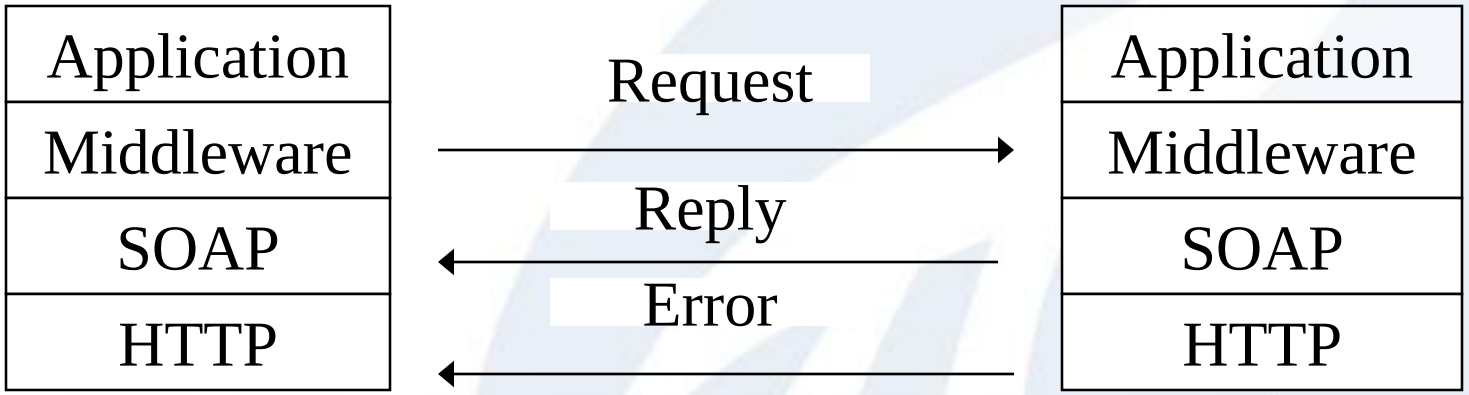
It's easy to consume web services


```
set objSoap = CreateObject("MSSOAP.SoapClient")
objSoap.mssoapinit "c:\AirportWeather.wsdl"
msgbox objSoap.getTemperature("KTRI")
```

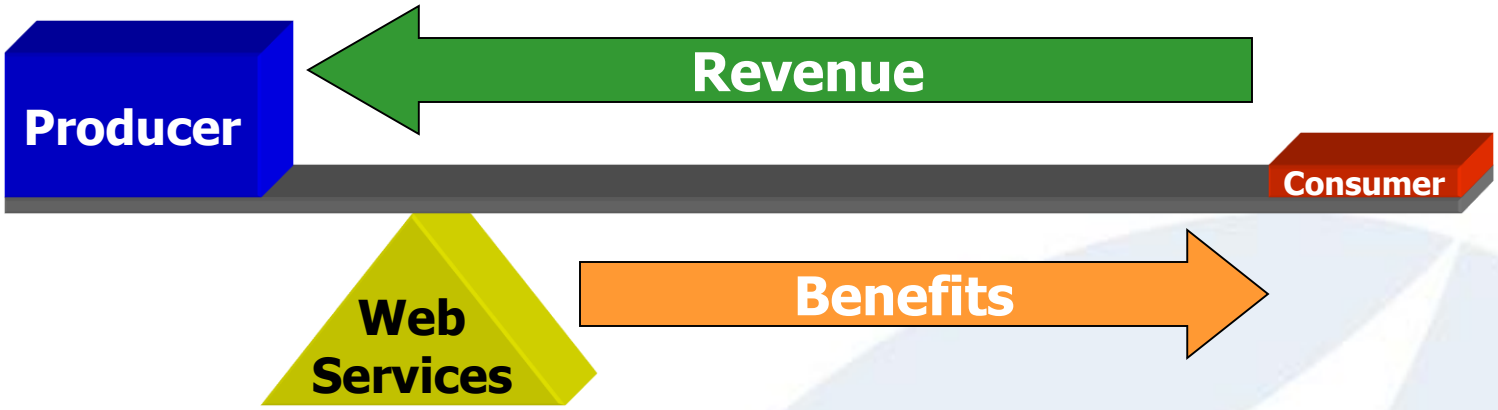
Just 3 lines of code to call a web service and display results!!!

Access via SOAP

- **www.weather.com**
- **float CurrentTemp(zip_code)**
- **The process**

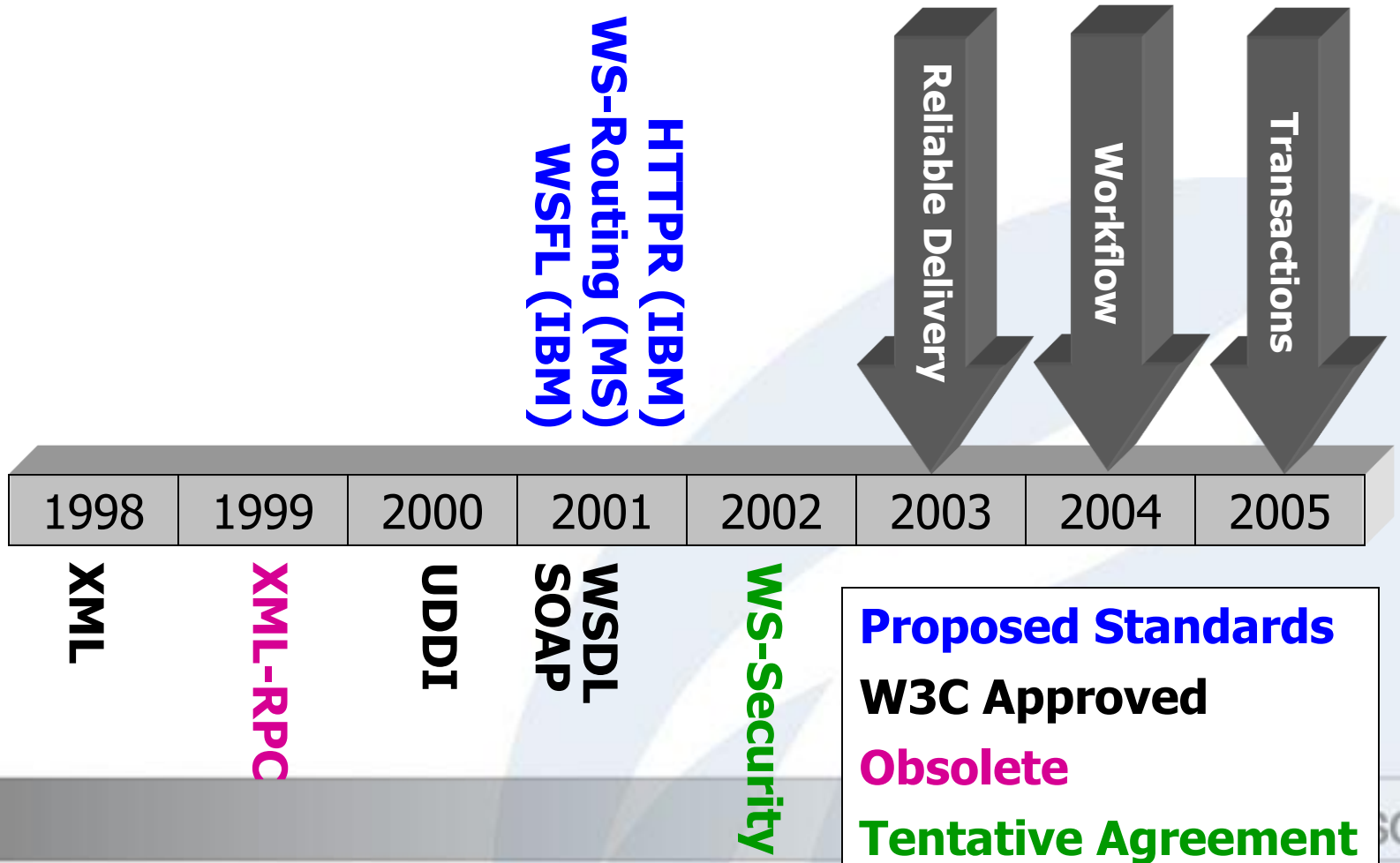


Web Services – Value Proposition

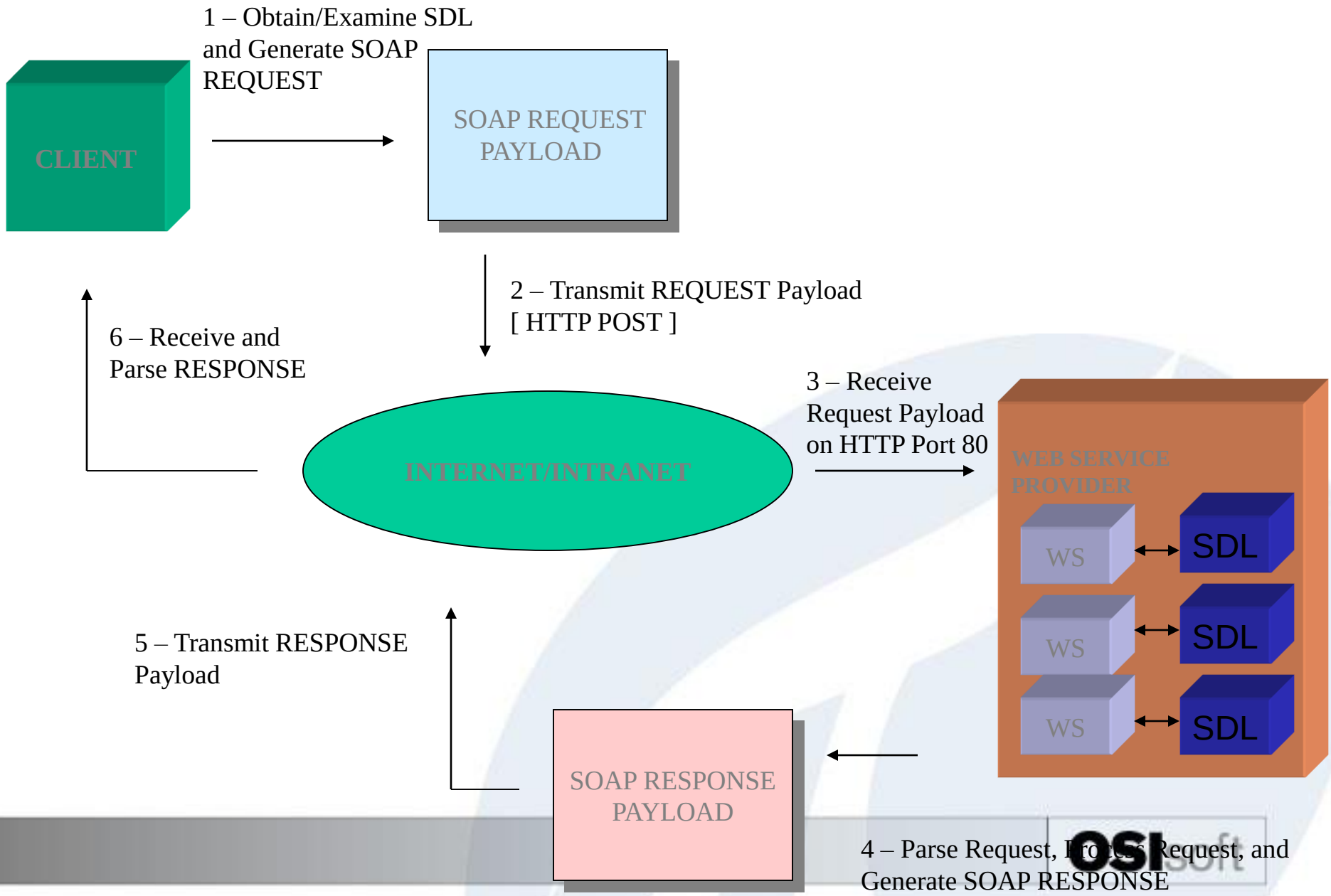


- Standard technologies drive consumer costs down.
- Data is pulled on demand from a single source.
- Software is delivered as a scalable service.
- Leverage produces a revenue generation model.

Web Services Standards Agreements



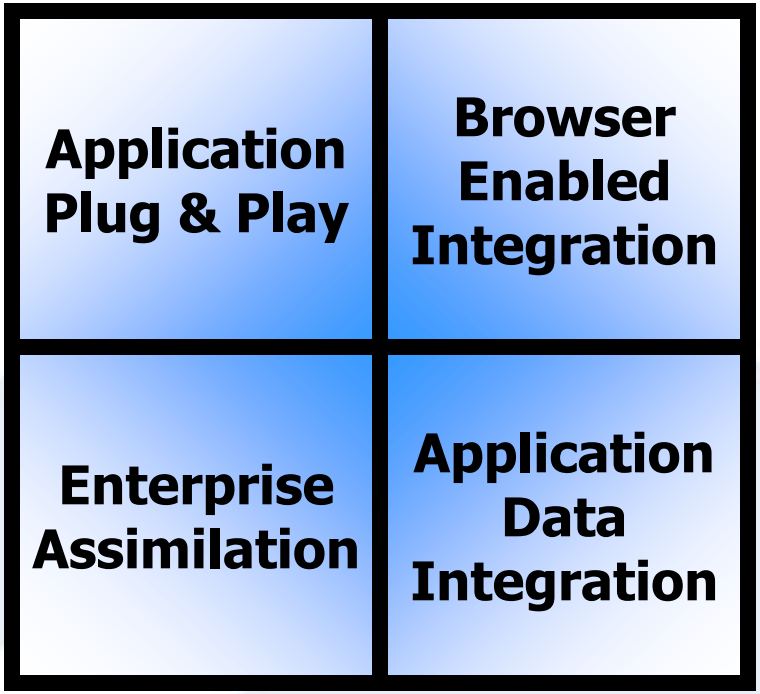
Accessing a Web Service Using SOAP



Re-examine Role of Integration

- Expensive
- Marginal Success
- Hard to Maintain
- Proprietary, Point Solutions
- Potential High ROI Not Achieved

There is no single *RIGHT* way to solve an integration problem.



Catching the Wave

- Envision the Future
- Collaborative Web Servers
- OS Agnostic
- Focused Function
- Standards Based Communication
- Web Services are the Key

Application Plug and Play

- Connect Application to Application
- Lots of Legacy Systems
- Proprietary Protocols
- Custom Code to Support
- Limited Success

Browser Enable Integration

- Servers a Purpose
- Browsers good for Browsing
- Weak for Interactive
- Good first Step If Appreciate Strengths/Weaknesses

Portal Home - Microsoft Internet Explorer

File Edit View Favorites Tools Help | Address http://saturn/dashboard/dashboard.asp?DashboardID=http://saturn/DAVCatalog/Dashboards/Welcome/PortalHome/

Back Search Favorites Media

OSIsoft **Portal Home**

LogOut | Publish | Adhoc Trend | Content | Layout | Settings

Welcome | Administration | BuzzMe | Portal Home

PI-ICE Web Portal

Monday, August 19, 2002

Microsoft Outlook Calendar

New | Delete

Monday, August 19	Thursday, August 22
Tuesday, August 20	Friday, August 23
7:30am Safety review r	
Wednesday, August 21	Saturday, August 24
	Sunday, August 25

Microsoft Outlook Tasks

New | Delete

Subject	Status	Du...	%.
HR survey	Not Started	None	0..
West plant J24 car seal insp...	Not Started	None	0..
Obtain permit for entry to O...	Not Started	None	0..

Web Links

New | Organize

- Real-time Tank Inventory Management
- Tank Inventory Report
- OSI Software, Inc.
- Kesler Engineering, Inc.

Microsoft Outlook Messages - Inbox

New | Delete

From	Subject	Received	Size
Gopal Gopalkris...	RE: PIML Update	Mon 8/19/2002 11:...	10 KB
Richard Crounse	Meeting Request - Week of Sept 9	Sat 8/17/2002 11:...	2 MB
Gilmartin, Tom	RE: Fired Heater Sentinel Demos	Fri 8/16/2002 9:53 ...	13 KB
Bryan Owen	RE: BuzzMe Manual update	Sun 8/11/2002 12:...	22 KB
Sue Quense	RE: PI-CEM?	Fri 8/9/2002 11:48 ...	49 KB
Alex Zheng	FW: Design documentation for ACE.Net	Thu 8/8/2002 12:1...	200 KB
info@KeslerEng...	ICE Demo Registration	Mon 8/5/2002 5:17...	4 KB
Tom Kurata	RE: LG Caltex - Korea /AID visiting Kesler on 7/23	Fri 8/2/2002 3:17 PM	15 KB
Jason Banfelder	Heater Exception Report on-line	Sat 6/15/2002 10:...	4 KB

Inventory Report

G20

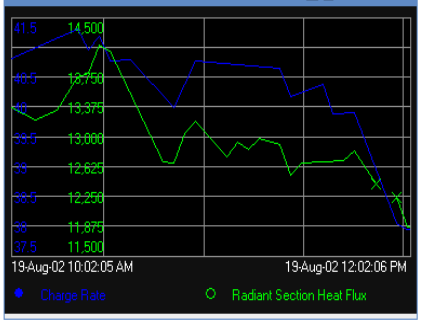
	A	B	C	D	E
1	Weekly Inventory Report				
2				Week Ending:	8/19/2002
3					
4	Product	Tank	Status	Net Volume	Avail For Sale
9	L. Arabian Crude Total			1,355,482	1,221,534
13	DP Kerosene Total			394,087	357,032
17	LVGO Total			909,517	817,077
18	Grand Total			2,659,086	2,395,643
21	All volumes in Std. BBL.				

6-15-2002 Inventory

Tanker Report

Vessel Name	Vessel Type	Dwt tonnes	Year of Build	LOA m#	Beneficial Owner	Speed	Draft m#	Flag	Breadth m#	Cargo Barrels	
Marine Duval	Molten Sulphur Carrier	25131	1944	186.54	Marine Transport	14.6	9.95	AM.	24.46	88	1
Hassayampa	Fleet Replenishment Vessel	37431	1955	199.8	U.S. Govt.	17	10.67	AM.	26.23	189	4
Mispillion	Fleet Replenishment Vessel	25947	1945	196.91	U.S. Govt.	18	10.97	AM.	22.86	145	2
Ponchatoula	Fleet Replenishment Vessel	37431	1956	199.64	U.S. Govt.	21	10.06	AM.	26.34	189	4
Star	Tanker	16441	1956	161.44	Shpg. & Trad. Agens.	14.5	9.25	GR.	19.56	126	2
Da Qing He	Sewage Disposal Carrier	16000	1957	165.2	COSCO Guangzhou	13	9.33	PRC	19.5	126	1
Wave	Tanker	20518	1958	172.49	Shpg. & Trad. Agens.	14	9.48	GR.	21.72	145	1

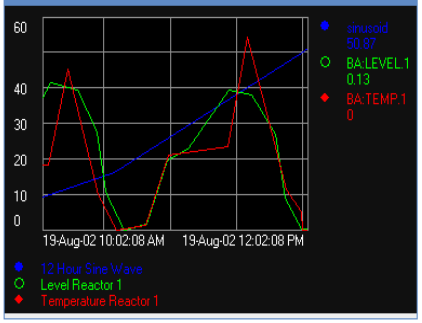
Current Production Trend



Current Production

Descriptor	Value	Engineering Units
Thermal Efficiency (LHV)	0.847	
Charge Rate	37.936	M bbl/day
Radiant Section Heat Flux	11866.694	Btu/(hr*ft^2)

PI Tags Trend



PI Tags

Dataset	Value	Engineering Units
\\localhost\sinusoid	50.872	
\\localhost\BA:LEVEL.1	0.133	
\\localhost\BA:TEMP.1	0.000	

Start: *-2h End: *

Apply

Done | Local intranet

Enterprise Assimilation

- **Enforce Standards**
- **Difficult w/Software**
  - Fast Changing Technology
  - Aggressive Buy/Sell of Assets
  - Hard to Get Consensus
  - Still have the Integration Problem

Application Integration

- Require Functions as well as Data
- Remote Servers Across Internet
- Sweet Spot of Web Services

Companies Can Sell Services Amazon.COM

http://xml.amazon.com/onca/xml?v=1.0& t=Webservices-20&dev-t=DFE9CIU5XVZ1J& KeywordSearch=WEB%20SERVICES& mode=books&type=lite&page=1&f=xml

DFE9CIU5XVZJ is my developer ID

KeywordSearch is the Web Service

Web Services & books is the Search Criteria

Result of Search

```
<?xml version="1.0" encoding="UTF-8" ?>
- <ProductInfo
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:noNamespaceSchemaLocation="http://xml.amazon.com/schemas/dev-lite.xsd">
- <Details
    url="http://www.amazon.com/exec/obidos/redirect?tag=Webservices-20%26creative=DFE9CIU5XVZ1J%26camp=2025%26link_code=xm2%26path=ASIN/0596002696">
      <Asin>0596002696</Asin>
      <ProductName>Java Web Services</ProductName>
```

(continued next slide)

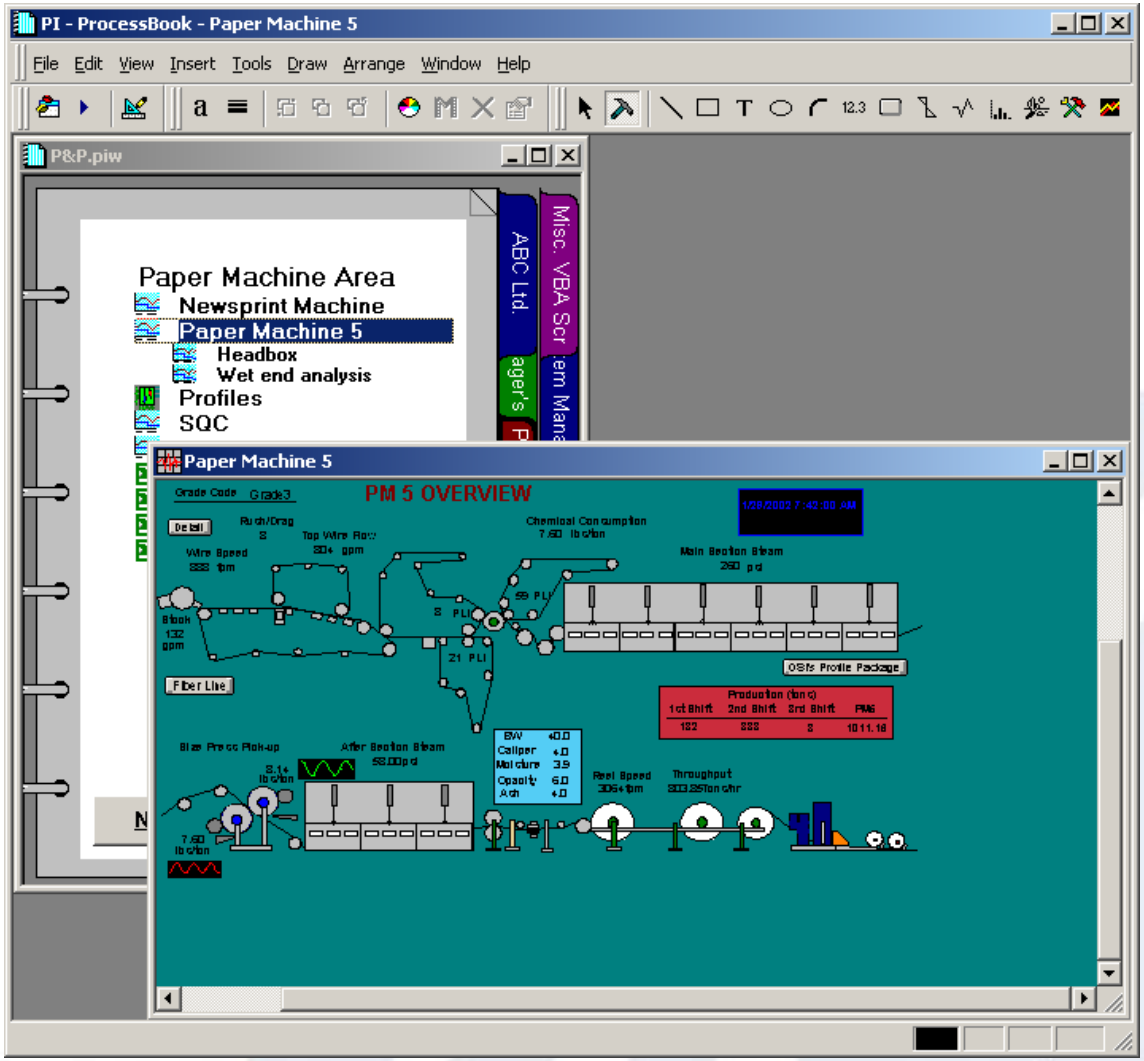
<Catalog>**Book**</Catalog>
<Authors>
<Author>**David A. Chappell**</Author>
<<Author>**Tyler Jewell**</Author>
</Authors>
<ReleaseDate>**March, 2002**</ReleaseDate>
<Manufacturer>**O'Reilly & Associates**</Manufacturer>
<ImageUrlSmall>**http://images.amazon.com/images/P/0596002696.01.THUMBZZZ.jpg**</ImageUrlSmall>
<ImageUrlMedium>**http://images.amazon.com/images/P/0596002696.01.MZZZZZZZ.jpg**</ImageUrlMedium>
<ImageUrlLarge>**http://images.amazon.com/images/P/0596002696.01.LZZZZZZZ.jpg**</ImageUrlLarge>
<ListPrice>**$39.95**</ListPrice>
<OurPrice>**$27.97**</OurPrice>
<UsedPrice>**$19.92**</UsedPrice>
</Details>

(first of many references with “Web Services in the name)

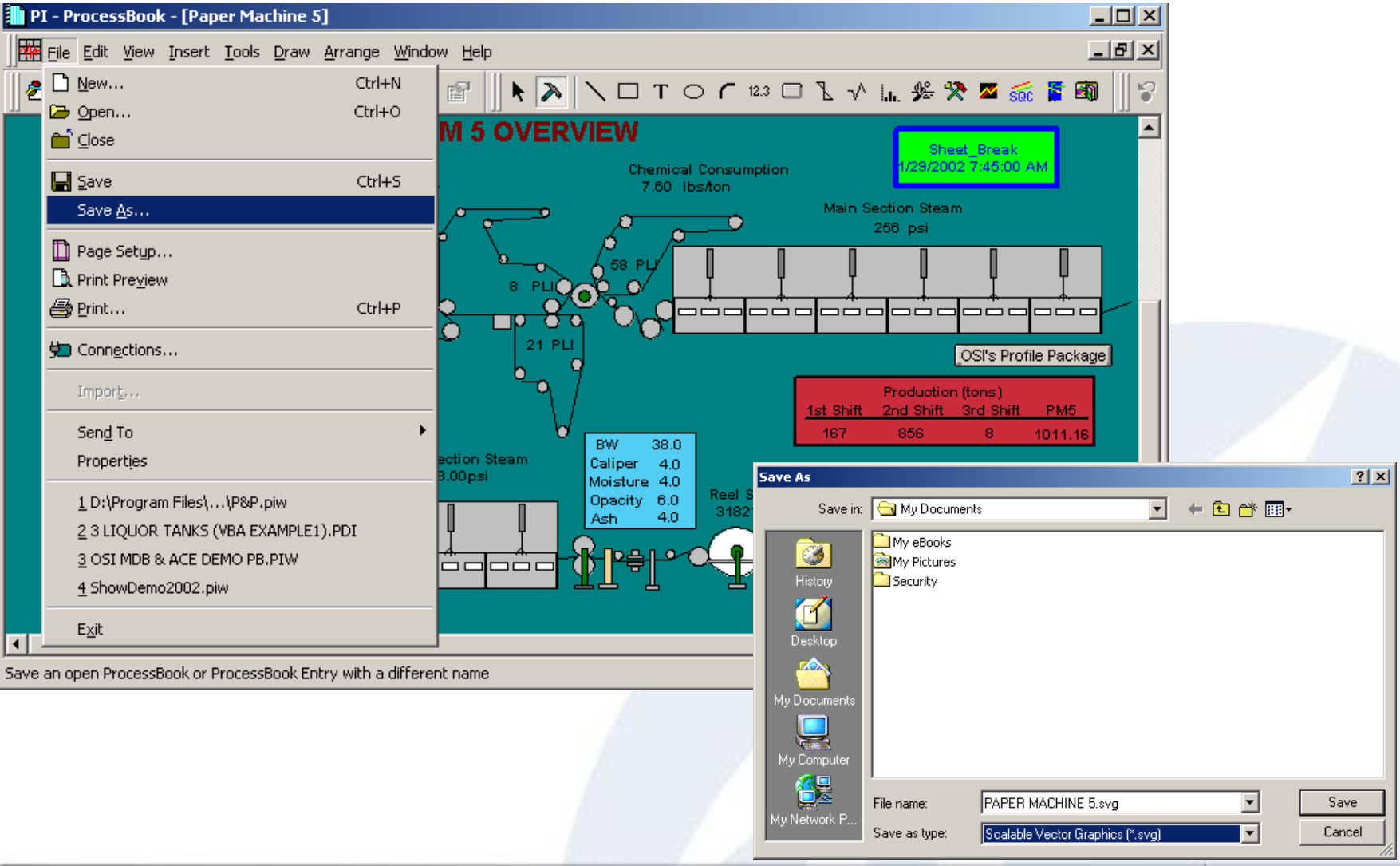
OSIsoft – What Have We Done

- LAN Based GUI – ProcessBook
- Added New Symbols w/SaveAs SVG Interface
- SaveAs SVG for Graphic File
- Build Web Part to View

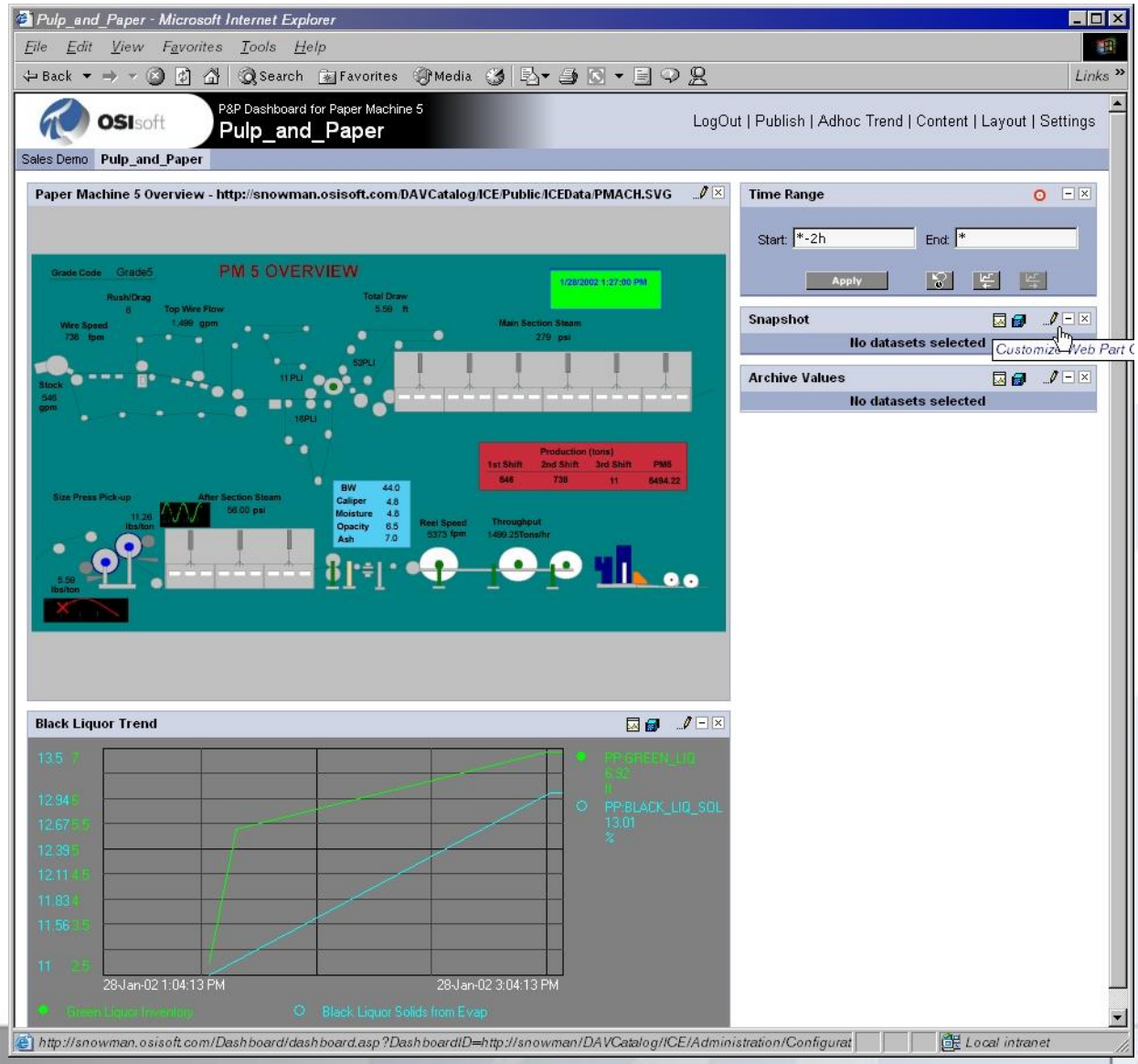
ProcessBook Display



SaveAs SVG


PI - ProcessBook - [Paper Machine 5]
File Edit View Insert Tools Draw Arrange Window Help
New... Ctrl+N
Open... Ctrl+O
Close
Save Ctrl+S
Save As...
Page Setup...
Print Preview
Print... Ctrl+P
Connections...
Import...
Send To
Properties
1 D:\Program Files\...\P&P.piw
2 3 LIQUOR TANKS (VBA EXAMPLE1).PDI
3 OSI MDB & ACE DEMO PB.PIW
4 ShowDemo2002.piw
Exit
Save an open ProcessBook or ProcessBook Entry with a different name
M 5 OVERVIEW
Chemical Consumption
7.60 lbs/ton
Sheet_Break
1/29/2002 7:45:00 AM
Main Section Steam
256 psi
58 PLI
8 PLI
21 PLI
OSI's Profile Package
Production (tons)
1st Shift 2nd Shift 3rd Shift PM5
167 856 8 1011.16
BW 38.0
Caliper 4.0
Moisture 4.0
Opacity 6.0
Ash 4.0
Save As
Save in: My Documents
My eBooks
My Pictures
Security
History
Desktop
My Documents
My Computer
My Network P...
File name: PAPER MACHINE 5.svg
Save as type: Scalable Vector Graphics (*.svg)
Save
Cancel

ICE Web Part



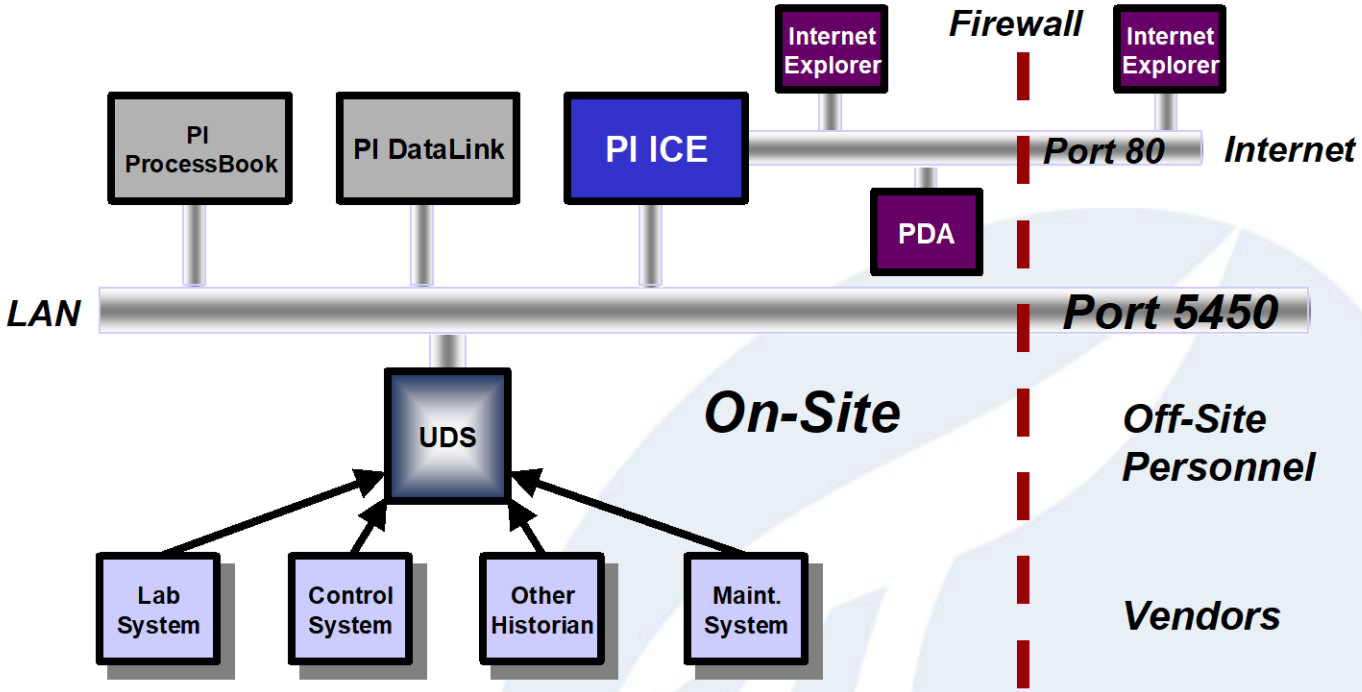
OSIsoft

Had To Create New Web View

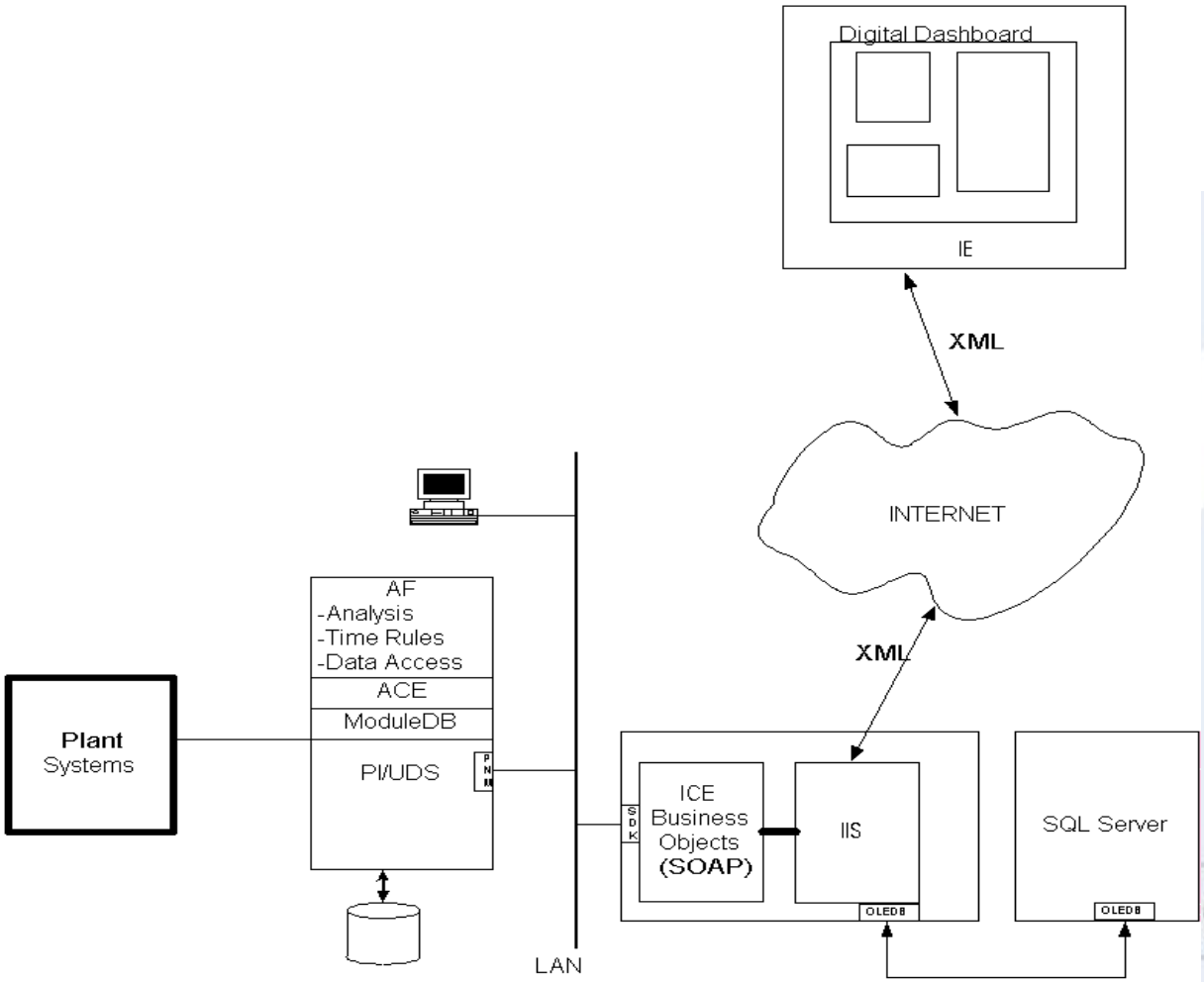
- Totally Different Access Methods
- XML Messages
- Data From SOAP Objects
- Tried to Preserve Old Displays

Created New Web View - ICE

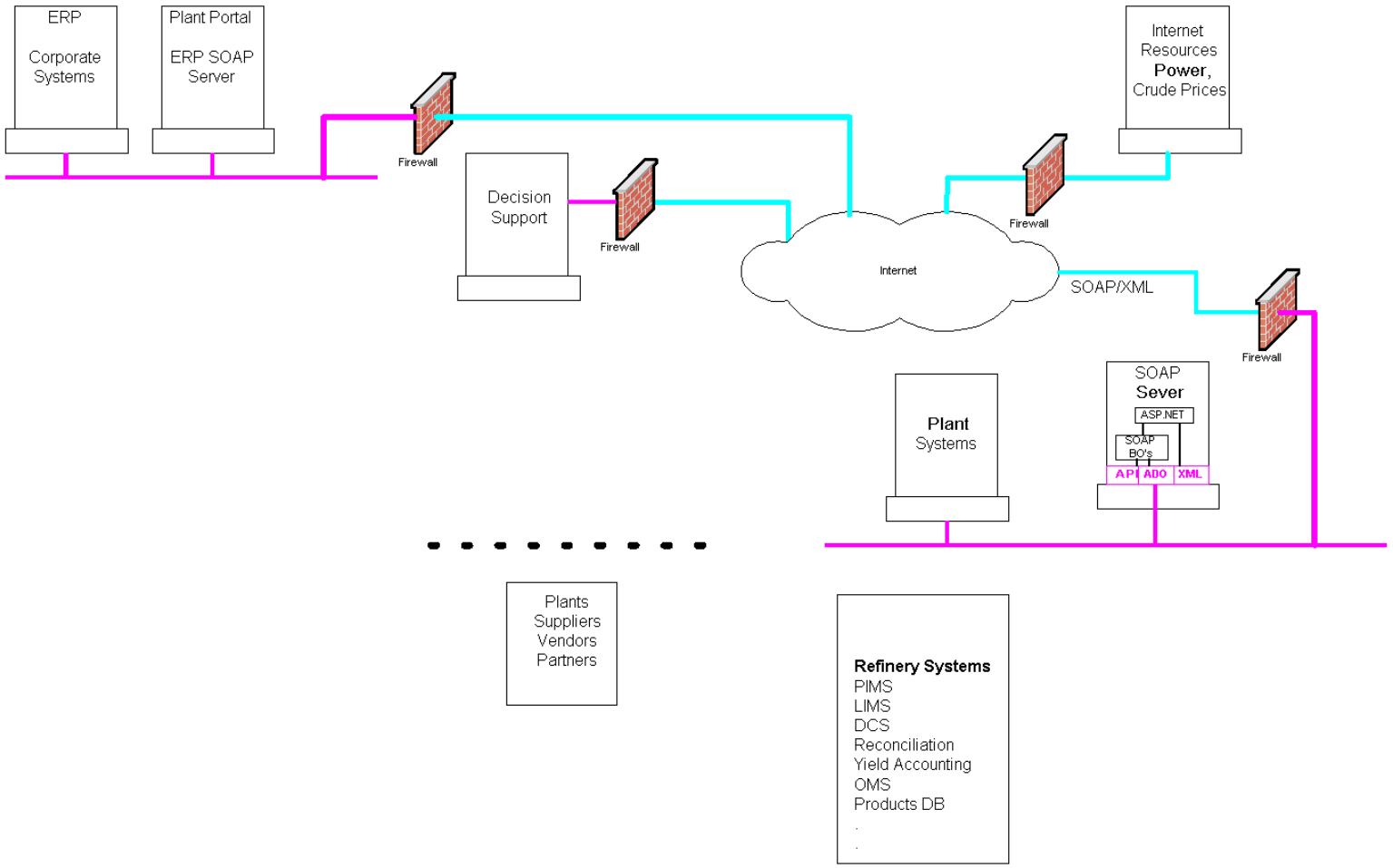
PI ICE Topology



ICE Structure



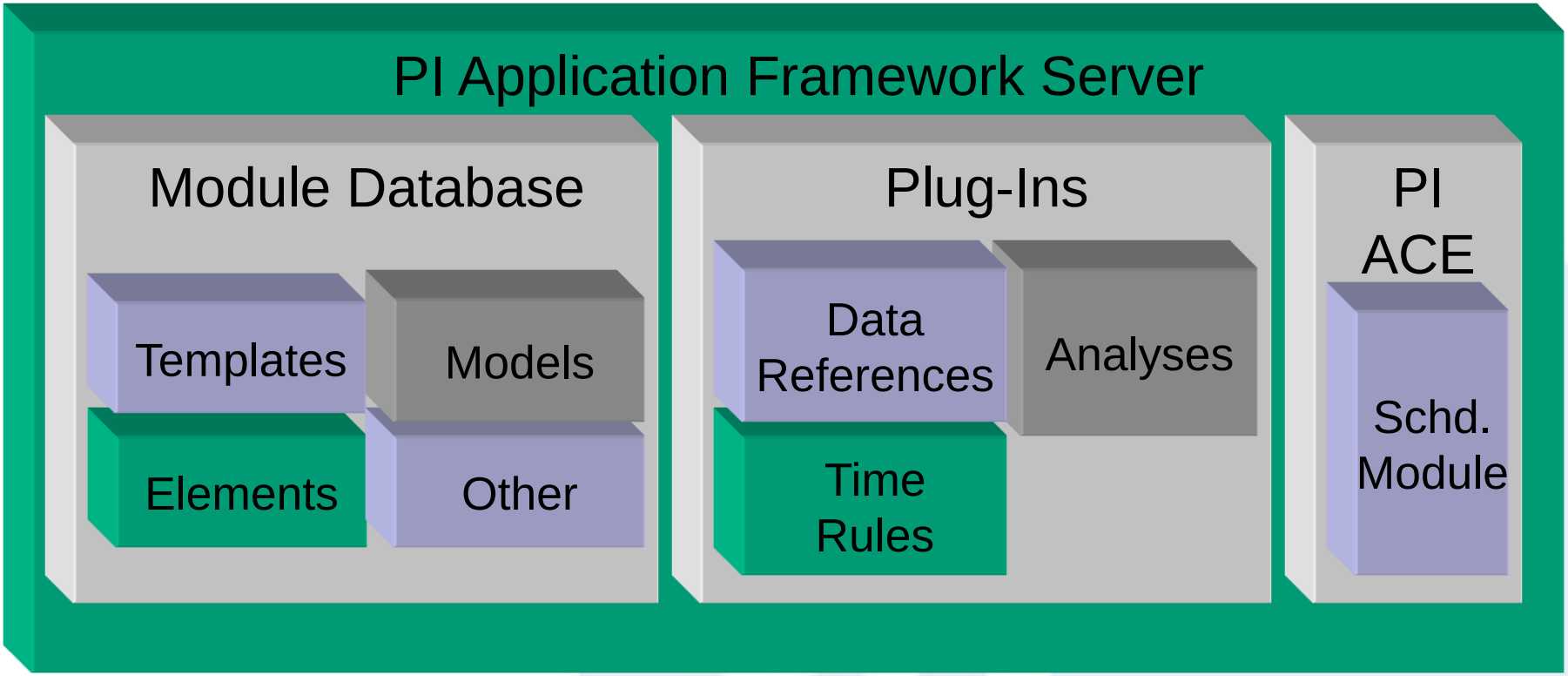
Web Service Integration



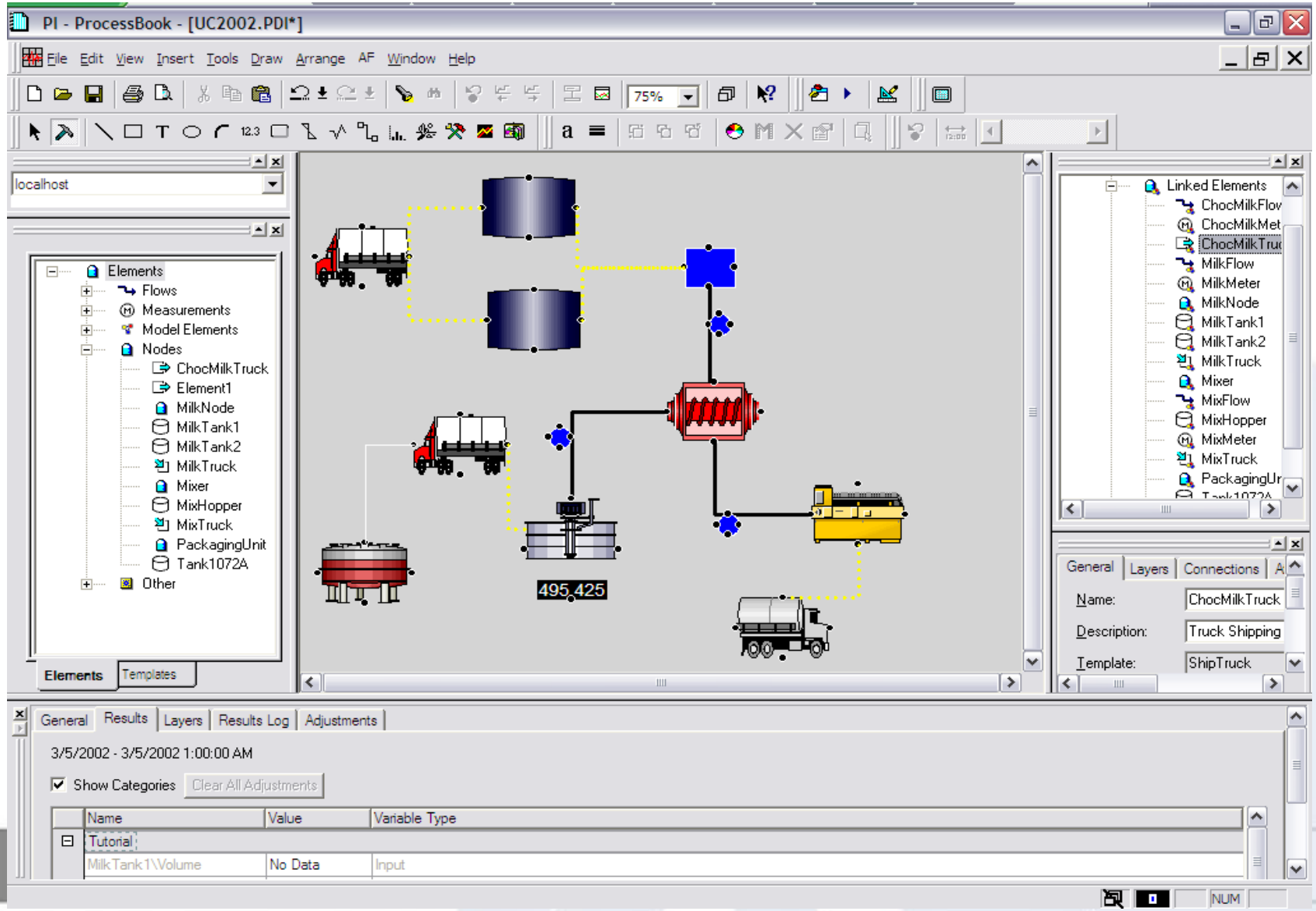
Also Had to Build New Server

- Leverage .NET Development Environment
- Thin Clients Require Servers
- Needed Connectivity Between Objects
- Needed Plug Ins (.NET Classes) for Calcs

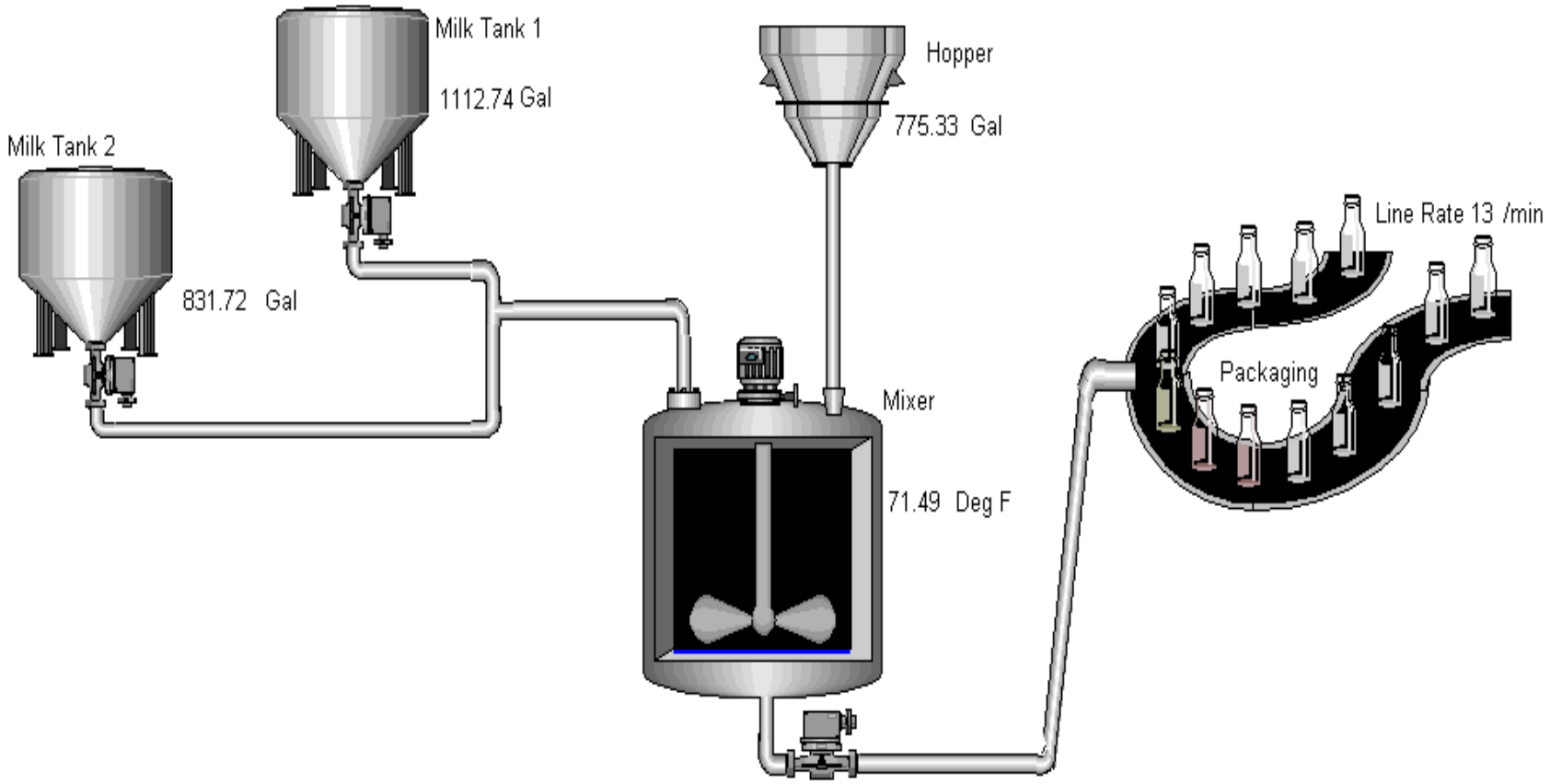
PI Application Framework Server



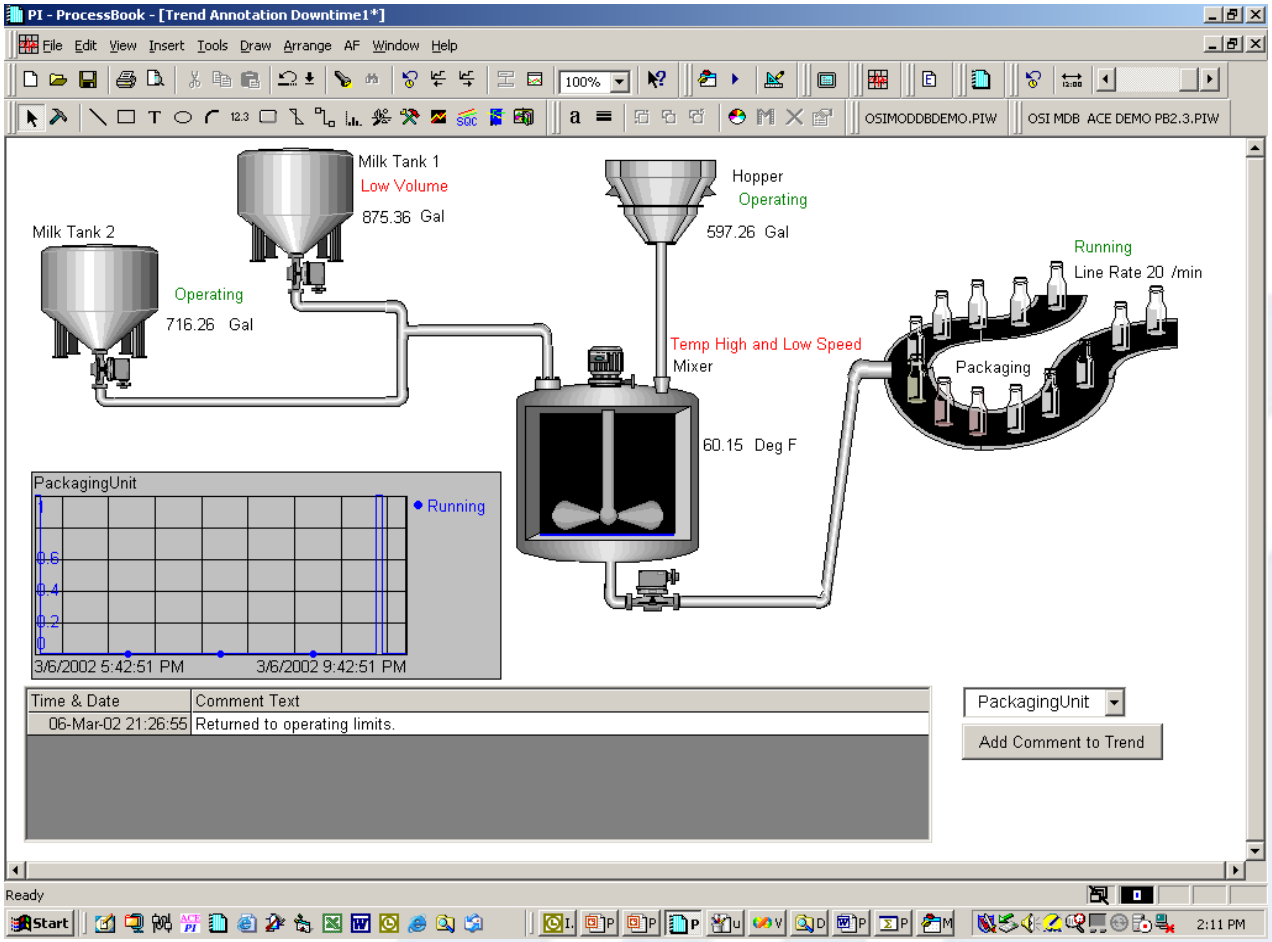
AF Development Environment



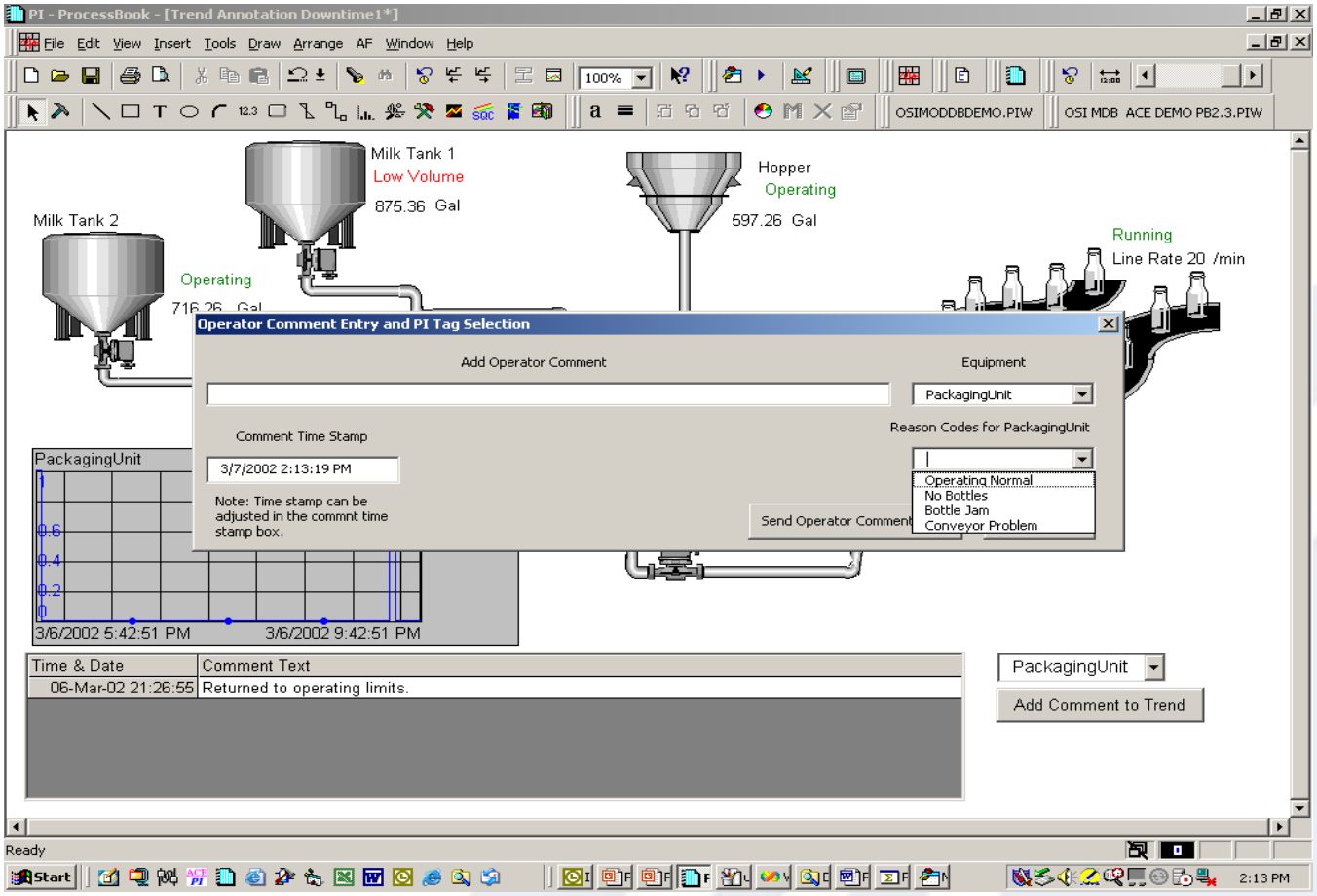
Sample Application - Downtime



ProcessBook Display



Reason Codes based on Equipment



Element Templates

Name	Description	Category	Version	Type	Type Modifier
CartonBottomSealer	Carton Bottom Sealer Element Template		12/31/1969 ...	Node	None
CartonFiller	Cartom Filler Element Template		12/31/1969 ...	Node	None
CartonFolder	Carton Folder Element Template		12/31/1969 ...	Node	None
CartonTopSealer	Carton Top Sealer Element Template		12/31/1969 ...	Node	None
ChocalatePump	Chocolate Pump Element Template		12/31/1969 ...	Node	None
ChocolatePump	Chocolate Pump Element Template		12/31/1969 ...	Node	None
ChocoMilkMixer	Choco Milk Mixer Element Template		12/31/1969 ...	Node	None
ChocoSlurryMixer	Choco Slurry Mixer Element Template		12/31/1969 ...	Node	None
Flow	Flow Element Template	Tutorial	12/31/1969 ...	Flow	None
Hopper	Element Template for a Hopper	Downtime	12/31/1969 ...	Node	Storage
Meter	Meter Element Template	Tutorial	12/31/1969 ...	Measurement	None
MilkPump	Milk Pump Element Template		12/31/1969 ...	Node	None
Mixer	Mixer Element Template	Downtime	12/31/1969 ...	Node	None
ModelDetails	ModelElement Element Template	Tutorial	12/31/1969 ...	Model	None
Node	Node Element Template	Tutorial	12/31/1969 ...	Node	None
PackagingUnit	Packaging Unit Element Template	Downtime	12/31/1969 ...	Node	None
ReceiptTruck	Receipt Truck Element Template	Tutorial	12/31/1969 ...	Node	Reciept Point
ShipTruck	Shipment Truck Element Template	Tutorial	12/31/1969 ...	Node	Ship Point
Tank	Tank Element Template	Downtime	12/31/1969 ...	Node	Storage
Transfer	Transfer Element Template	Tutorial	12/31/1969 ...	Transfer	None

Element Template Attributes

General | Elements | Attributes

Mixer

	Name	Description	Track Revision	Category	Value Type	Default Value	UOM	Data Referen...	Settings
	Speed	Current Speed of...	False	DTinput	Anything	–		<None>	–
	Temperature	Current Temperat...	False	DTinput	Double	0 degF	fahrenheit	<None>	–
	Volume Imba...	Difference in Vol...	False	Tutorial	Double	0 gal	gallon	<None>	–
	SpeedOp		False	DToperator	String	–		<None>	–
	TempOp		False	DToperator	String	–		<None>	–
	SpeedLimit	Mixer speed limit	False	DTlimit	Anything	–		<None>	–
	TempLimit	Temp limit	False	DTlimit	Anything	–		<None>	–
	Output	Event output	False	DTtrigger	String	0		<None>	–
	Mixer	Reason Codes fo...	False	DTcodes	Anything	–		<None>	–
	OpComments	Operator comme...	False	DTcomments	String	–		<None>	–
	MixerStatus	Mixer on/off	False	DTsensor	Anything	–		<None>	–
	SpeedTarget	Target value	False	DTtarget	Anything	–		<None>	–
	TempTarget	Target value	False	DTtarget	Anything	–		<None>	–
*			False			–			–

Conclusions

- New Era of Software Nearly Here
- Install Modern MS Based SW and Plan Continuous Improvement and Change
- Strengthen IT and Expect Lose Federation of Web Servers
- Focus on Benefits