

# **Tank-to-Boardroom: Inventory Management Comes of Age!**

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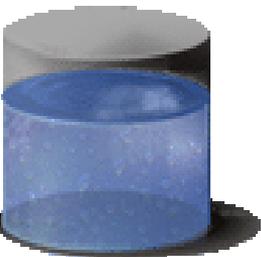
*A web service strategy featuring  
OSIsoft Technologies  
&  
Industrial Evolution Services*

Roland Heersink  
CEO, Industrial Evolution



OSIsoft User Conference  
Monterey, March 2002



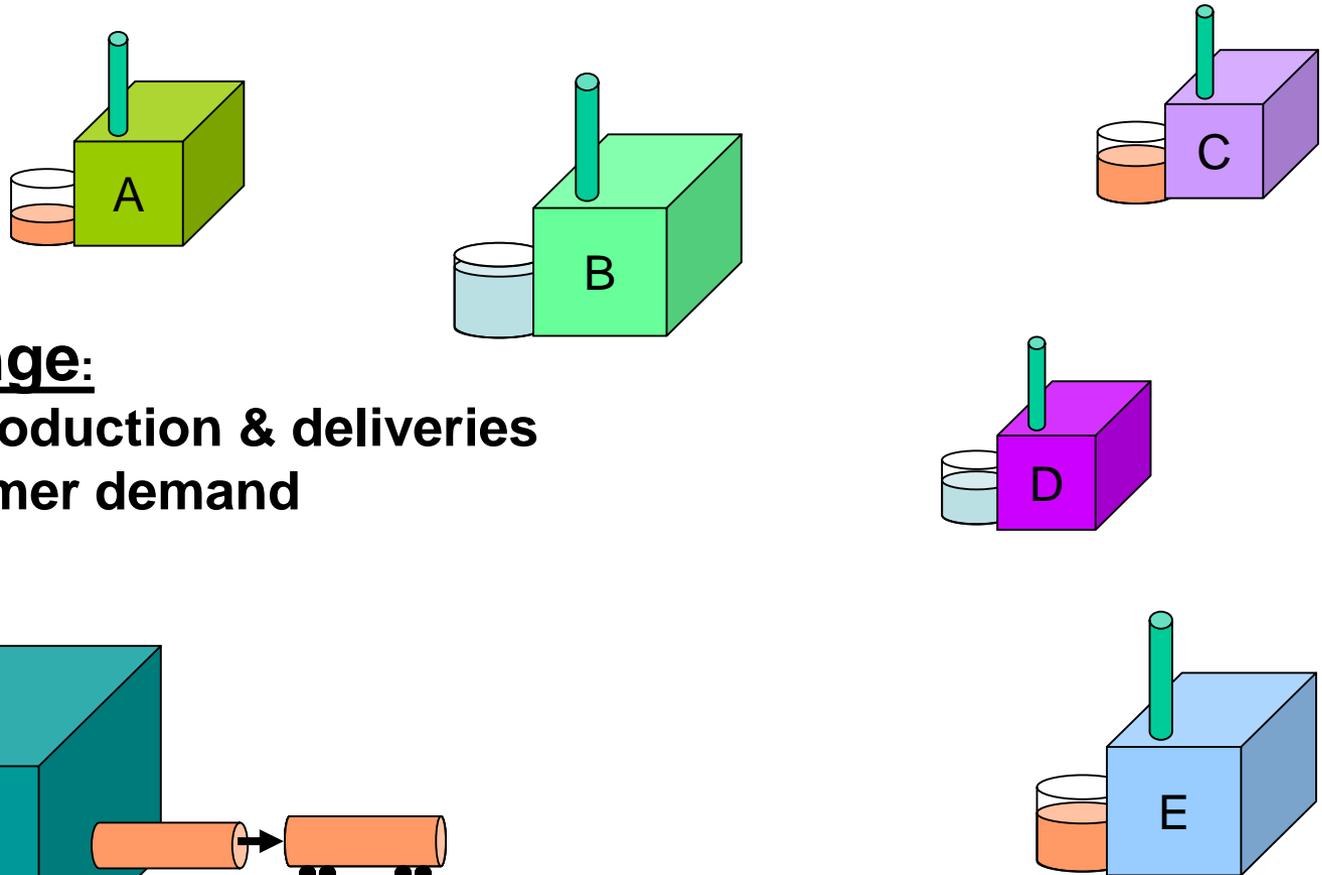


# Presentation Outline

- Inventory management
  - What is it?
  - Typical solutions
- OSIsoft / Industrial Evolution approach
  - Solution components
  - How it all fits together
- BASF Mexicana implementation

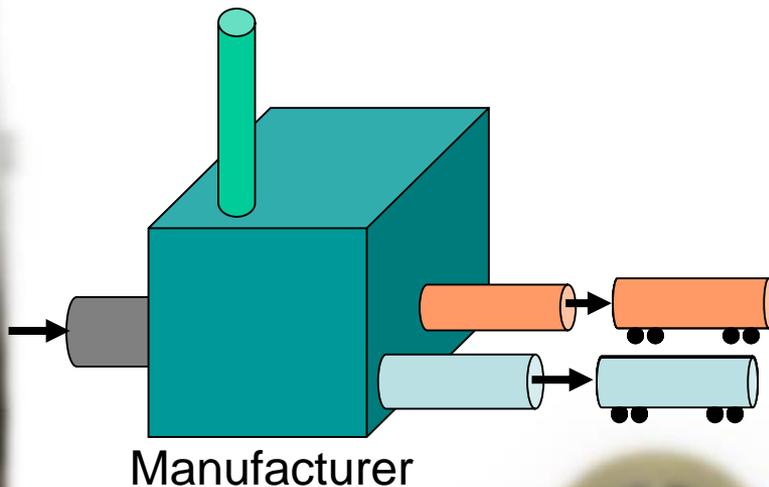


# What is Inventory Management?

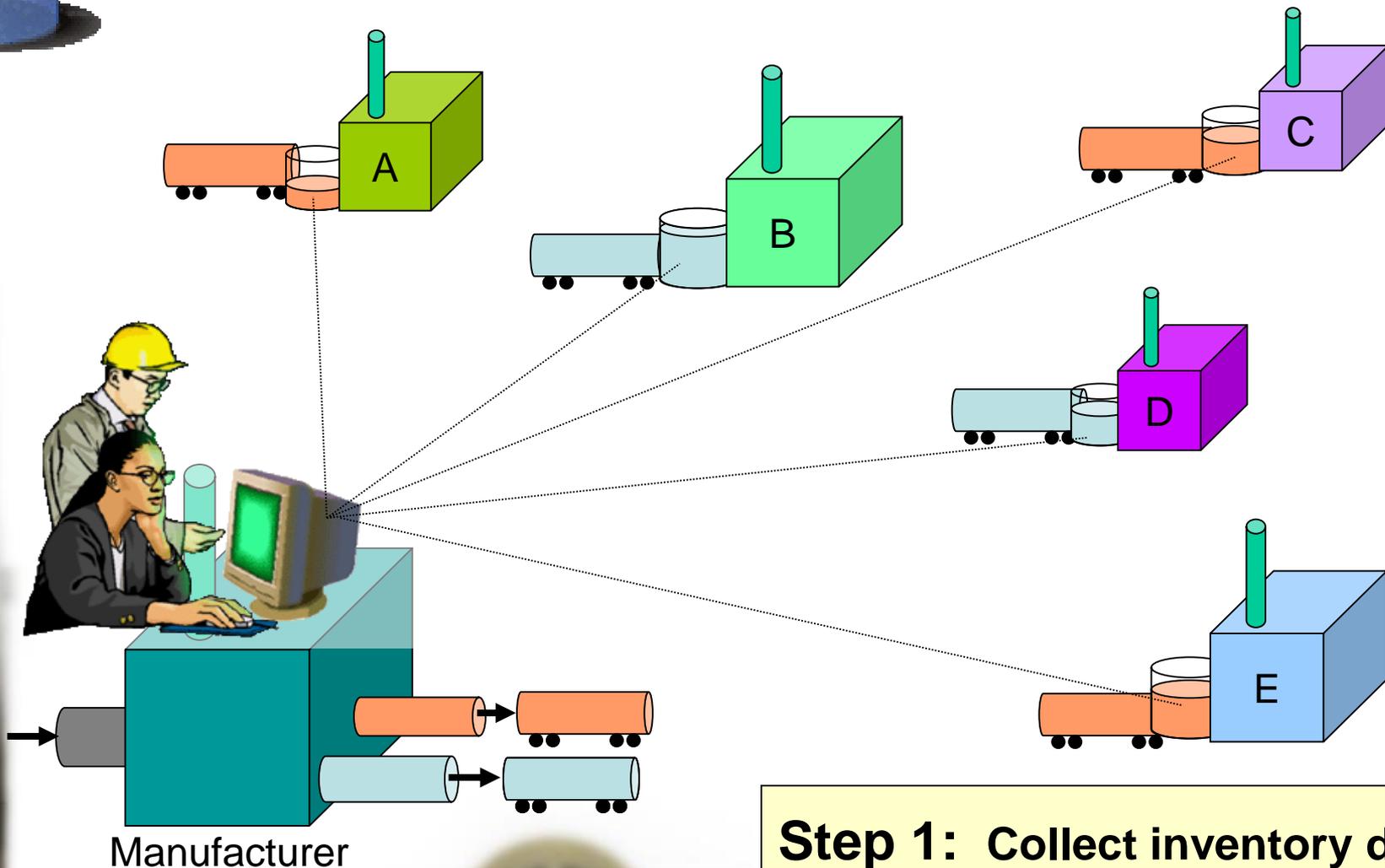


## Challenge:

Match production & deliveries to customer demand



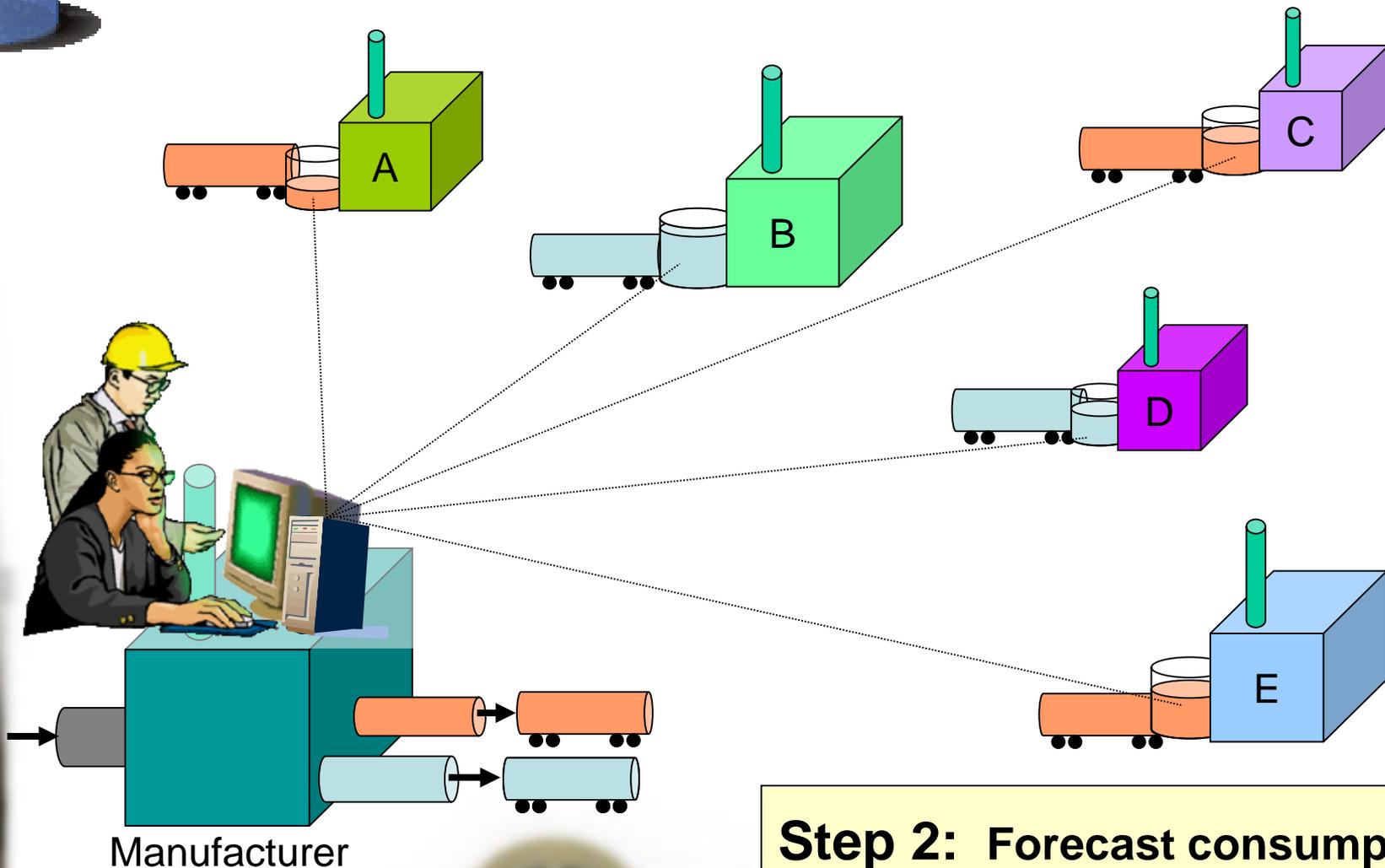
# What is Inventory Management?



**Step 1: Collect inventory data**



# What is Inventory Management?

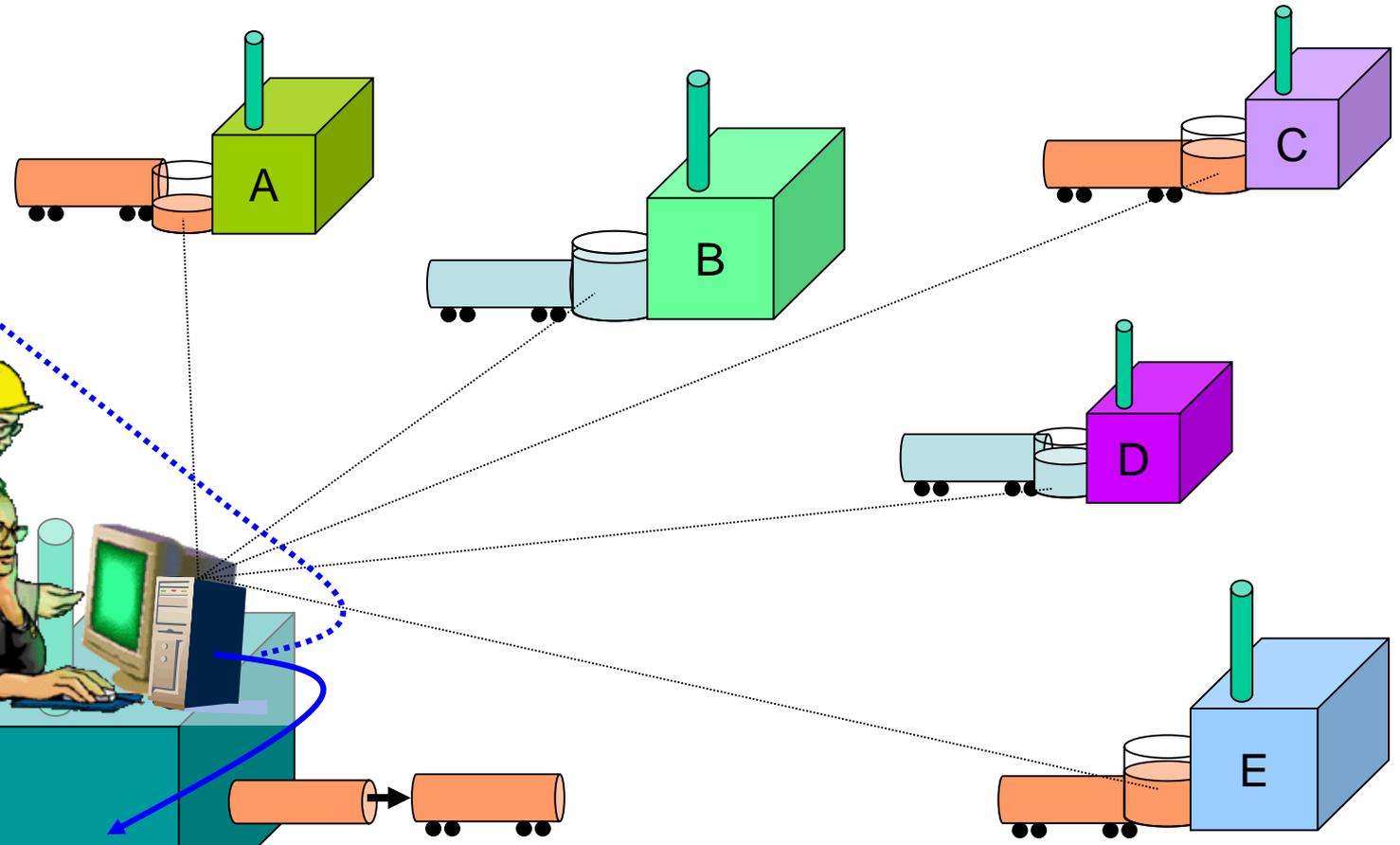


**Step 2: Forecast consumption**

# What is Inventory Management?



Corporate ERP/CRM Systems



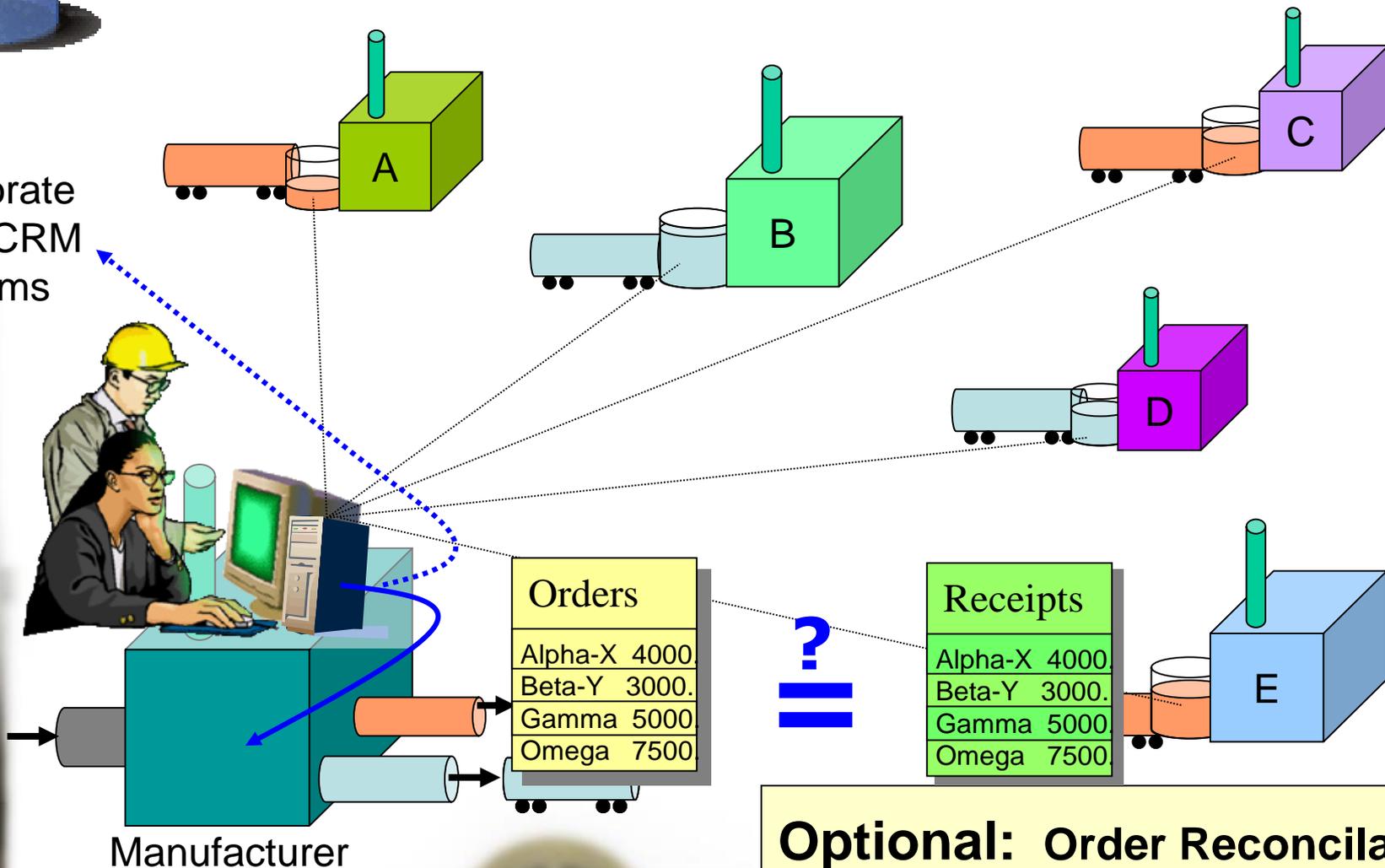
Manufacturer

**Step 3: Integrate Plant & Office**



# What is Inventory Management?

Corporate ERP/CRM Systems



# Why do Inventory Management?

*For the customer:*

- Reduced “excess” inventories
- Lower working capital

*For the manufacturer:*

- Better inventory control & planning
- Optimized plant operations

*For both parties:*

- Higher profits

**Vendor-Managed Inventory**

Corporate  
ERP/CRM  
Systems

Manufacturer



# Solution Components

## Centralize

- Collect all inventory measurements into a central location

## Reconcile

- Match deliveries & receipts

## Forecast

- Predict when next deliveries are required

## Integrate

- Send forecast data to corporate planners
- Match plant operations with forecasts





# Typical Solutions

## Centralize

- Data collection
  - Daily or weekly values collected
  - Electronic capture from PLC, DCS, PI or other
  - Manual entry also possible!
  - Transfer via e-mail, FTP, network connection
- Data centralization
  - Directly to planning systems (ERP)
  - Storage in inventory database





# Our Solution



## Centralize

- Data collection
  - PI-to-PI, PI-UDS or other as required
  - Real-time data collection
- Data centralization
  - All data stored in a central PI System





# Typical Solutions

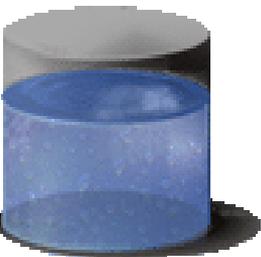
## Reconcile

- None
- Manual (ugh!)
- Automatic
  - At the off-line business system level
  - At the inventory database level
  - Most often some sort of statistical regression



## Reconcile

- ProTRAQ for receipt reconciliation
- Optional: Sigmafine

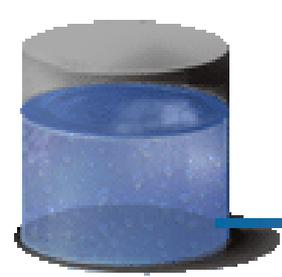


# Typical Solutions

## Forecast

- None
- Simple difference
  - Level minus fixed consumption rate
- Advanced difference
  - Level minus order rate
- Real-time difference
  - Level minus projected consumption





## Forecast

- ProTRAQ software provides the following
  - Volume calculations
  - Receipt identification
  - Consumption rate estimation based on history
  - Time-to-Reorder; minimum delivery time
  - Time-to-Empty





# Typical Solutions

## Integrate

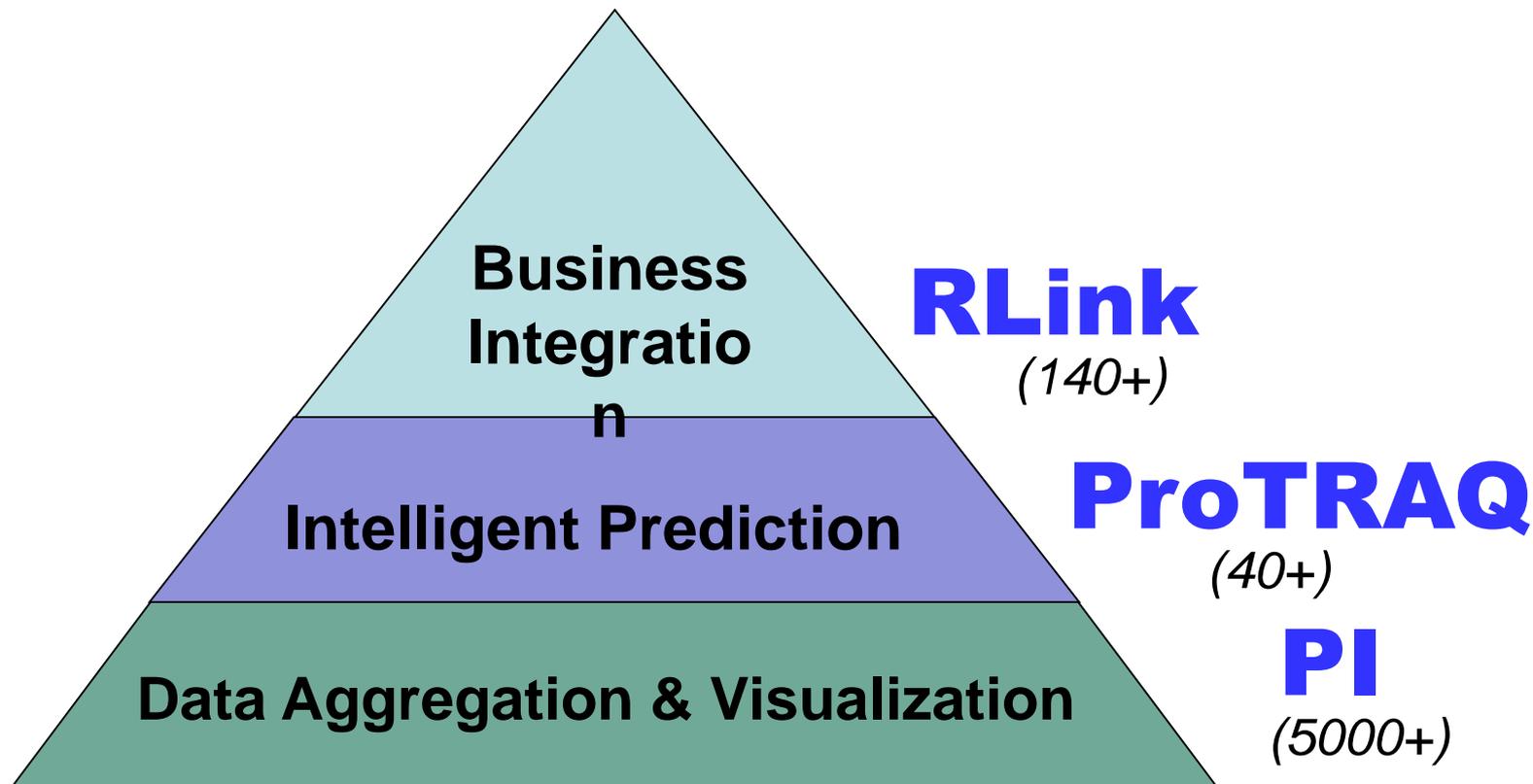
- None
- With Plant Systems
  - Feedback of inventory forecasts to plant automation/optimization systems
  - Done in real-time
- With Business Systems
  - Data input to order & shipment database of business planning systems
  - Periodic input only; eg. weekly



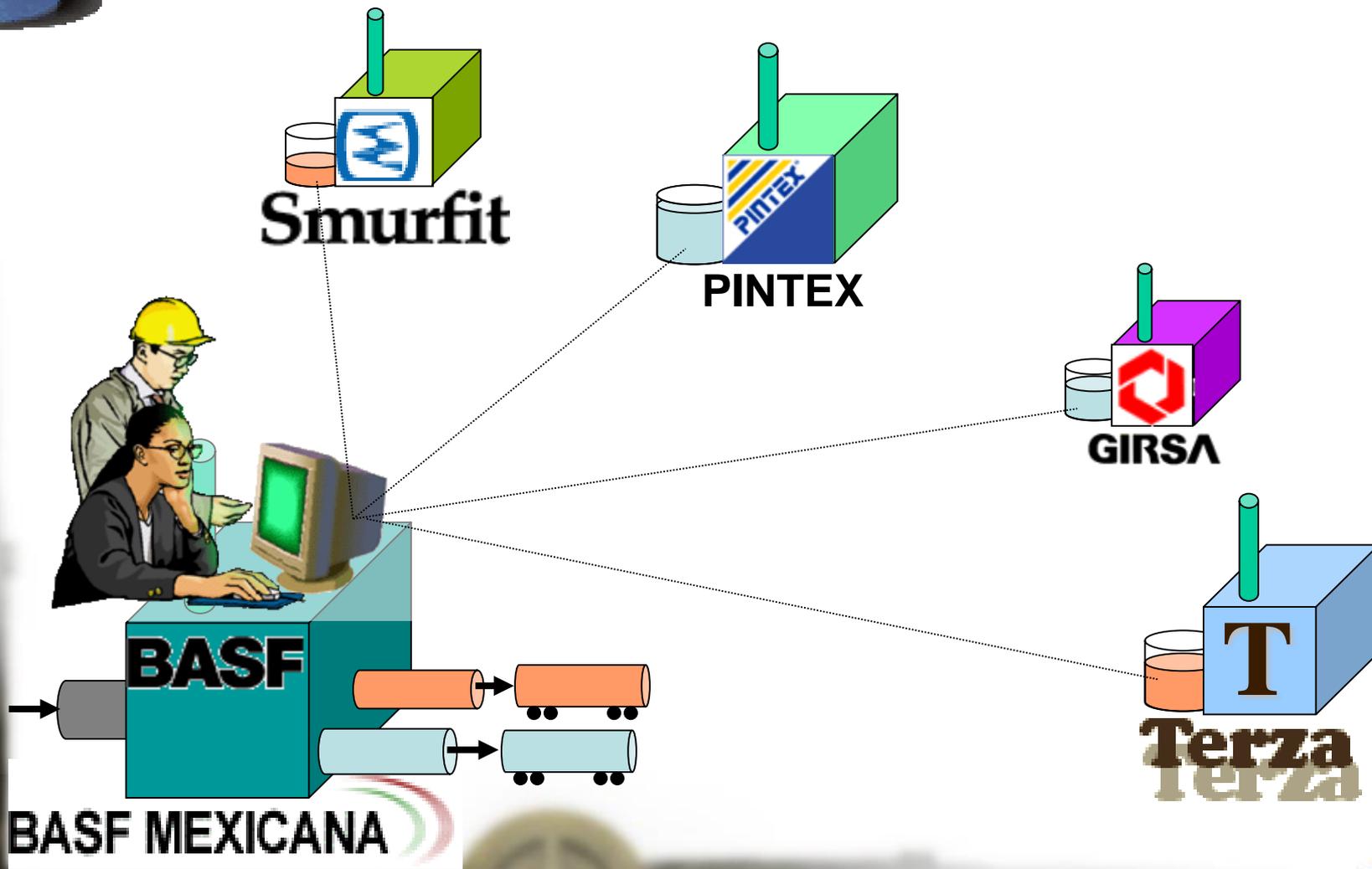
## Integrate

- With Plant Systems
  - Directly to local PI System or other historian using PI-to-PI or PI-UDS
    - No direct access by any user to on-site systems!
- With Business Systems
  - Direct bi-directional communications with corporate ERP systems (like SAP or other) via RLink
    - Generate order requests
    - Receive order plans

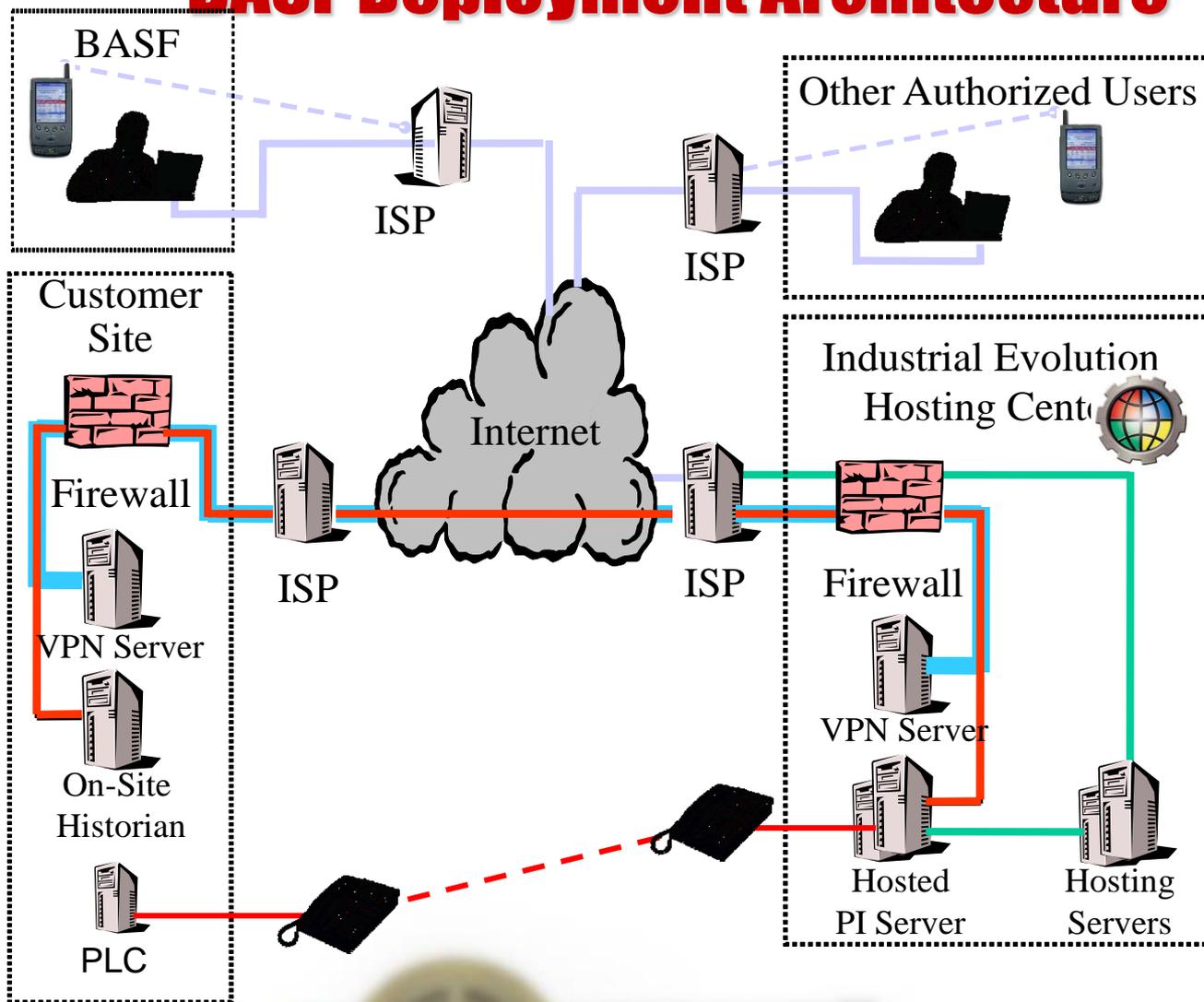
- Putting it all together, we have:



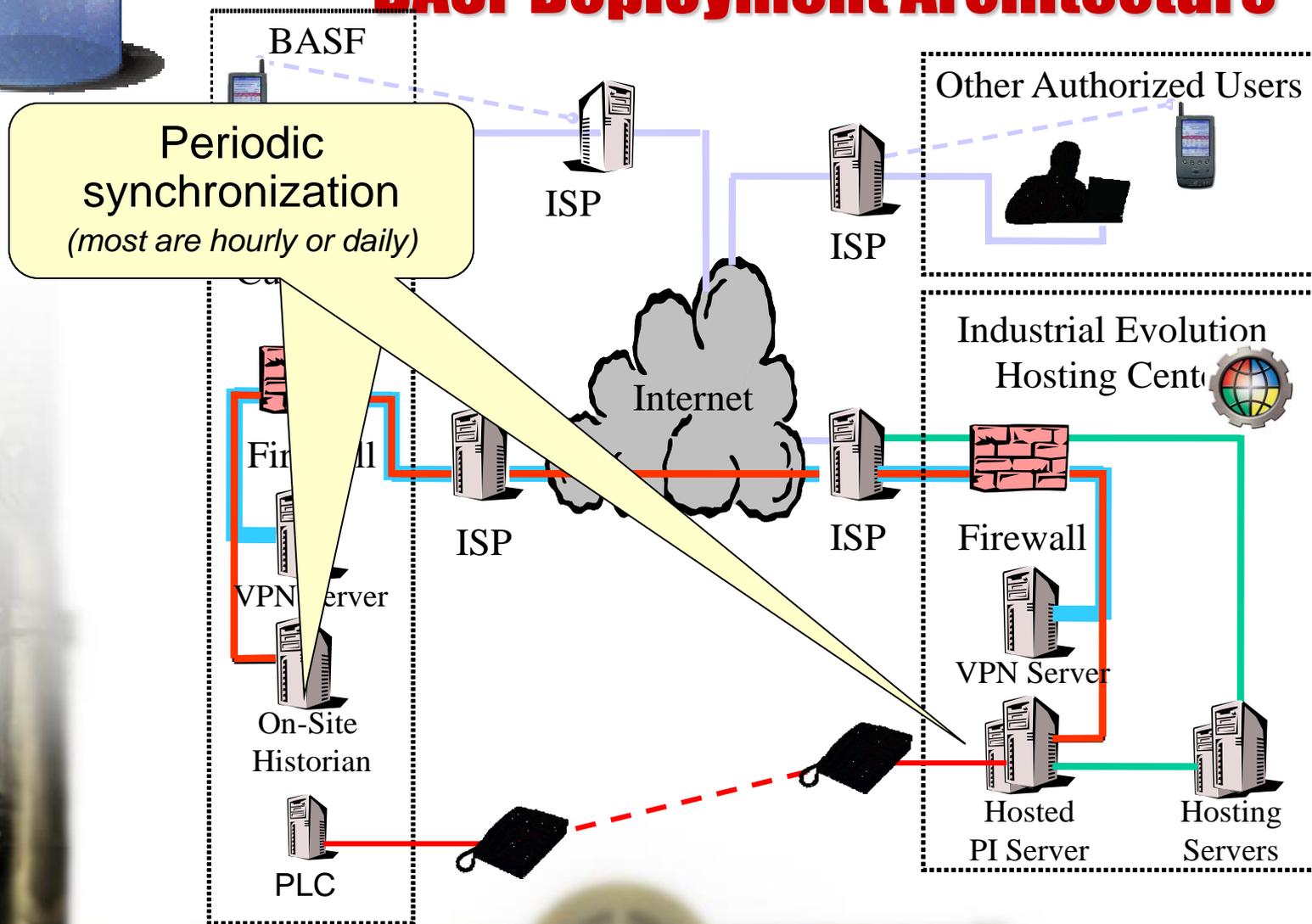
# BASF Mexicana



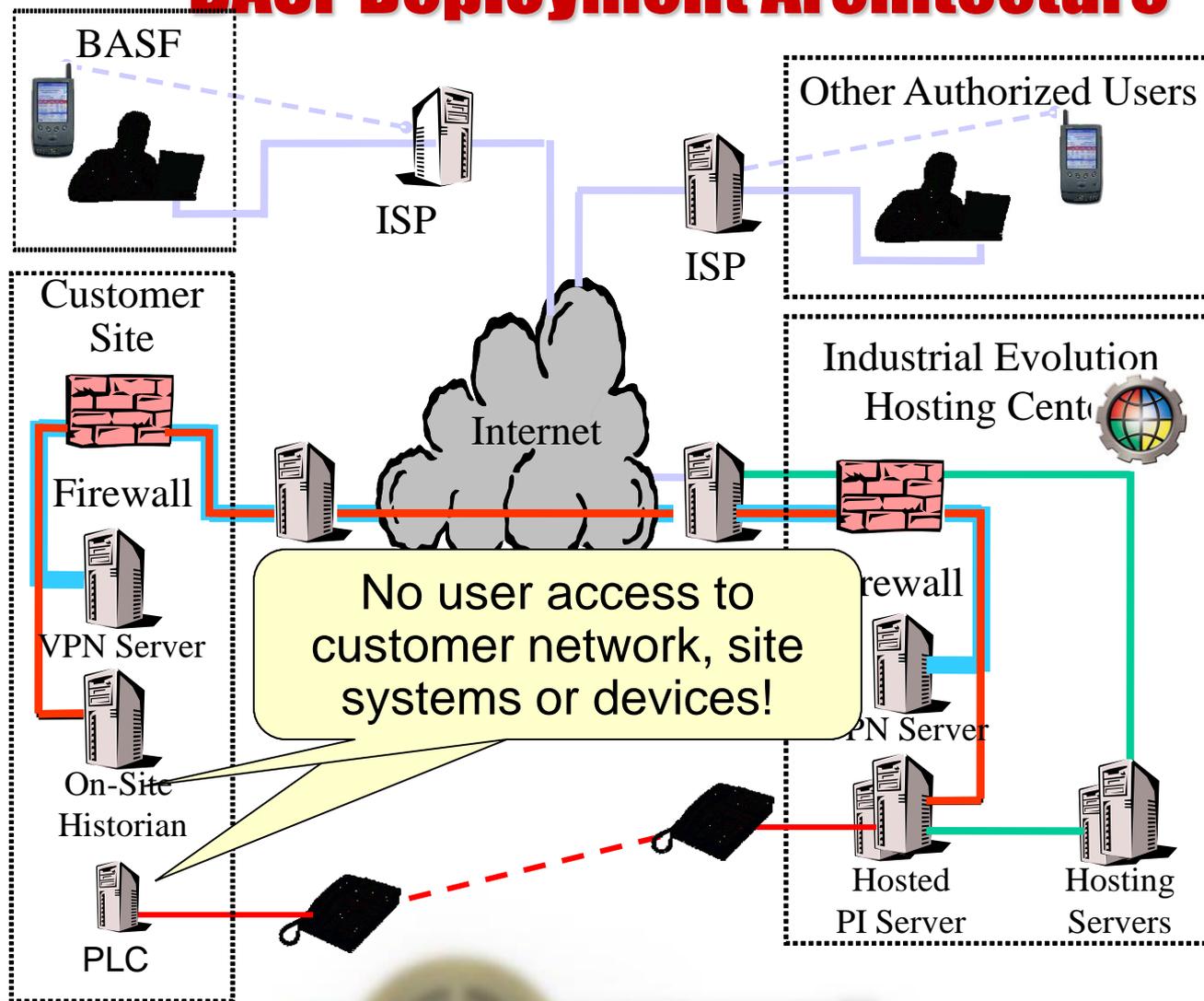
# BASF Deployment Architecture



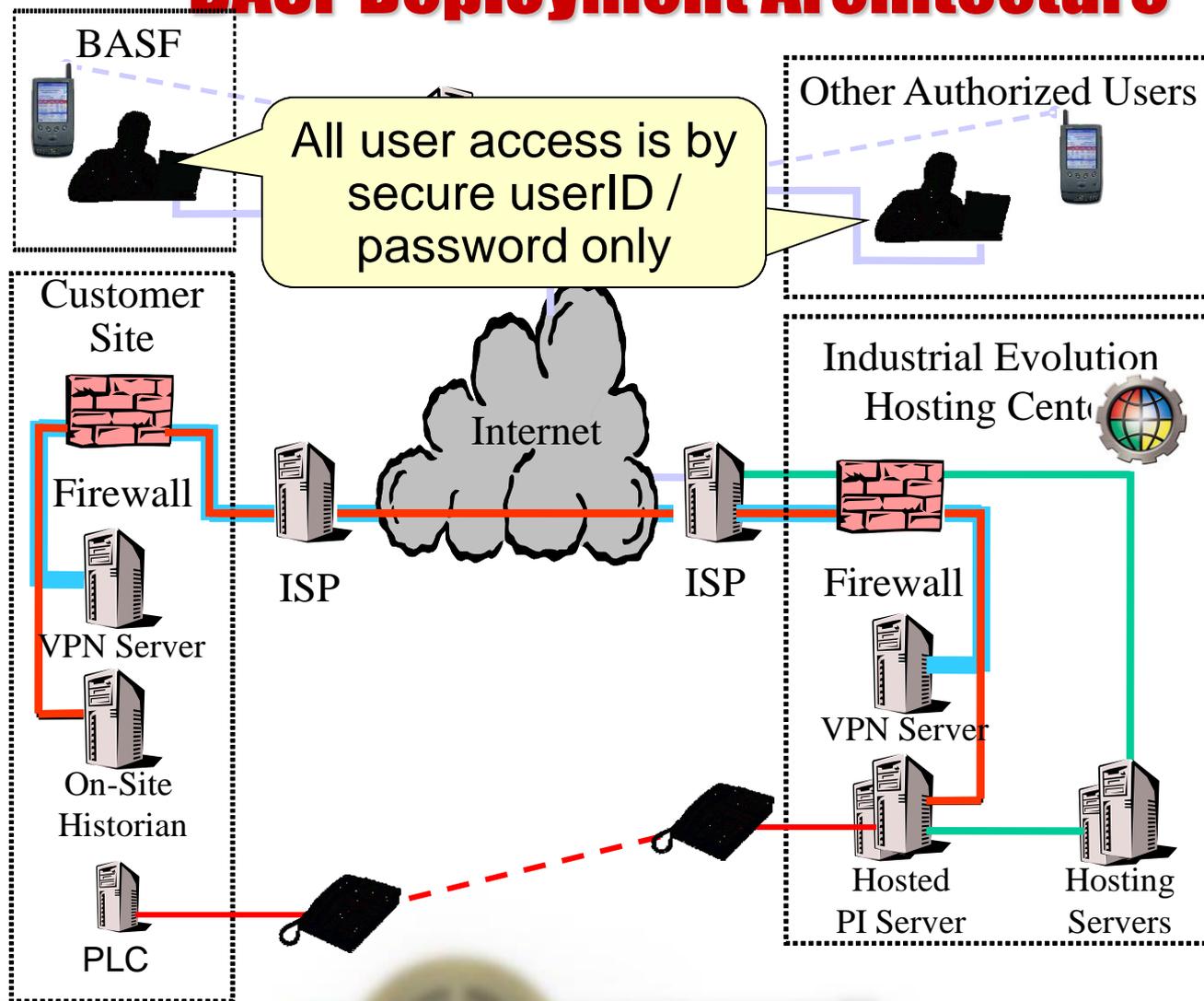
# BASF Deployment Architecture



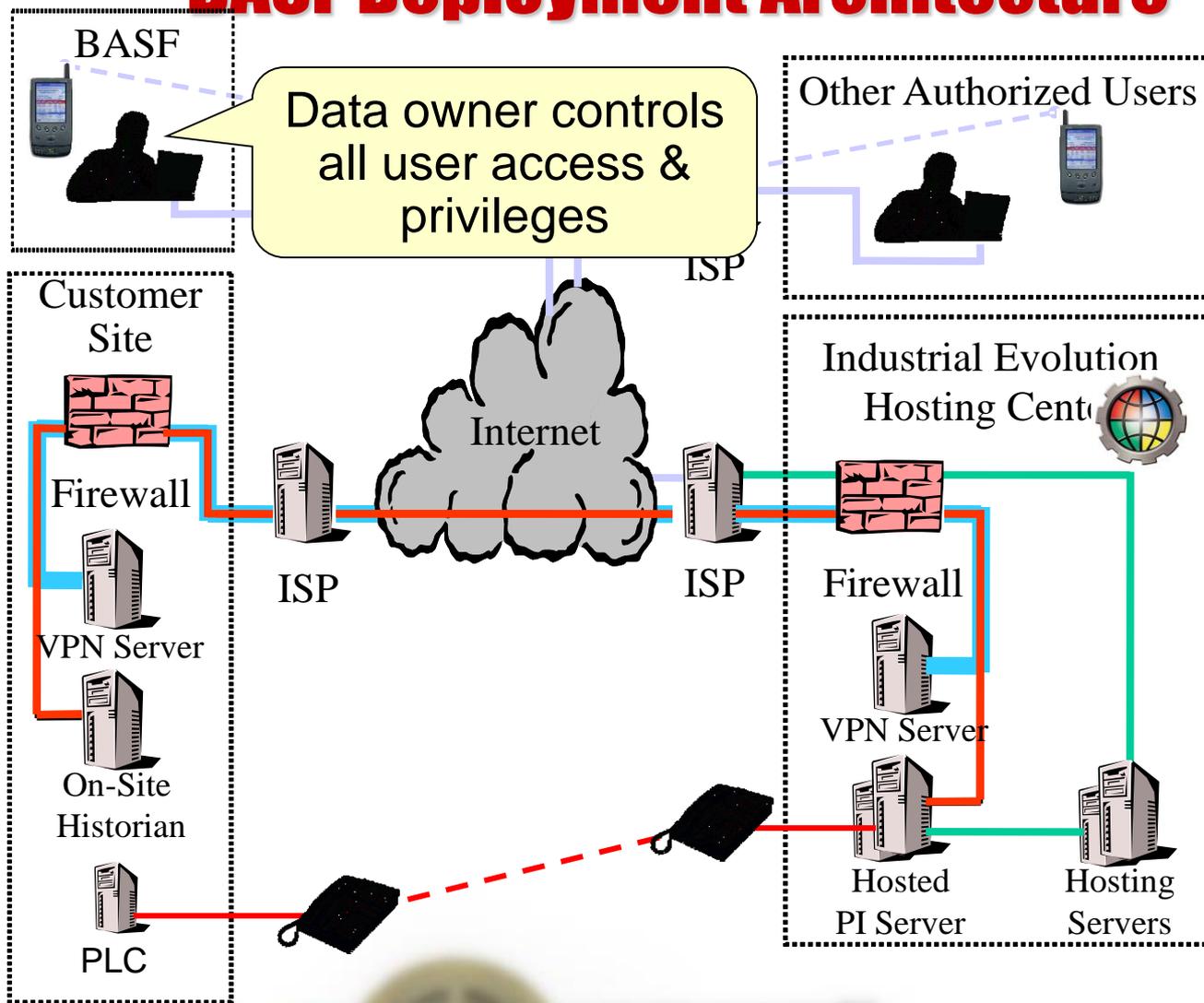
# BASF Deployment Architecture



# BASF Deployment Architecture



# BASF Deployment Architecture





# BASF Deployment

- Look at typical inventory views

- Taken from:

[www.industrialevolution.com/apps](http://www.industrialevolution.com/apps)

in the “GCP Industries” folder





## User Login

Username:

Password:

- |                            |  |
|----------------------------|--|
| <b>First time user?</b>    | Login as GuestUser (no password required). This will give you access to a LIVE system, but with restricted access and personalization privileges. To enable these privileges, please click on " <a href="#">Register For Additional Privileges</a> " at the top of the directory tree on the left after initial logon. |
| <b>Already registered?</b> | Login with your Username and Password.   |
| <b>Forgot password?</b>    | Login as GuestUser and register again (you may use the same Username and Password or a different one).   |



Help

System Requirements



- GCP Industries
  - Inventory Overview
    - By Customer
    - By Product

# Inventory Overview By Customer

Select a customer from the drop-down list:



[Help](#) [System Requirements](#)



- GCP Industries
  - Inventory Overview
    - By Customer**
    - By Product

# Inventory Overview By Customer

Select a customer from the drop-down list:

— Choose a Customer —  
All Customers  
Amnesty Chemicals  
Beloraphorm International  
Chism Consolidated  
Delonby Inc.



- GCP Industries
  - Inventory Overview
    - By Customer**
    - By Product

# Inventory Overview by Customer

Select a customer from the drop-down list:

	Customer: <a href="#">Amnesty Chemicals</a> Product: <a href="#">Abulite</a>	Vessel: 201-IE	Last Updated: Fri Jan 25 22:33:53 MST 2002 Current Inventory: <b>430.32 gal</b>	<input type="button" value="Go To Vessel"/>
	Customer: <a href="#">Amnesty Chemicals</a> Product: <a href="#">Beta 123</a>	Vessel: 203-IIM	Last Updated: Fri Jan 25 22:33:53 MST 2002 Current Inventory: <b>3400.00 gal</b>	<input type="button" value="Go To Vessel"/>
	Customer: <a href="#">Amnesty Chemicals</a> Product: <a href="#">DXL</a>	Vessel: 207-IIP	Last Updated: Fri Jan 25 22:33:53 MST 2002 Current Inventory: <b>935.00 gal</b>	<input type="button" value="Go To Vessel"/>
	Customer: <a href="#">Amnesty Chemicals</a> Product: <a href="#">Fremula Plus</a>	Vessel: 212-IIR	Last Updated: Fri Jan 25 22:33:53 MST 2002 Current Inventory: <b>1367.80 gal</b>	<input type="button" value="Go To Vessel"/>
	Customer: <a href="#">Beloraphorm International</a> Product: <a href="#">Abulite</a>	Vessel: S65-D4F	Last Updated: Fri Jan 25 22:33:53 MST 2002 Current Inventory: <b>102.00 m3</b>	<input type="button" value="Go To Vessel"/>
	Customer: <a href="#">Beloraphorm International</a> Product: <a href="#">Catulin</a>	Vessel: S67-D16	Last Updated: Fri Jan 25 22:33:53 MST 2002 Current Inventory: <b>127.50 m3</b>	<input type="button" value="Go To Vessel"/>
	Customer: <a href="#">Beloraphorm International</a> Product: <a href="#">Fremula Plus</a>	Vessel: S71-D2G	Last Updated: Fri Jan 25 22:33:53 MST 2002 Current Inventory: <b>39.78 m3</b>	<input type="button" value="Go To Vessel"/>
	Customer: <a href="#">Beloraphorm International</a> Product: <a href="#">Golon</a>	Vessel: S27-D17	Last Updated: Fri Jan 25 22:33:53 MST 2002 Current Inventory: <b>65.01 m3</b>	<input type="button" value="Go To Vessel"/>
	Customer: <a href="#">Chism Consolidated</a> Product: <a href="#">Beta 123</a>	Vessel: Tk 107	Last Updated: Fri Jan 25 22:33:53 MST 2002 Current Inventory: <b>55.49 %</b>	<input type="button" value="Go To Vessel"/>
	Customer: <a href="#">Chism Consolidated</a> Product: <a href="#">ERMO</a>	Vessel: Tk 13	Last Updated: Fri Jan 25 22:33:53 MST 2002 Current Inventory: <b>58.27 %</b>	<input type="button" value="Go To Vessel"/>
	Customer: <a href="#">Chism Consolidated</a>		Last Updated: Fri Jan 25 22:33:53 MST 2002	<input type="button" value="Go To Vessel"/>

Toll-Free User Support  
**+1 (866) IND-EVOL**





- GCP Industries
  - Inventory Overview
    - By Customer**
    - By Product

# Vessel Details

Customer: [Amnesty Chemicals](#)  
 Product: [Abulite](#)  
 Vessel: [201-IIE](#)

Select another product:

Select another vessel:



Last Updated:	Fri Jan 25 22:36:01 MST 2002
Level:	33.98%
Volume:	<b>424.80 gal</b>
Low Caution Level:	375 gal
Critical Level:	250 gal
Capacity:	1250 gal

[Customer Overview](#) [Product Overview](#)



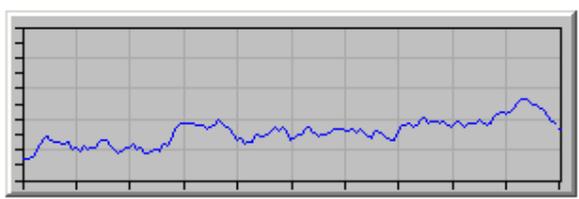
GCP Industries

- Inventory Overview
  - By Customer
  - By Product

# Vessel Details

Customer: [Amnesty Chemicals](#)  
 Product: [Abulite](#)  
 Vessel: [201-IIIE](#)

Select another product:   
 Select another vessel:



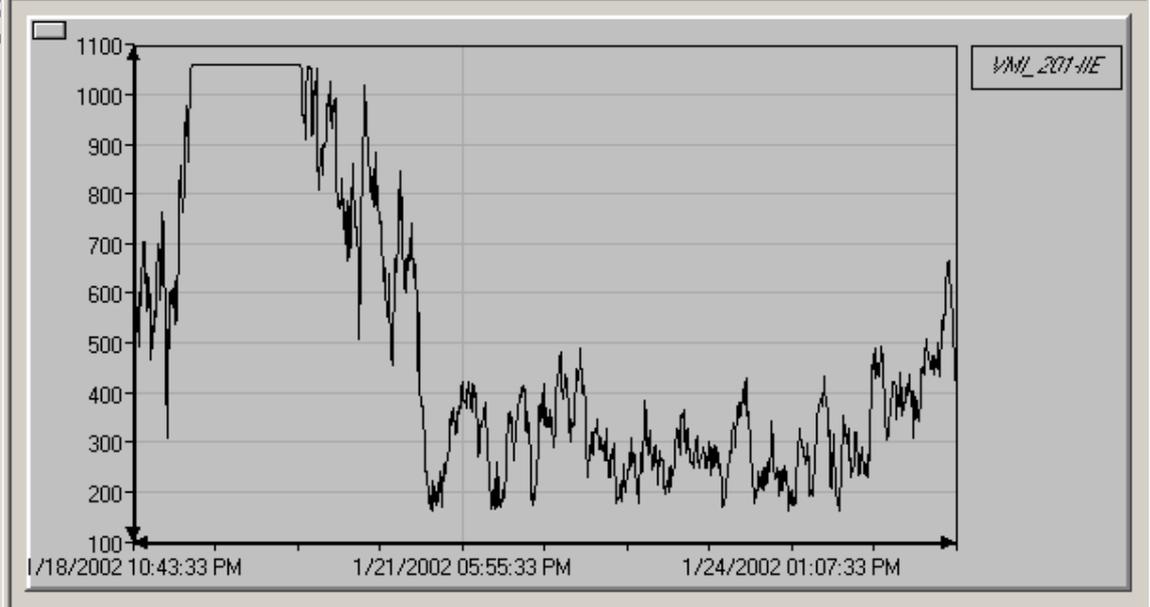
Last Updated:	Fri Jan 25 22:41:15 MST 2002
Level:	33.90%
Volume:	<b>423.78 ual</b>
Low Caution Level:	37
Critical Level:	25
Capacity:	125

- 1 Day
- 1 Week**
- 1 Month
- Calendar
- BuzzMe
- Help

[Customer Overview](#) [Product Overview](#)



Industrial Evolution's Ad Hoc Trend - Microsoft Internet Explorer



Export to Excel All times displayed are GMT -8h

- 60 Min Step
- 30 Min Step
- 15 Min Step
- 10 Min Step
- 5 Min Step**
- 1 Min Step



Select another product:

Select another vessel:

Last Updated:	Fri Jan 25 22:42:08 MST 2002
Level:	34.60%
Volume:	<b>432.52 gal</b>
Caution Level:	375 gal
Critical Level:	250 gal
Capacity:	1250 gal

view

**INDU**

- GCP Industries
  - Inventory C
    - By Cust
    - By Prod



### Loading MS-Excel...

Please wait, loading approximately 2016 values from database...

If Excel fails to load correctly, [click here](#) to close this window.



2:50 MST 2002  
44%  
8 gal  
gal  
gal  
0 gal

A1	Time Stamp			Formula Bar	E	F	G	H	I	J	K	L	M
	A	B	C										
1	TimeStamp	VMI_201-II.E.STATUS	VMI_201-II.E.VALUE										
2	1/18/2002 22:43	0	596.5165405										
3	1/18/2002 22:48	0	634.0328979										
4	1/18/2002 22:53	0	637.7141113										
5	1/18/2002 22:58	0	705.1264648										
6	1/18/2002 23:03	0	618.3637085										
7	1/18/2002 23:08	0	597.2054443										
8	1/18/2002 23:13	0	625.5725708										
9	1/18/2002 23:18	0	588.8578491										
10	1/18/2002 23:23	0	584.2800293										
11	1/18/2002 23:28	0	575.3971558										
12	1/18/2002 23:33	0	569.7907715										
13	1/18/2002 23:38	0	549.7853394										
14	1/18/2002 23:43	0	548.7123413										
15	1/18/2002 23:48	0	545.5944824										
16	1/18/2002 23:53	0	493.6179199										
17	1/18/2002 23:58	0	437.8755798										
18	1/19/2002 0:03	0	538.2266846										
19	1/19/2002 0:08	0	578.2000122										
20	1/19/2002 0:13	0	602.4086304										
21	1/19/2002 0:18	0	495.355896										
22	1/19/2002 0:23	0	573.9865112										
23	1/19/2002 0:28	0	558.0438232										
24	1/19/2002 0:33	0	611.6782837										
25	1/19/2002 0:38	0	621.8858643										
26	1/19/2002 0:43	0	690.751709										
27	1/19/2002 0:48	0	657.5979004										
28	1/19/2002 0:53	0	704.0405273										
29	1/19/2002 0:58	0	671.9245605										
30	1/19/2002 1:03	0	703.9348755										
31	1/19/2002 1:08	0	658.7633667										
32	1/19/2002 1:13	0	630.8765259										
33	1/19/2002 1:18	0	625.8589478										
34	1/19/2002 1:23	0	620.5402222										
35	1/19/2002 1:28	0	578.1338501										
36	1/19/2002 1:33	0	640.06073										
37	1/19/2002 1:38	0	661.583252										
38	1/19/2002 1:43	0	563.5186157										
39	1/19/2002 1:48	0	547.4755859										



2:50 MST 2002  
14%  
8 gal  
gal  
gal  
gal



- GCP Industries
  - Inventory Overview
    - By Customer**
    - By Product

# Vessel Details

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Corporate  
ERP/CRM  
Systems

