

OSIsoft®

PI SYSTEM 2014 ROADSHOW

The **Power** of **Data**

DECISION READY IN REAL-TIME

O C E A N I A



The PI System

**The Foundation for Enterprise
Analytics, Visualization, &
Collaboration in Context**

**Business to Operations
Value**

Presented by **Craig Harclerode**
Industry Principal –in O&G and Petrochemicals

My Journey with Technology....What an Experience!



What I used



I moved up to
an HP Calculator
by the time
I graduated..

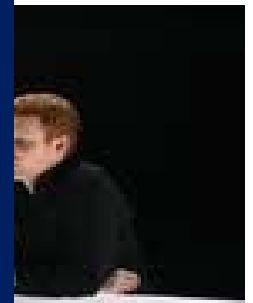
**The Power of Real-Time Data in the
21st Century**

**Data as a Strategic Asset – Needs to
be Managed as Such!**

Need A Strategic Data Infrastructure



My First Job out of College..



In the not to distant future...

Agenda



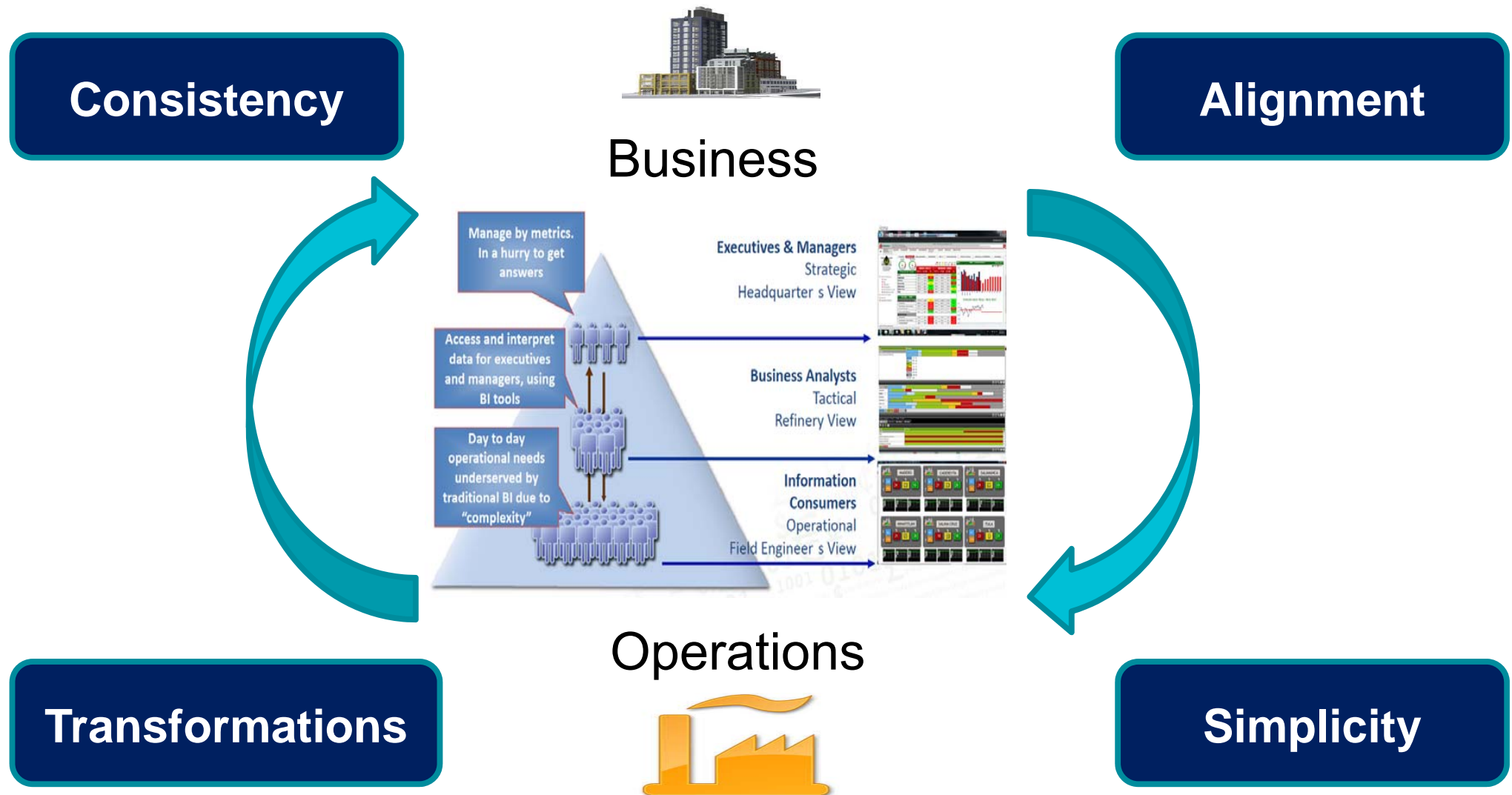
- Business to Operations Data Value Requisites:
 - Data Consistency and Context
 - Organizational Alignment
 - Applications/Solutions Simplicity
 - Data Transformation Methodology
- “Future Proofing” of the Data Infrastructure
- Resulting Value in O&G
- Closing Comments

Agenda

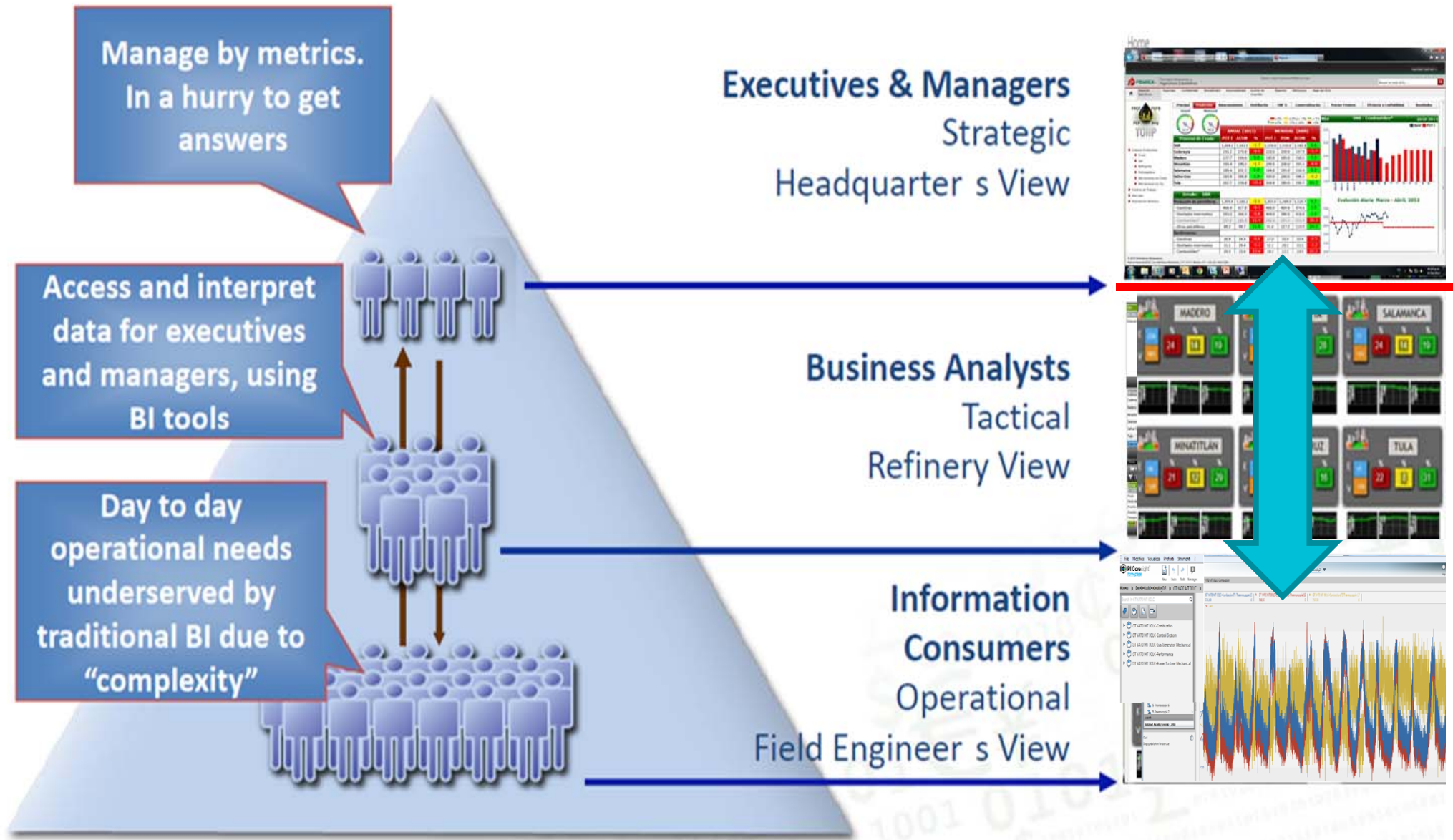


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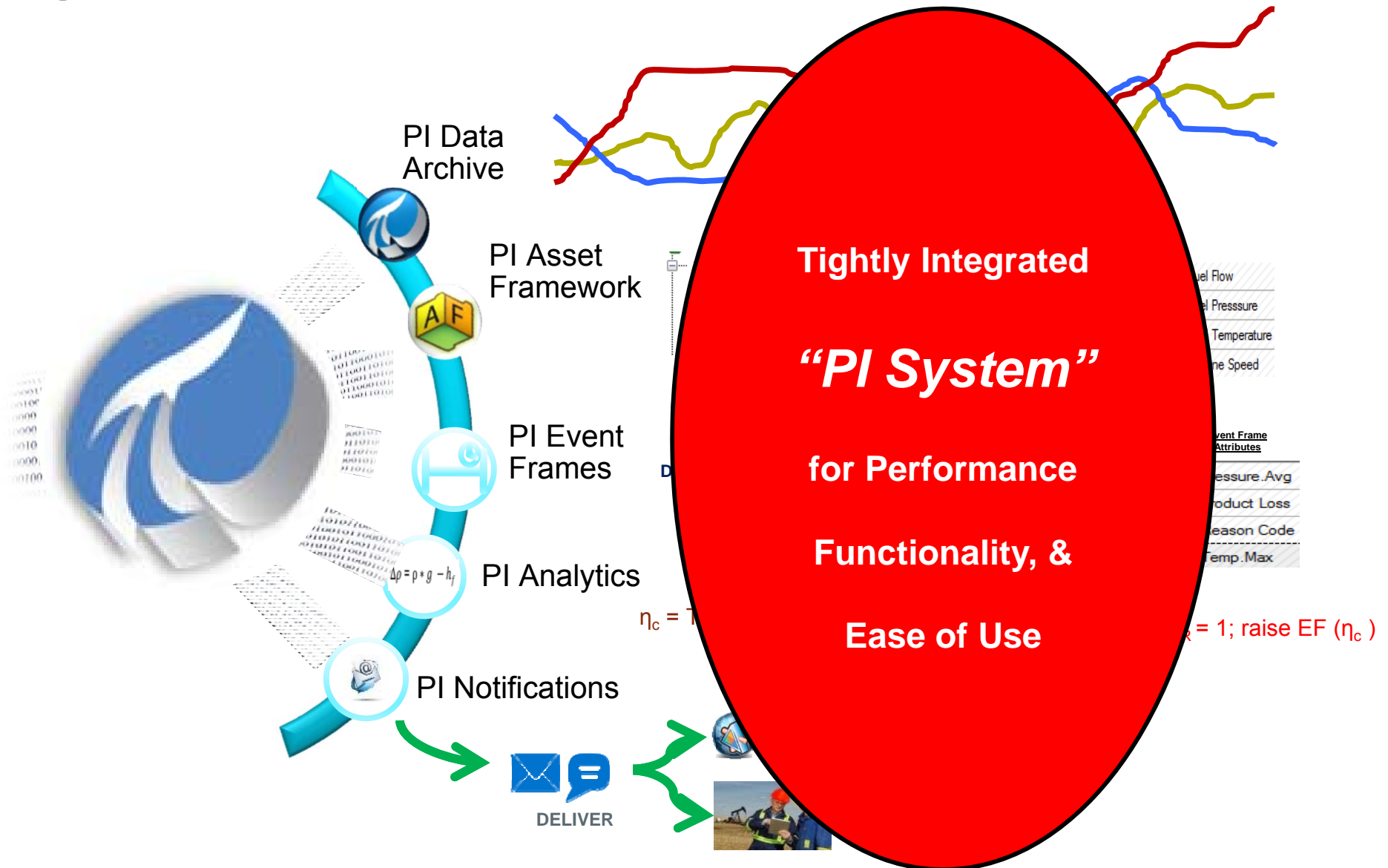
The Need for a Data Information Infrastructure



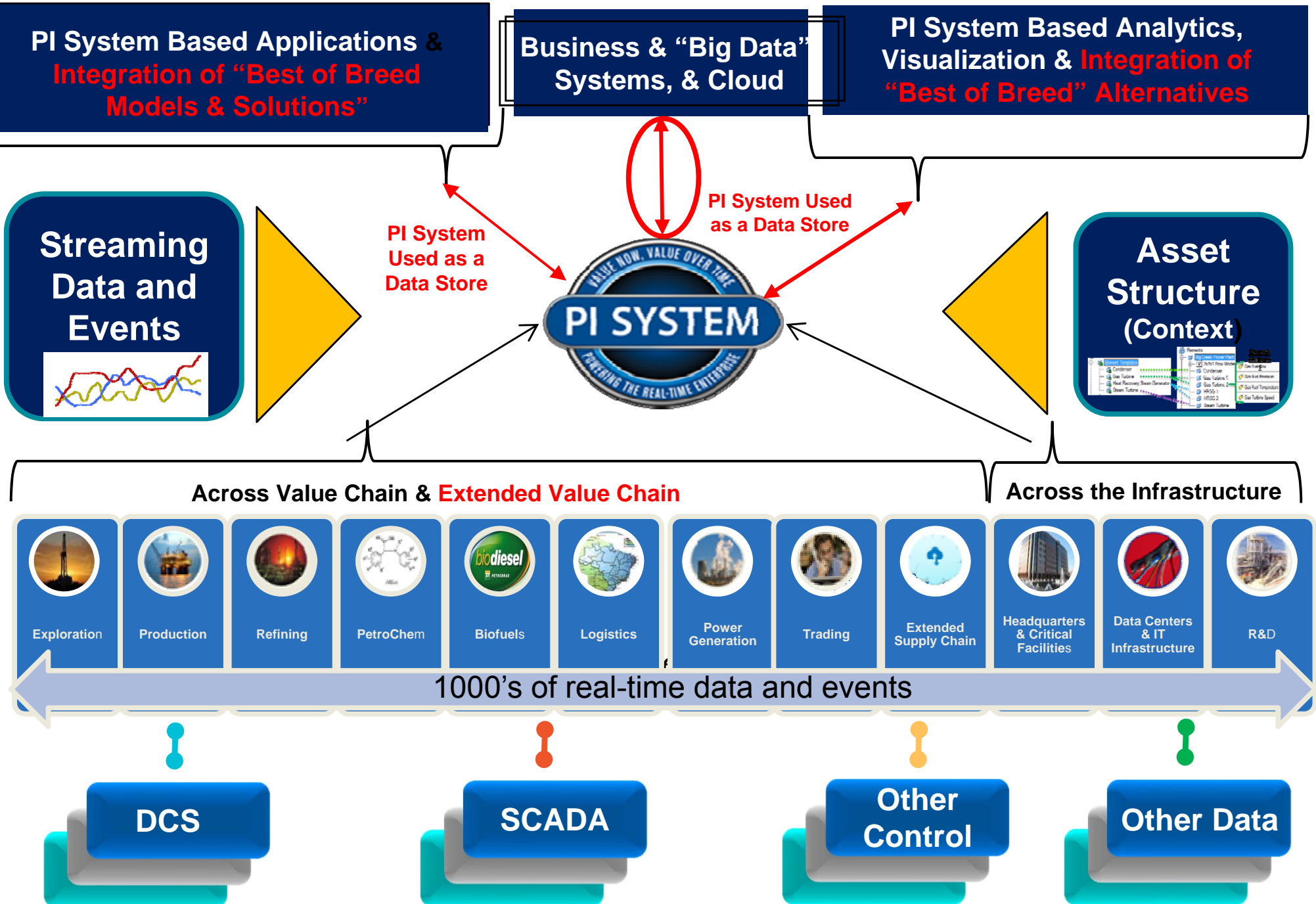
Data and Information in Context with Integrated High Fidelity Drill Down – “Don’t Let Sexy override Functionality”



The Foundation for Enterprise consistency, alignment, simplification, and data transformation

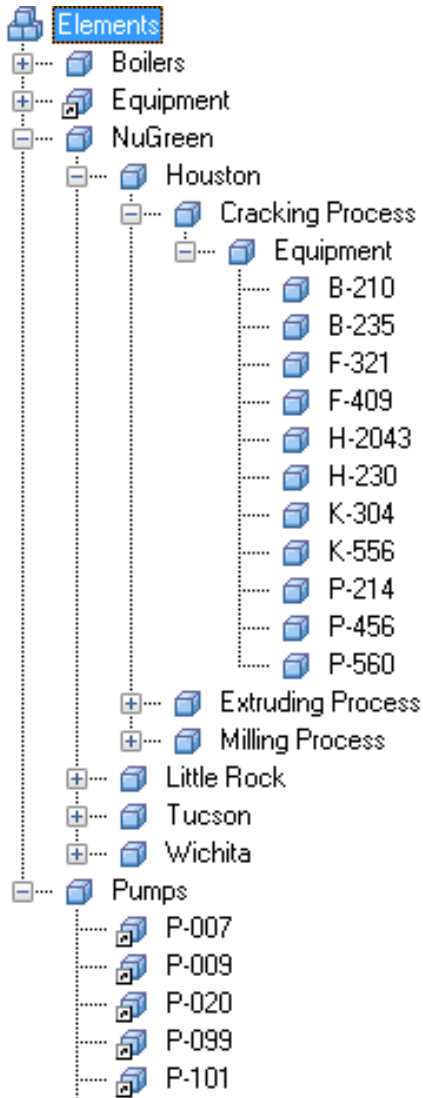


Enterprise Consistency, Alignment, Simplification & Data Transformation



PI Asset Framework (PI AF)

The Foundation for Business to Operations Value



Analyses

- Efficiency analysis
- Key Performance Indicators (KPI)

Time-series

- In-Flow
- Pressure
- Vibration data

Events

- Downtime
- Startup
- Failure

Asset details

- Name
- Model
- Manufacturer

Notifications

- High speed
- Rotor failure
- Low pressure

External data

- Performance curves
- Last maintenance date
- Design documents
- Best operating procedures



Example of PI-AF Templates – Scalability/ Governance

Calculation of Compressor Heat Rate

The screenshot displays the NGT&S - PI System Explorer application. The left sidebar shows a tree view of the library, with the 'HSRA-8T Unit' template selected under 'Element Templates'. The main window shows the 'General' tab for this template, listing various attributes and their descriptions. The 'Unit Actual Heat Rate' attribute is highlighted, and its configuration details are shown on the right.

Library

- NGT&S
 - Categories
 - Templates
 - Element Templates
 - Actual Heat Rate
 - CAT 3616 Unit
 - CB_8V-275-C2 Unit
 - CompressorStation
 - CS_Unit
 - GMWA Unit
 - GMWA_Driver
 - Heat Exchanger
 - HSRA-8T Unit
 - Pipeline Efficiency
 - Regulation Station Effi
 - Solar_Driver
 - TLA-8 Unit
 - TLAD-10 Unit
 - Model Templates
 - Transfer Templates
 - Enumeration Sets
 - Reference Types
 - Tables
 - Compressor Unit Info
 - Fuel Gas Cost
- Elements
- Event Frames
- Library
- Unit of Measure
- MyPI
- Notifications
- Contacts

HSRA-8T Unit

General | Attribute Templates | Ports

Search

Name	Description
BMEP	
HeatRateMargin	
Max Heat Rate	
Mfg Recommended Speed	Mfg Rec Spd
Min Heat Rate	
Name	
Target Heat Rate	
Unit Actual Heat Rate	
Unit BHP	
Unit Discharge Pressure	Unit or Stage 1 Discharge Pressure
Unit Flow Rate	Unit Volume Flow Rate
Unit Fuel	Unit Fuel
Unit HR_Diff_Maintenance	Actual/Target
Unit HR_Diff_Operations	Actual/7500
Unit Pressure Differential	Discharge-Suction Pressure
Unit Speed	Unit Speed
Unit SpeedFactor	
Unit Status	Unit Running or Not
Unit Step	
Unit Suction Pressure	Unit or Stage 1 Suction Pressure
Unit Suction Temperature	Suction Temperature
Unit Temperature - Ambient	Ambient temperature at station or u

Unit Actual Heat Rate Configuration:

Name: Unit Actual Heat Rate

Description:

Configuration Item: ☐ Indexed: ☐

Categories:

UOM: BTU(LHV)/BHP-Hr

Value Type: Double

Default Value: 0 BTU(LHV)/BHP-hr

Data Reference: Formula

Settings...

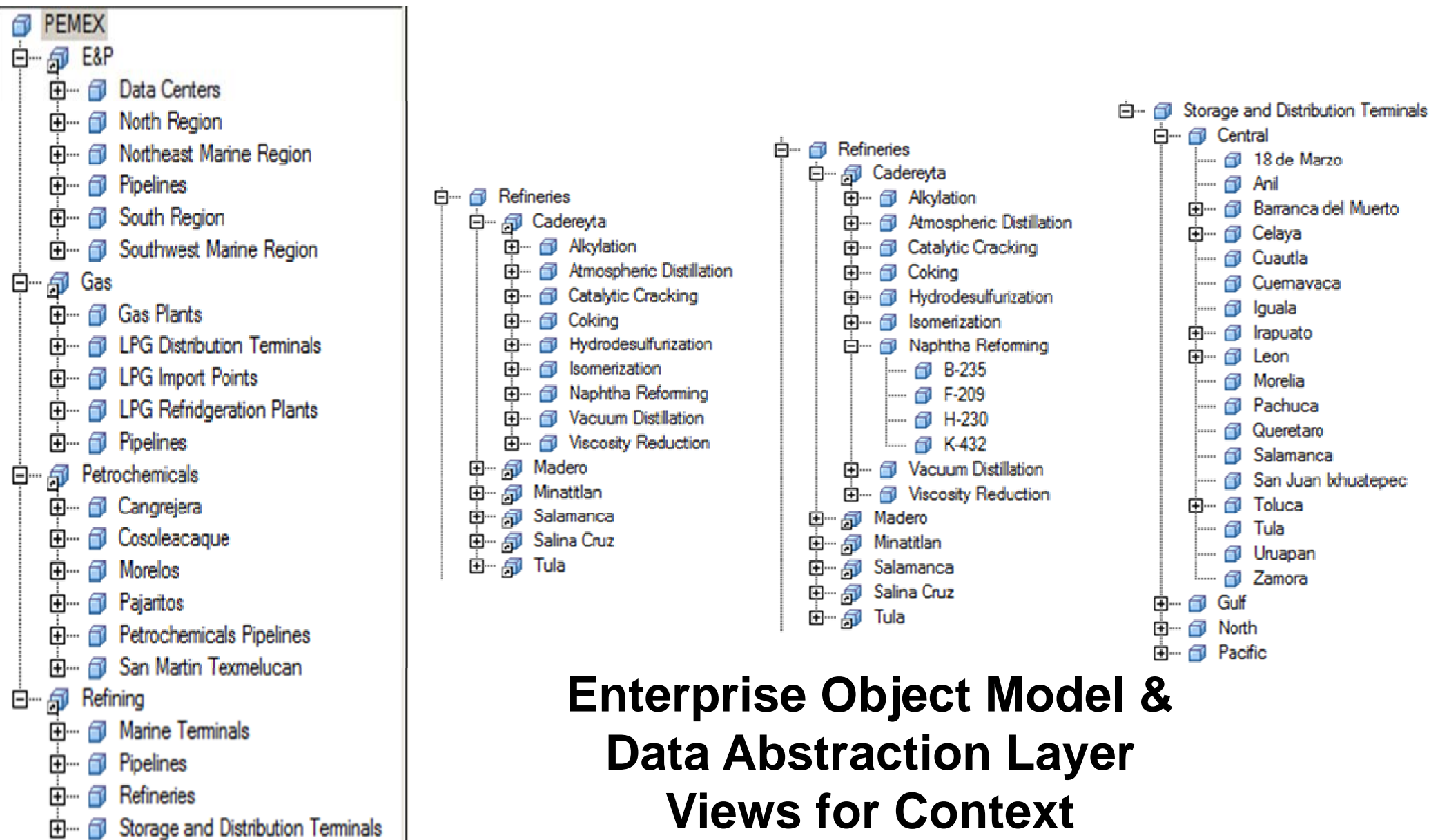
A=Unit BHP;B=Unit Fuel;UOM=MSCF;if A <=50 then 0 else (B*(1000*1030*0.915))/A]

Enterprise Analytics
TRANSFORMING DATA INTO ACTION

HSRA-8T Unit Modified: 7/26/2010 2:39:08 PM. 5ba8135e-7526-4ece-85d2-b11221b28dbc

PI – AF - The Underpinning of Analytics & Visualization

A Journey – started small, evolved over time...scalable

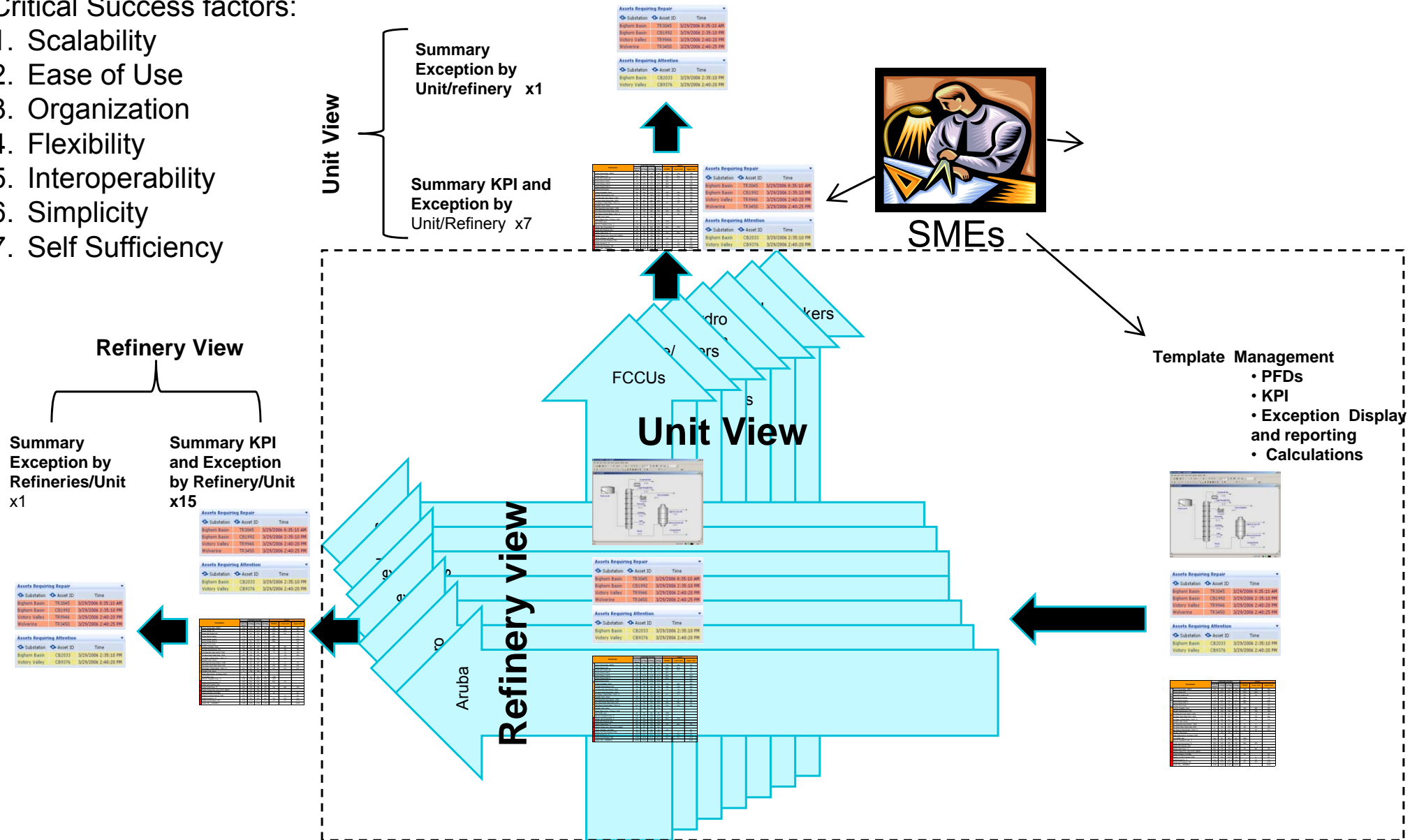


Enterprise Object Model & Data Abstraction Layer Views for Context

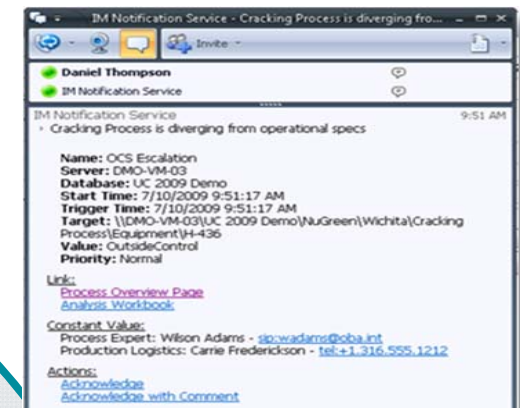
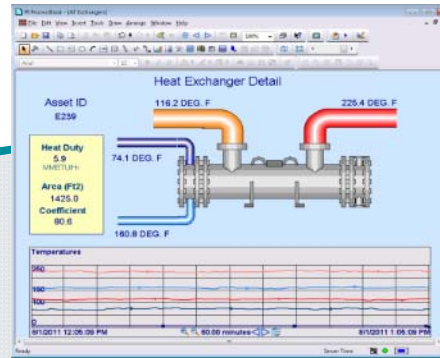
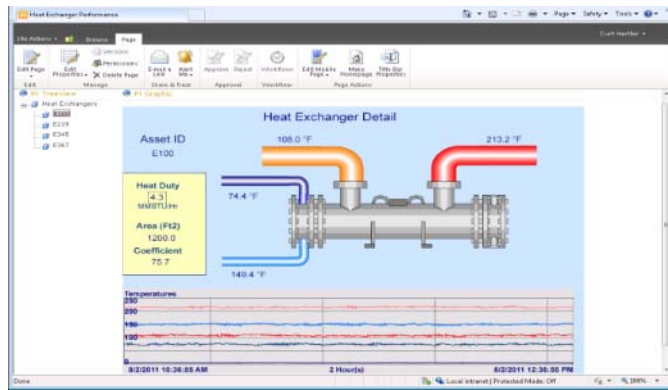
PI AF Views to Pivot the AF Structure – Consistency, Alignment, Simple, & Data Transformation

Critical Success factors:

1. Scalability
2. Ease of Use
3. Organization
4. Flexibility
5. Interoperability
6. Simplicity
7. Self Sufficiency



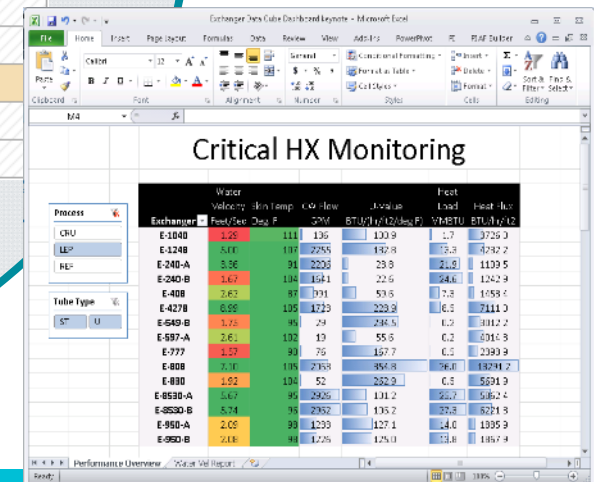
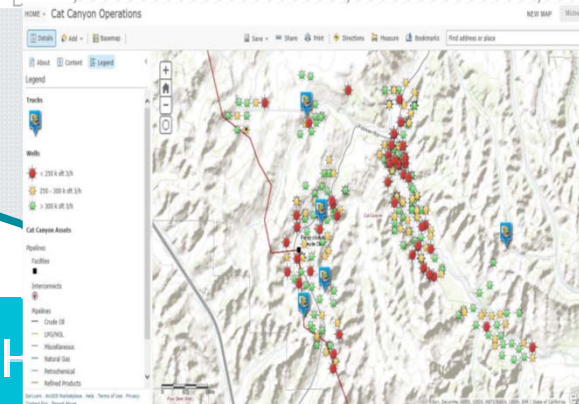
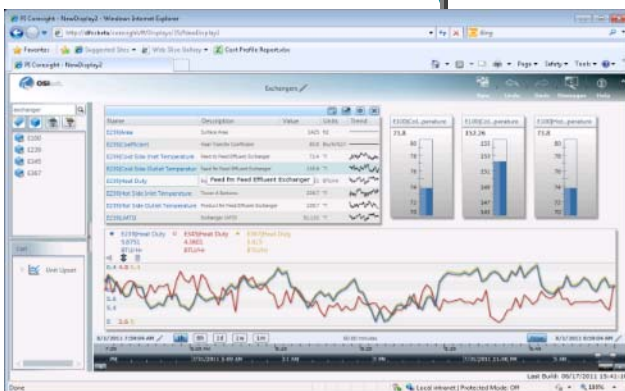
PI AF – Consistency, Simplicity, Scalability, Alignment, and Data Transformation



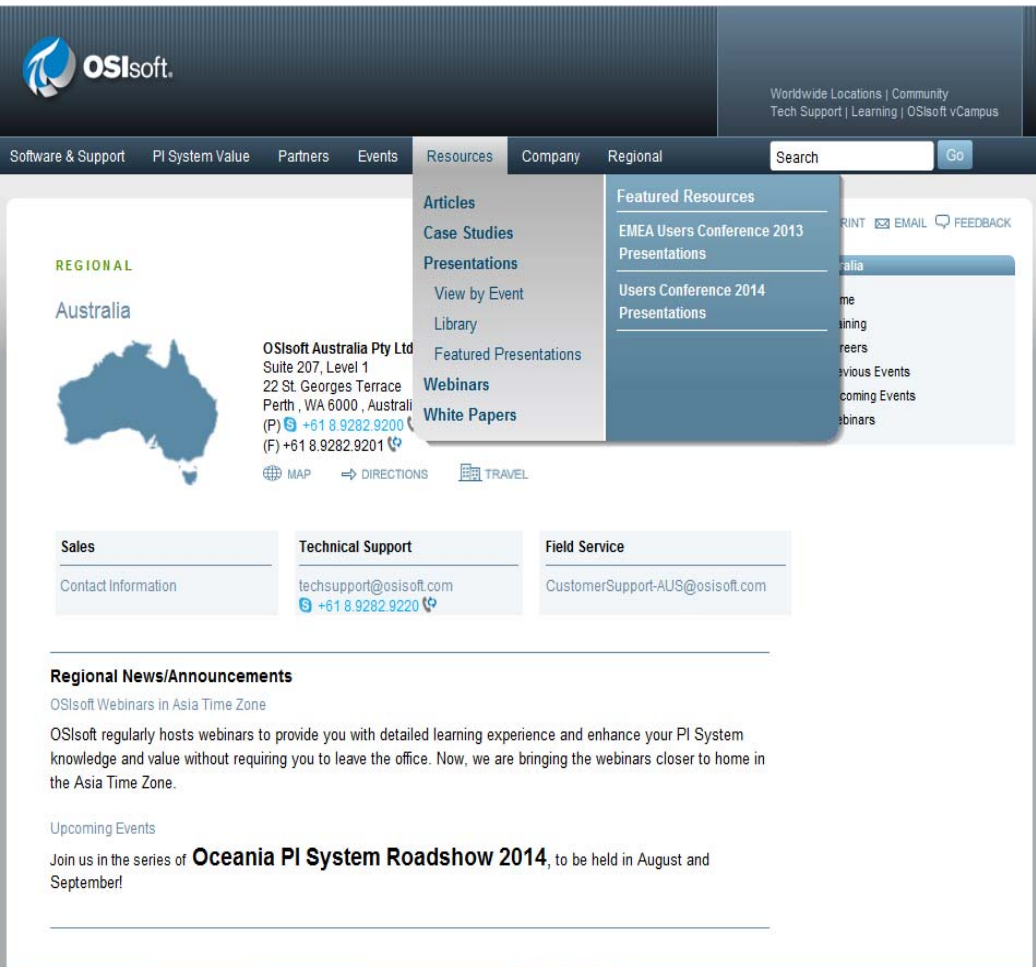
Elements

- E100
- E239
- E345
- E367

Calculation			
Heat Duty	4.52496386846314 B...	BTU per hour	
LMTD	49.8387949209527 °F	degree Fahrenheit	
Performance Limits			
High Heat Duty Limit	6 BTU/Hr	BTU per hour	
Low Heat Duty Limit	4 BTU/Hr	BTU per hour	
PI Data			
Cold Side Inlet Temperature	70.0089721679688 °F	degree Fahrenheit	
Cold Side Outlet Temperature	147.653396606445 °F	degree Fahrenheit	
Hot Side Inlet Temperature	211.52458190918 °F	degree Fahrenheit	
Hot Side Outlet Temperature	108.038589477539 °F	degree Fahrenheit	
Specifications			
Area	1200 ft2	square foot	
Coefficient	75.66 BTU per F ft2 Hr	BTU per F ft2 Hr	



Case Studies on the OSIsoft Website



The screenshot shows the OSIsoft website's Australia regional page. The top navigation bar includes links for Software & Support, PI System Value, Partners, Events, Resources, Company, and Regional. A search bar is located on the right. The Resources dropdown menu is open, displaying options: Articles, Case Studies, Presentations, View by Event, Library, Featured Presentations, Webinars, and White Papers. The Featured Resources section lists the EMEA Users Conference 2013 Presentations and the Users Conference 2014 Presentations. The main content area features a map of Australia and contact information for OSIsoft Australia Pty Ltd, including their address in Perth, WA, and phone numbers. Below this, there are sections for Sales, Technical Support, and Field Service contact information. The Regional News/Announcements section mentions OSIsoft Webinars in Asia Time Zone and an upcoming Oceania PI System Roadshow 2014.

OSIsoft

Worldwide Locations | Community
Tech Support | Learning | OSIsoft vCampus

Software & Support PI System Value Partners Events Resources Company Regional Search Go

REGIONAL

Australia

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(F) +61 8.9282.9201

MAP DIRECTIONS TRAVEL

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Contact Information

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techsupport@osisoft.com
+61 8.9282.9220

Field Service
CustomerSupport-AUS@osisoft.com

Regional News/Announcements

OSIsoft Webinars in Asia Time Zone

OSIsoft regularly hosts webinars to provide you with detailed learning experience and enhance your PI System knowledge and value without requiring you to leave the office. Now, we are bringing the webinars closer to home in the Asia Time Zone.

Upcoming Events

Join us in the series of **Oceania PI System Roadshow 2014**, to be held in August and September!



This screenshot is similar to the first one, showing the OSIsoft website's Australia regional page. The top navigation bar and search bar are identical. The Resources dropdown menu is open, showing the same options as the first screenshot. The Featured Resources section lists the EMEA Users Conference 2013 Presentations and the Users Conference 2014 Presentations. The main content area features a map of Australia and contact information for OSIsoft Australia Pty Ltd, including their address in Perth, WA, and phone numbers. Below this, there are sections for Sales, Technical Support, and Field Service contact information. The Regional News/Announcements section mentions OSIsoft Webinars in Asia Time Zone and an upcoming Oceania PI System Roadshow 2014.

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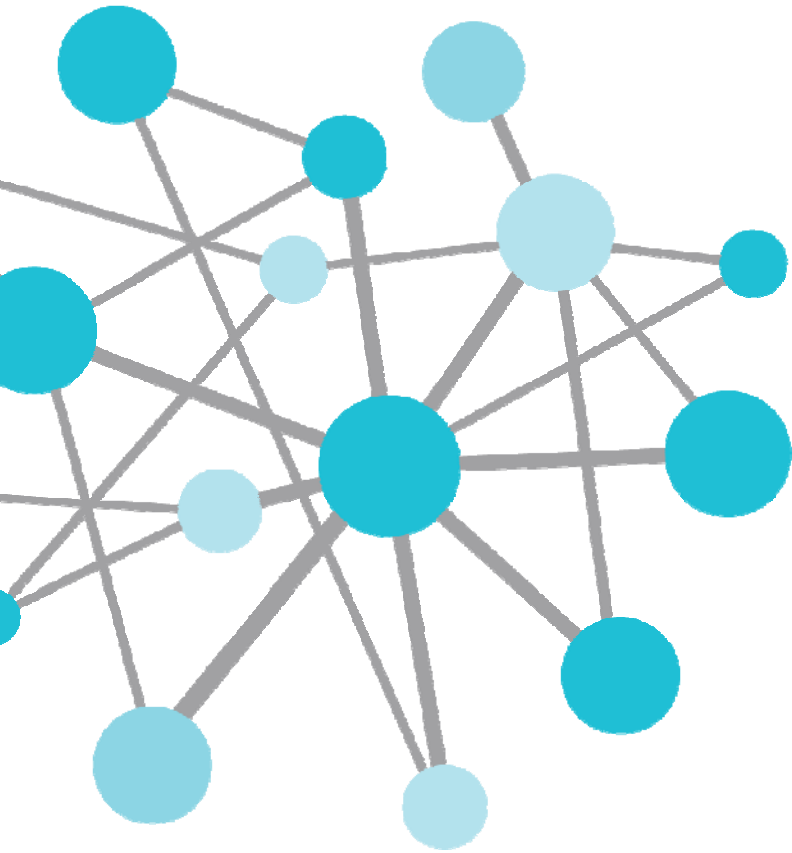
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Illustrative Case Study – Chevron GOM

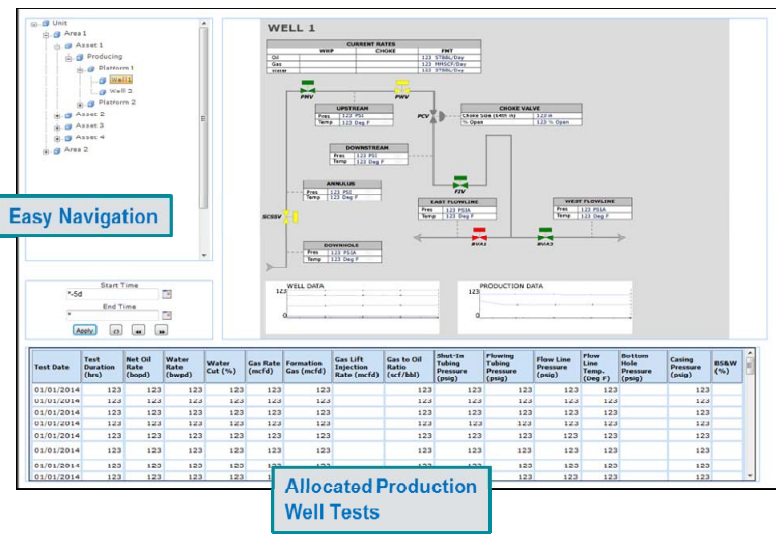
Data Consistency and Context
Organizational Alignment
Applications/Solutions Simplicity
Data Transformation Methodology

Data Consistency and Context

“The PI System infrastructure is fundamental to our E&P data governance and workflow. The PI System and in particular PI AF, underpins our analytics and visualization by providing asset based, normalized, and structured operational data including associated meta-data. The PI System as an enterprise data infrastructure “future proofs” our investment in our applications & solutions”



UC2014



E&P Automation Analyst

Business Challenge

- Data issues from E&P assets
- Legacy custom applications not scalable or maintainable
- No std tagging across E&P
- Data issues from DCS/SCADA
- No infrastructure for FOF vision

Solution

- Evolve and expand PI System leveraging unlimited access
- **Used PI AF to normalize and structure E&P data & information**
- Developed new E&P workflow, analytics, and visualization

Results and Benefits

- **Asset based** access and propagation of E&P data and information
- Enabled a **“best of breed”** approach to analytics and visualization tools
- **Significantly improved analytics, visualization, collaboration & Integration**

Gulf of Mexico Business Unit (GOM) Who we are...

■ Overview

- Largest leaseholder in the Gulf of Mexico
- Over 500 structures
- Onshore facilities in Louisiana and Alabama
- Main headquarters in Covington, LA
- 6 shore bases

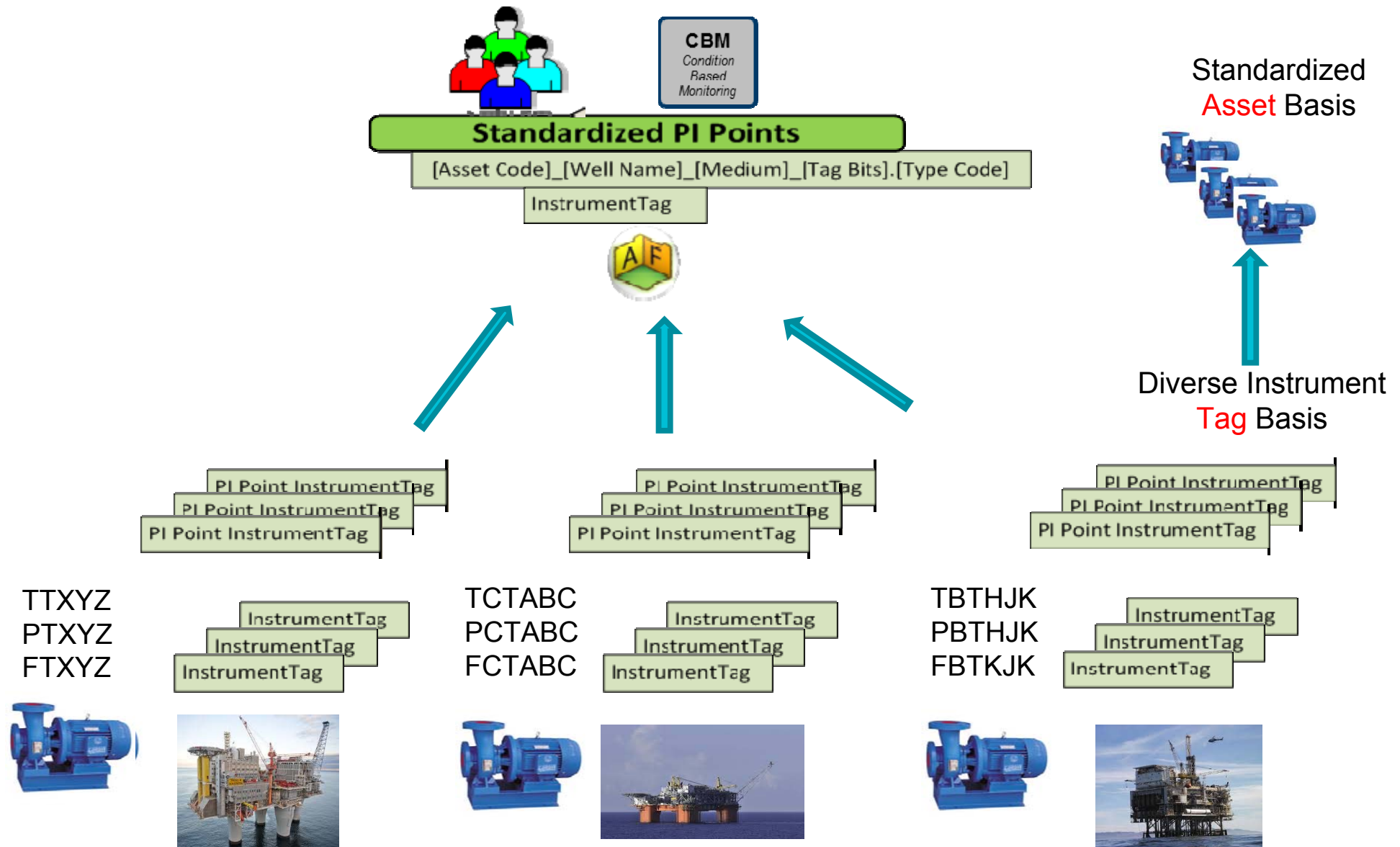
■ Process Control Network Overview

- Over 600 PCN servers, workstations & support machines
- Over 650 Control Systems
- Over 30 PCN Applications and 170 Utilities
- 25 historical databases
- 7 Firewalls, 150 routers and switches, 220 wireless radios



Abstracting the Tag/Naming with PI AF

Diversity in Tag Names to Standardized Asset Naming

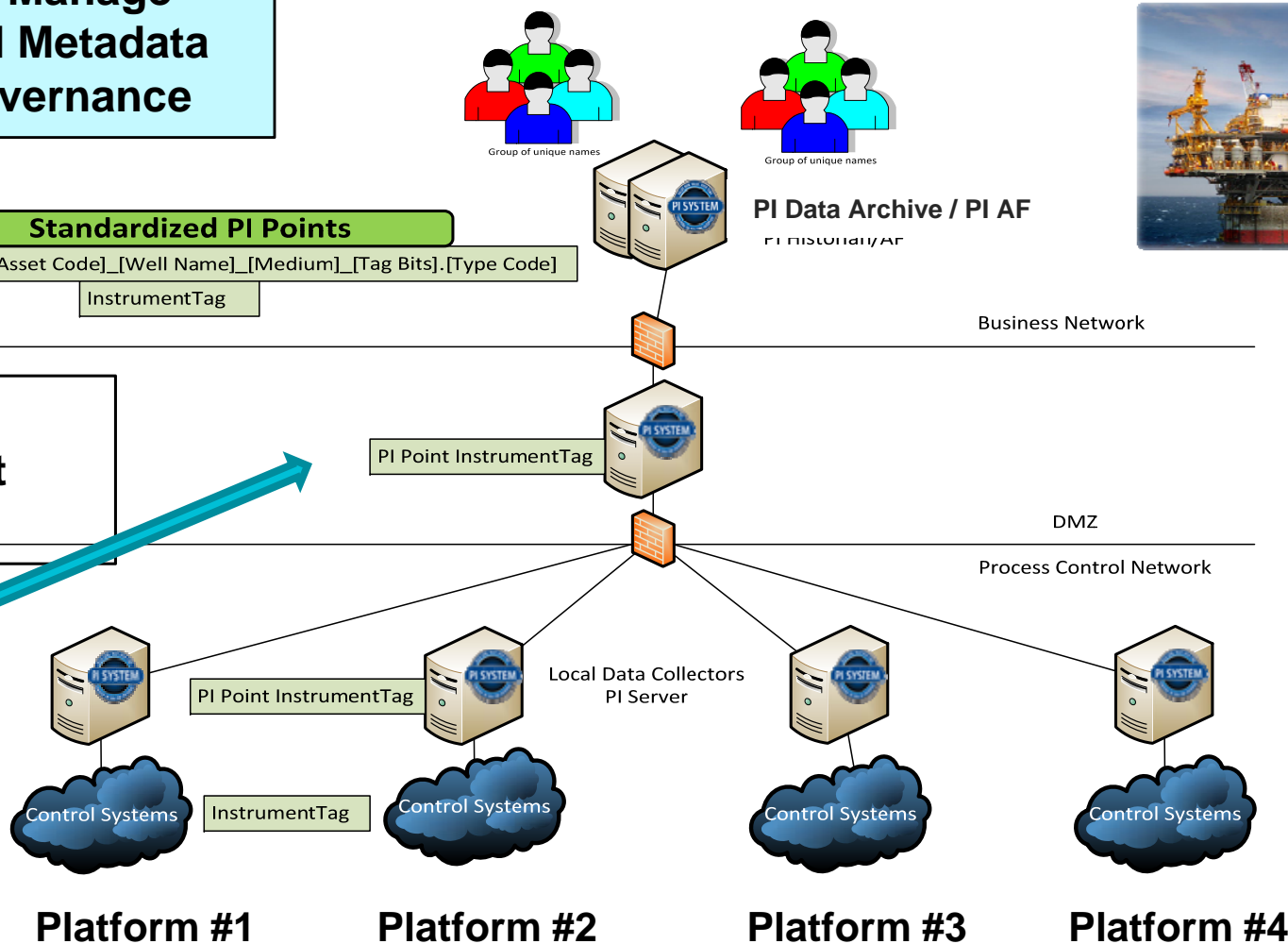


Chevron GOM PI System Infrastructure

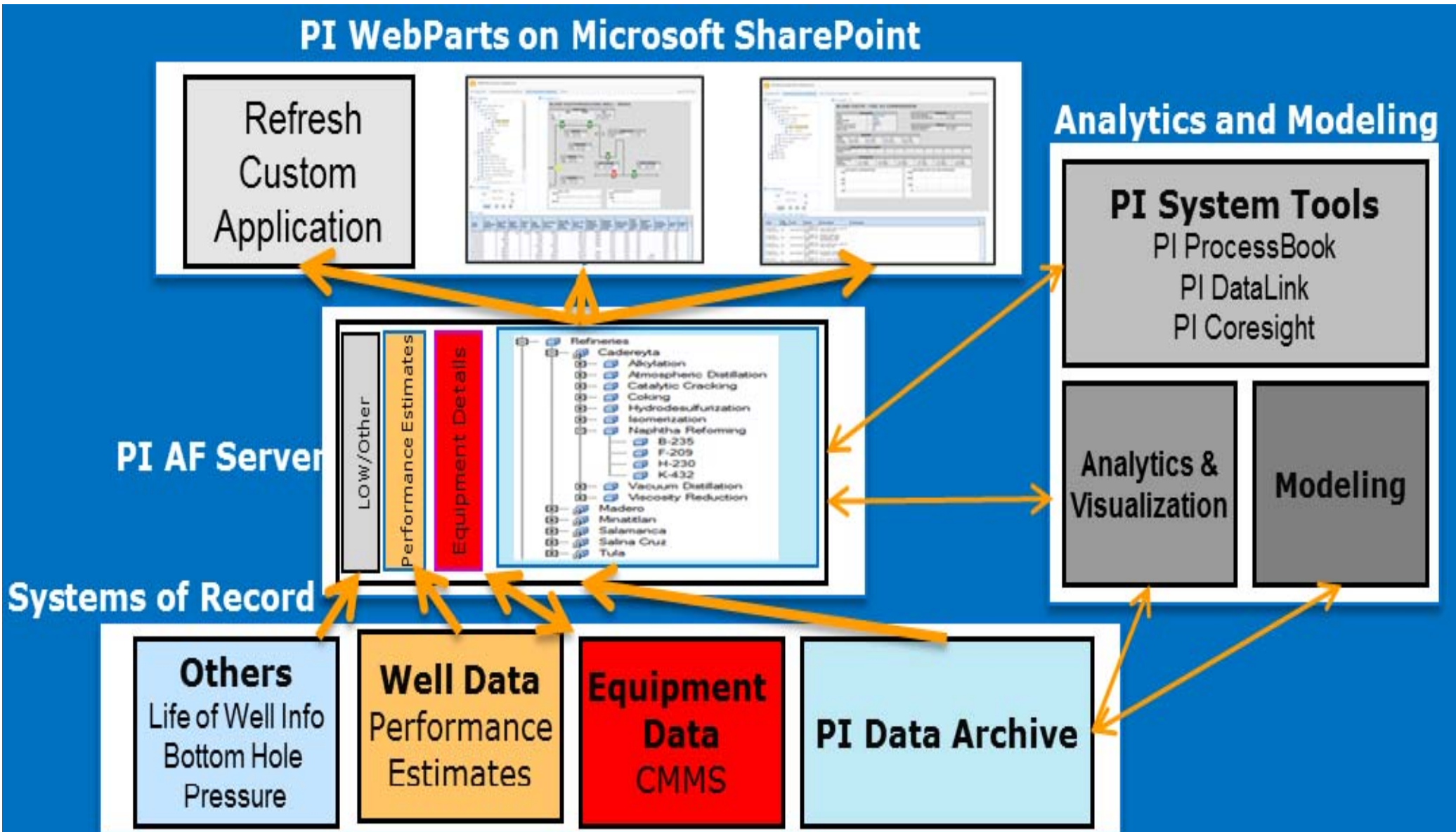
Using PI AF as a Data Abstraction Layer & Alias Feature to Manage Tagging and Metadata Naming Governance

GOM Standard Tags and Asset Naming

Retention of Original Tag and Asset Naming as Required for MOC

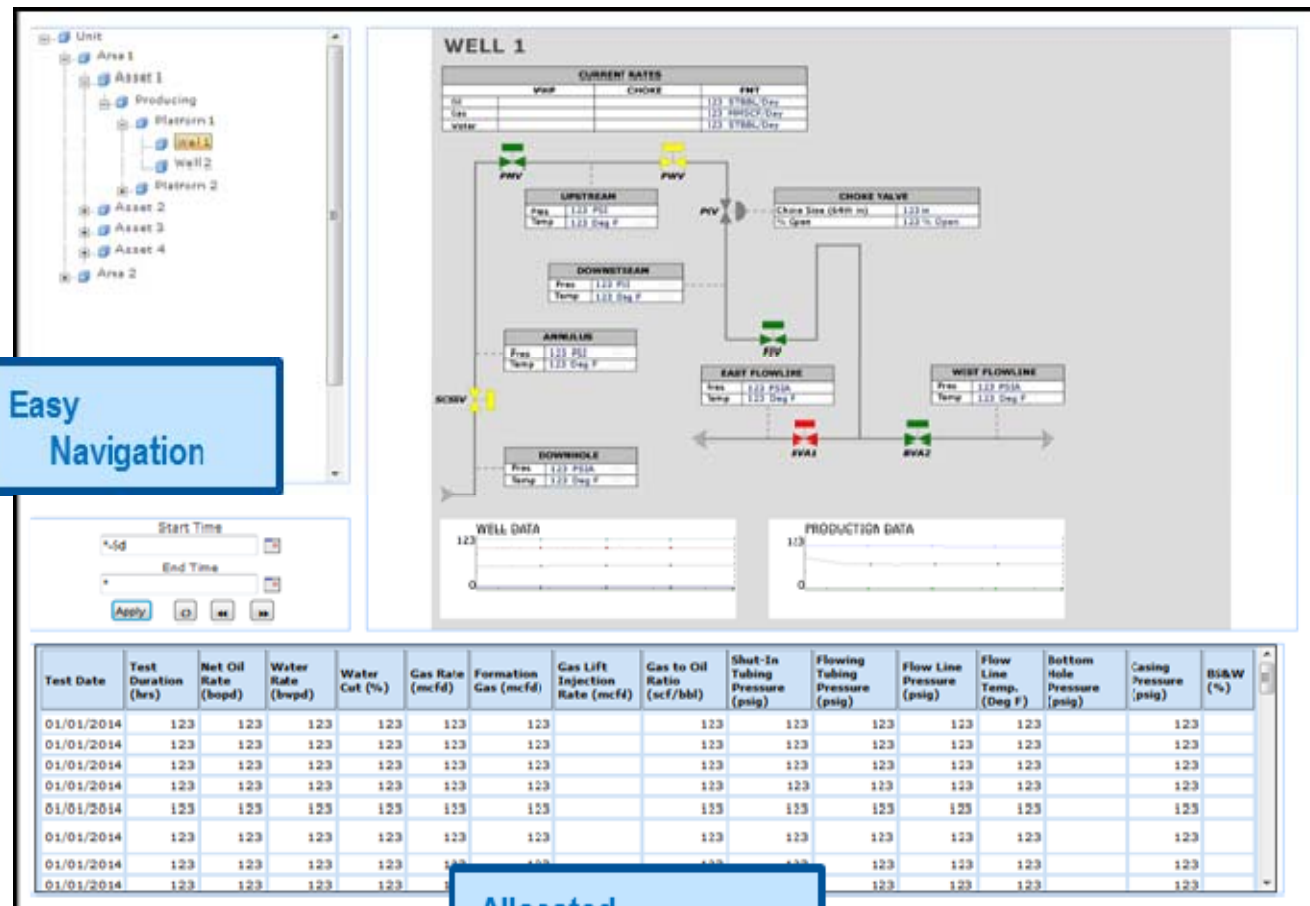


Chevron – GOM PI System Data Infrastructure



Chevron – Gulf of Mexico Business Unit

Integrating Key Well Data with the PI System



Project Benefits

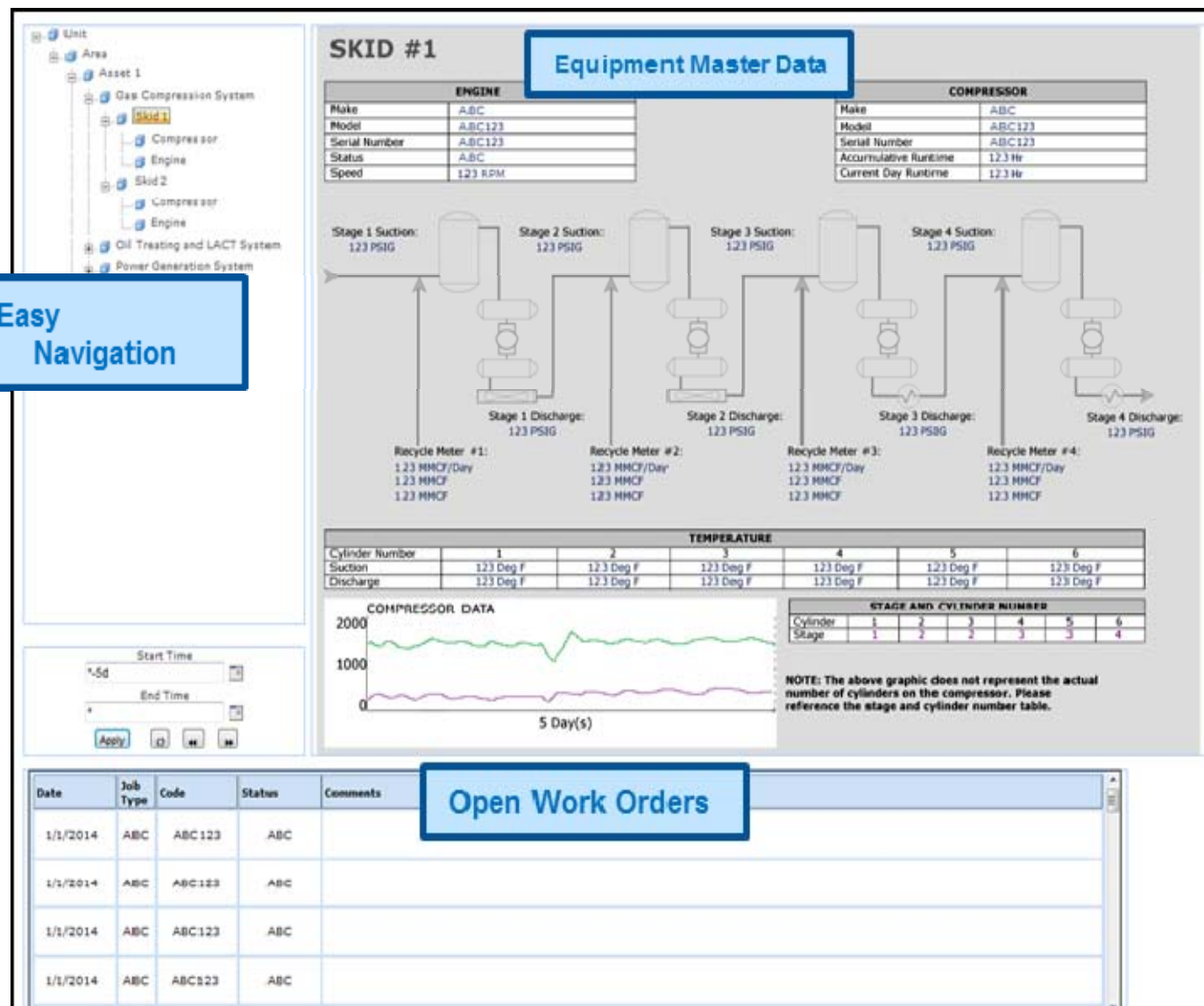
- Consistent, Reliable Real-time Data
- Standard Tags
- **Graphic Templates**
- Easy Navigation
- Allocated Production
- **Well Tests**
- Sustainable Support Model

Deployed Well Statistics

- **Over 700 Wells**

Chevron – Gulf of Mexico Business Unit

Integrating Key Equipment with the PI System



Project Benefits

Consistent, Reliable
Real-time Data
Standard Tags

Std. Graphic Templates
Std. Calculations/Analytics

Easy Navigation

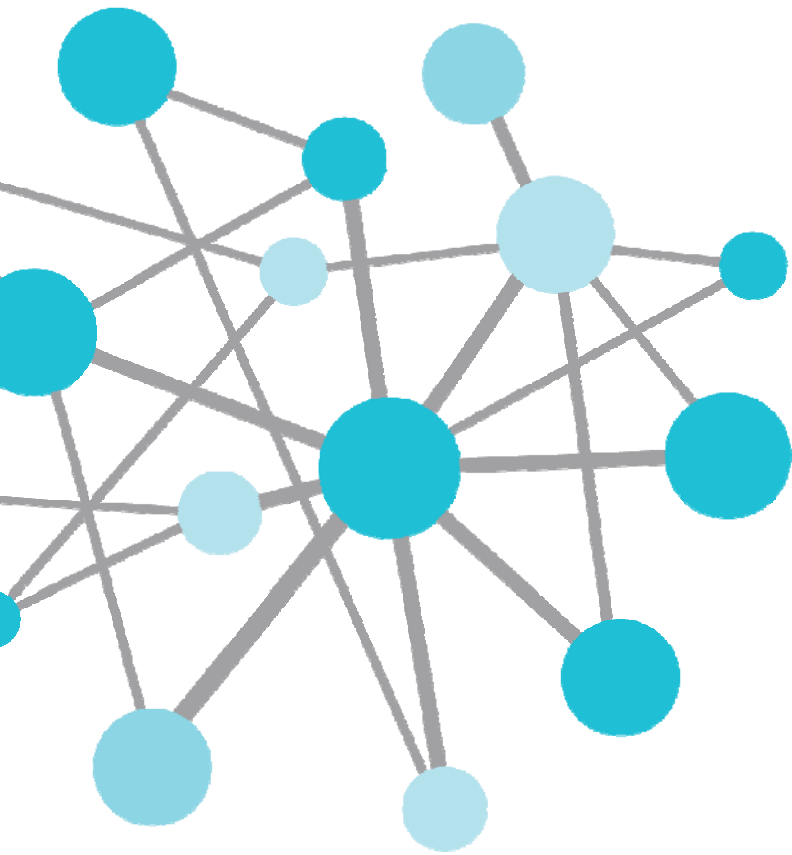
Equipment Master Data

Open Work Orders

Sustainable Support Model

Deployed Equipment Statistics

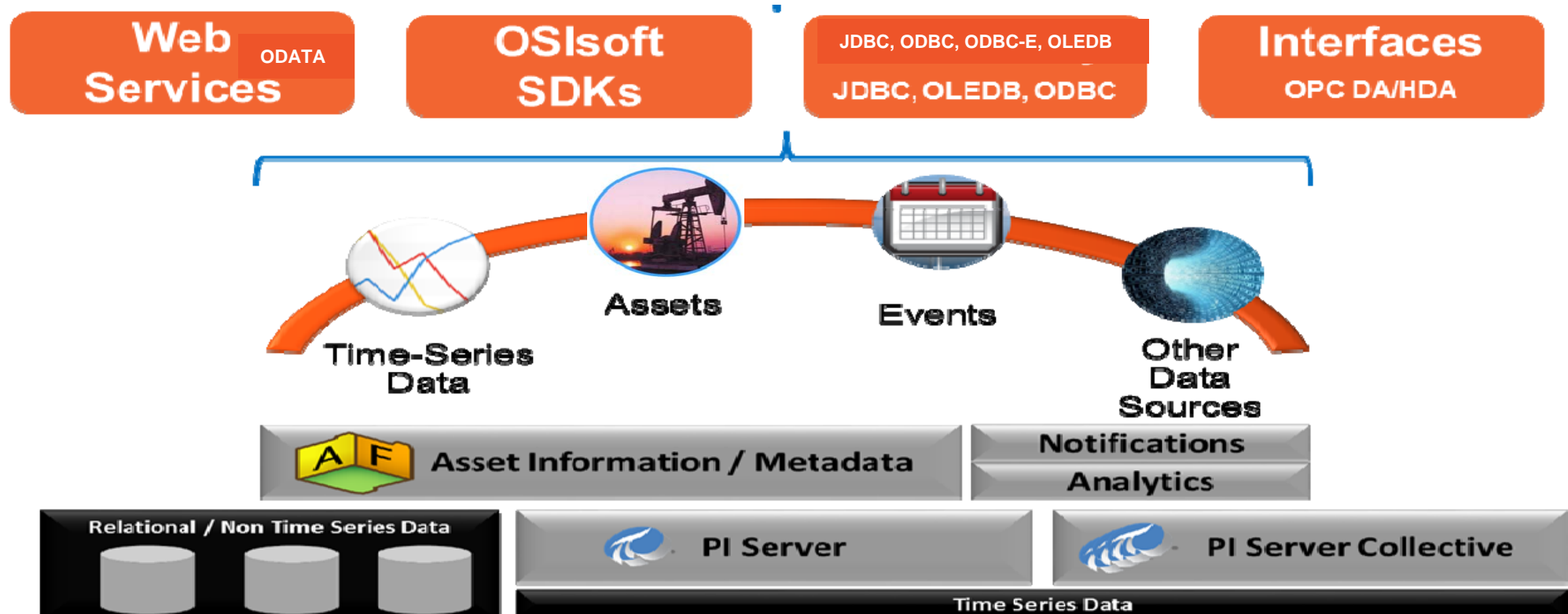
- Over 180 Compressors, Pumps, Generators**



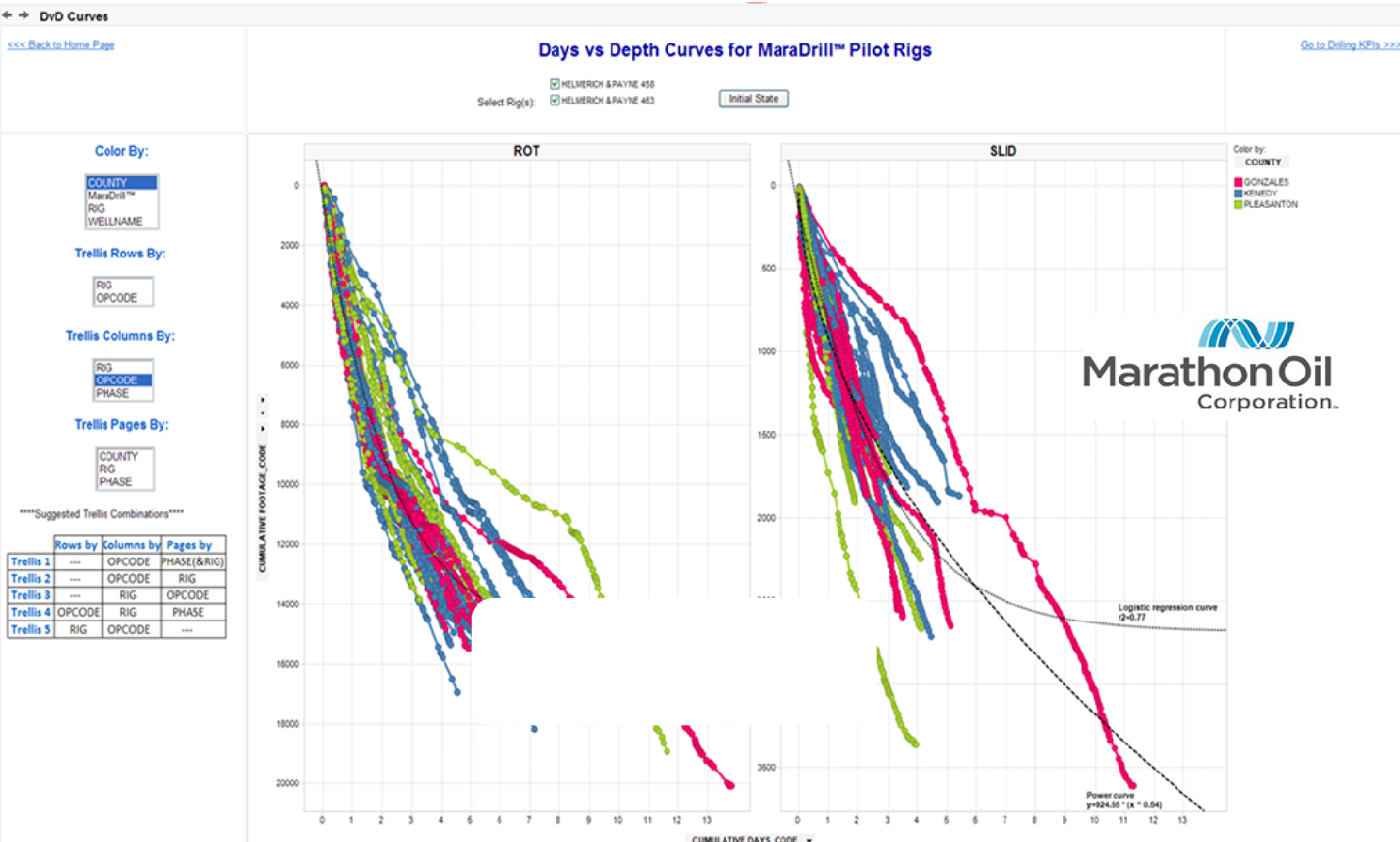
Illustrative Case Study – Marathon Oil

Data Consistency and Context
Organizational Alignment
Applications/Solutions Simplicity
Data Transformation Methodology

Integration of 3rd Party Analytics and Visualization Capability – Infrastructure Enabled “Best of Breed”

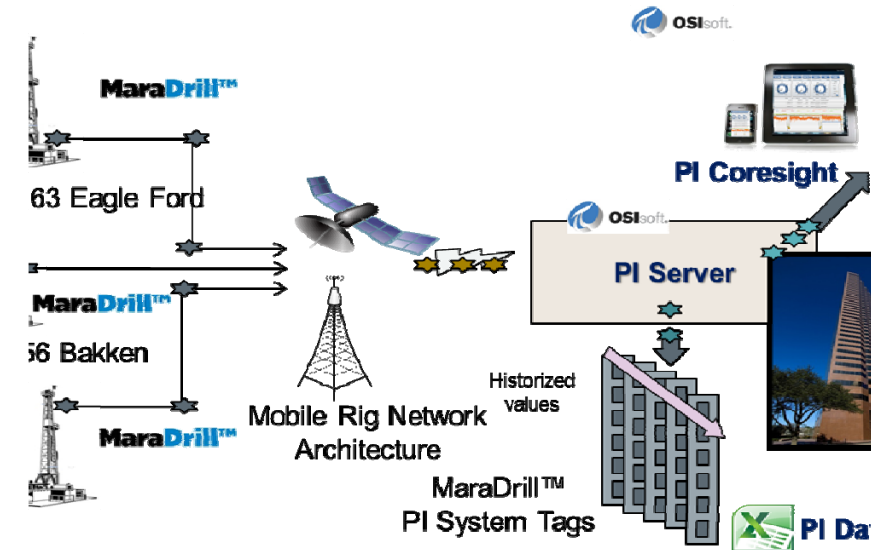
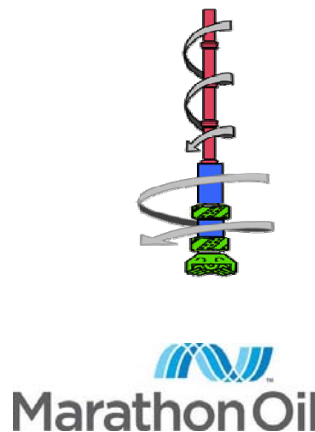
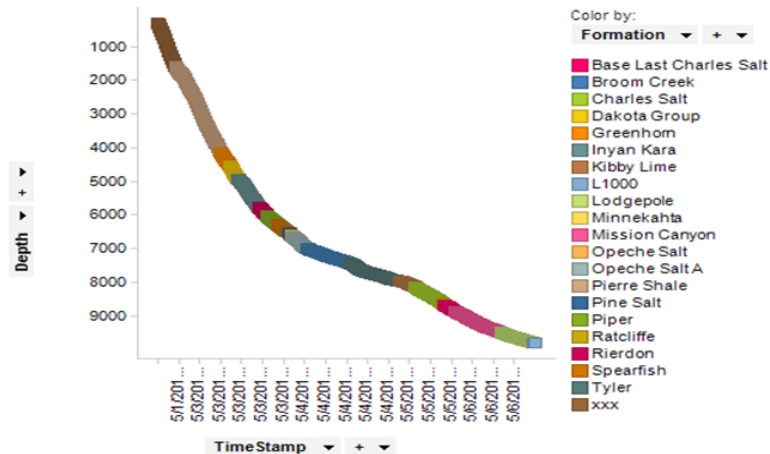


PI System/PI AF - The Foundation for Dashboards and Workflow Integration and Business to Operations Value



Real-Time Drilling Optimization Reduces Drilling Time and Associated Resources Usage

Days vs Depth



Business Challenge

- Drilling time and capital well cost savings including reduction in resources
- Reduced vibration and damage to downhole tools
- Continuous optimization onsite & retrospective post-well analysis

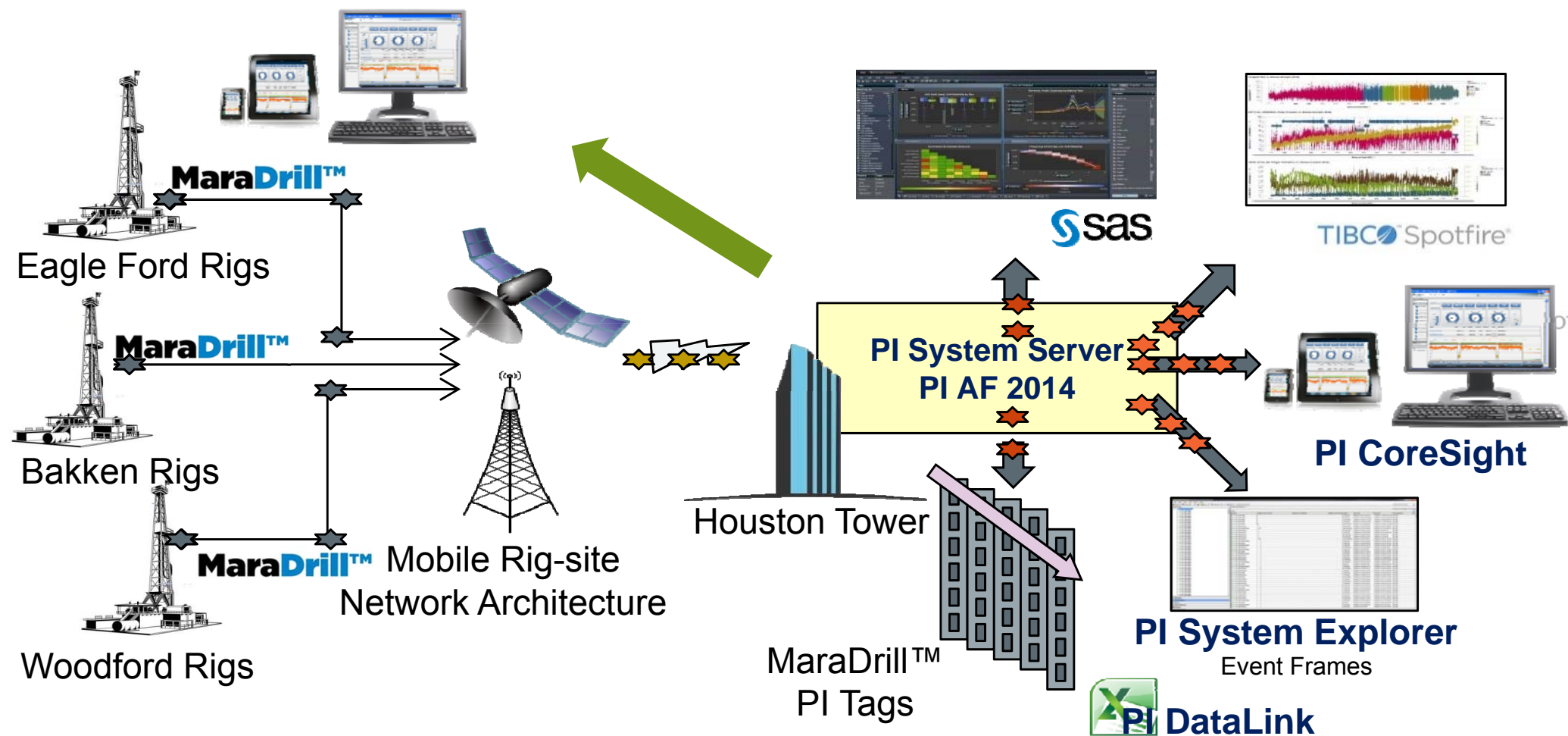
Solution

- Installation of the PI System real-time integration and applications infrastructure
- Creation of drilling process high fidelity real-time analytics and visualization capabilities at the drill site

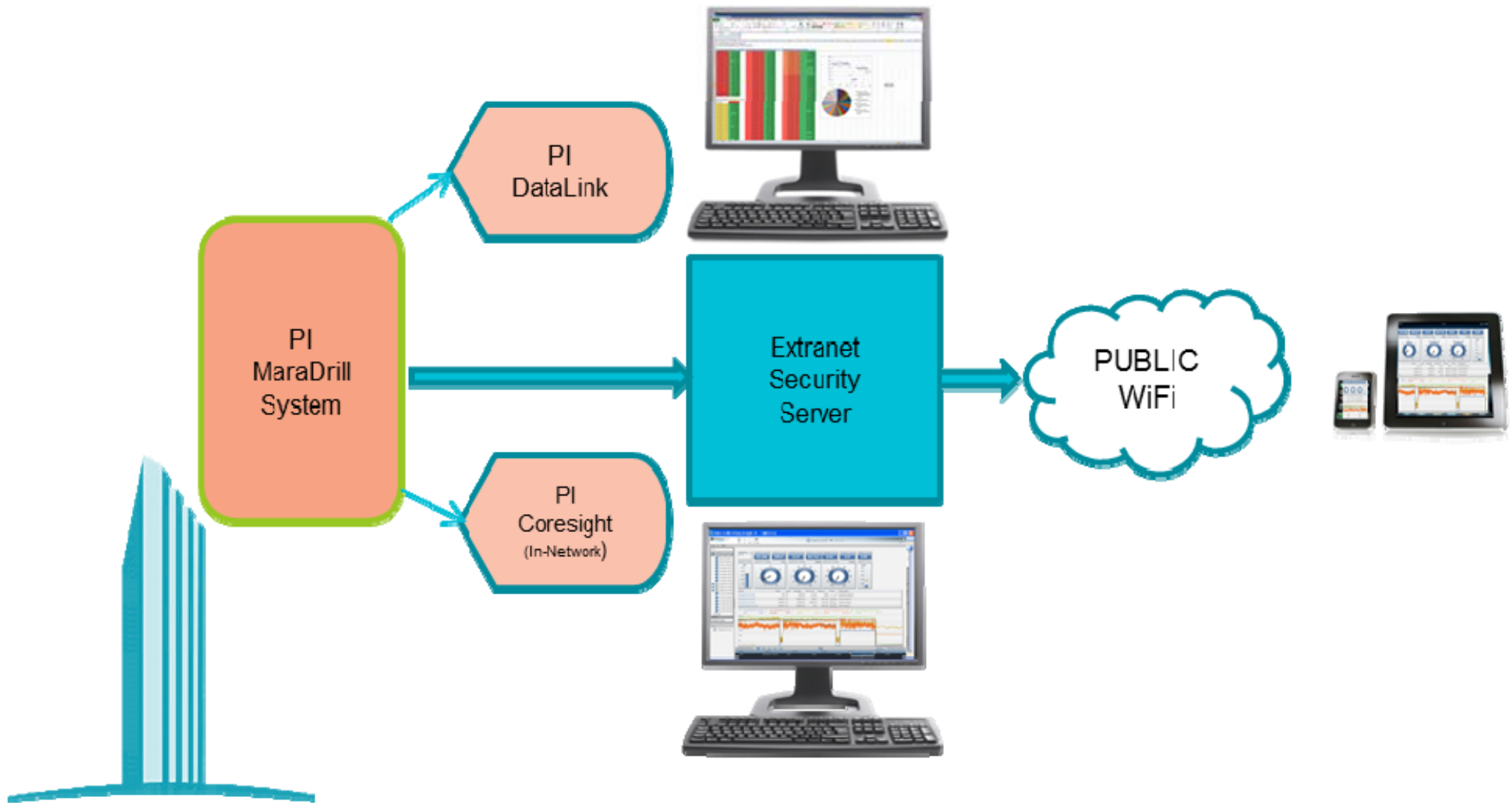
Results and Benefits

- Drilling time and capital well cost savings including reduction in resources
- Reduced vibration and damage to downhole tools
- Continuous optimization onsite and retrospective post-well analysis

Business to Operations Value – real-time Drill Site Guidance



PI System Visualization- Consistency



PI Coresight – Stick-Slip Identification- Eagle Ford Rig

Eagle Ford Rig



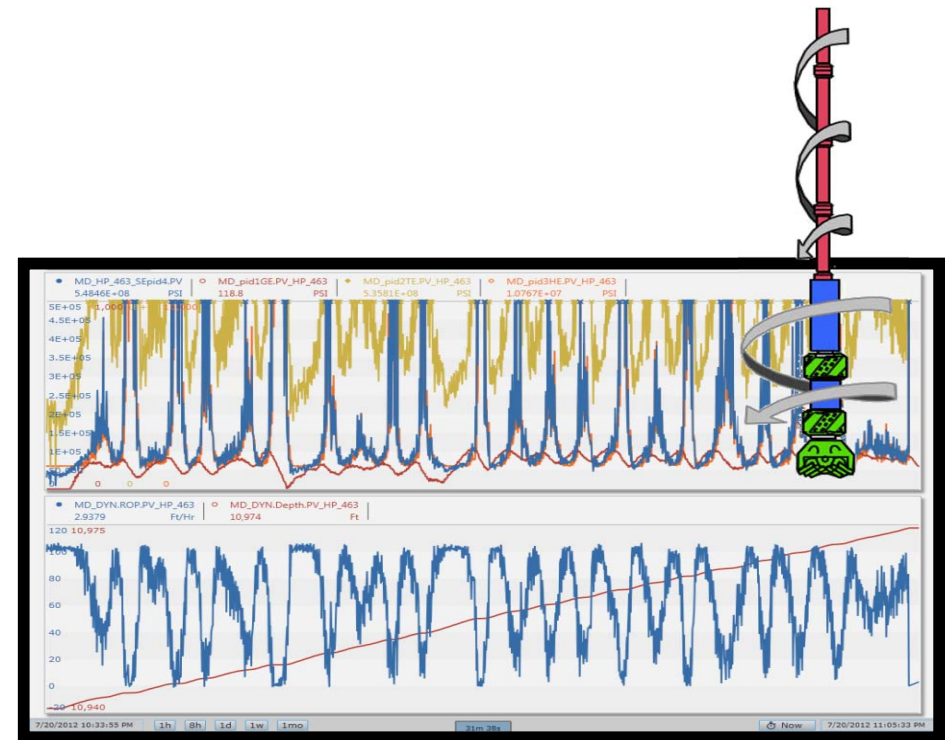
“Perfect” drilling

Stick-slip: Non-uniform rotation of the bit/BHA

Sticking phase → bit stops

Slipping phase → bit “breaks” free

Drillstring torsional oscillations



Stick-slip

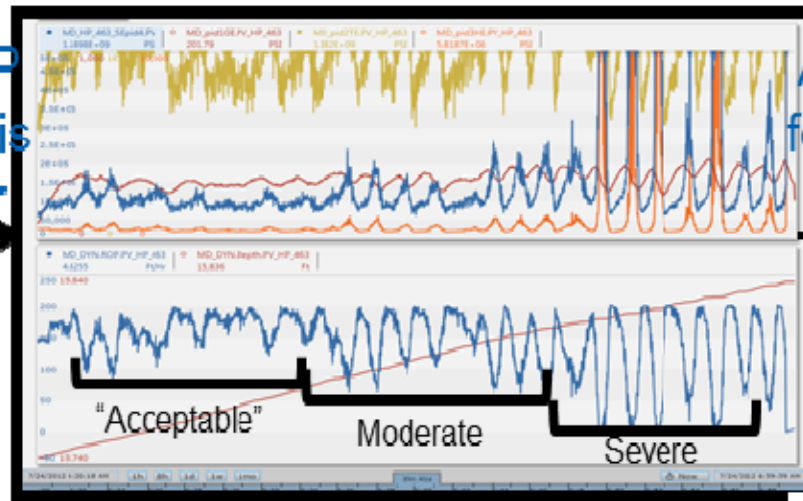
Real-Time Optimization PI Coresight



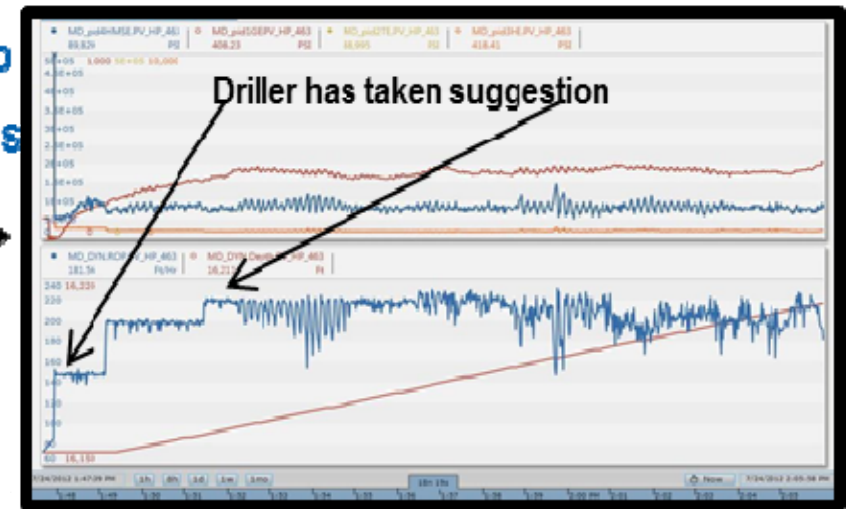
Stick-Slip Identification ...few stands later... Stick-Slip Mitigation

40% Sustained Increase in Rate of Penetration

Avg. ROP
for stand is
144 ft/hr



Avg. ROP
for stand is
201 ft/hr



PI Coresight View with XML Data Export

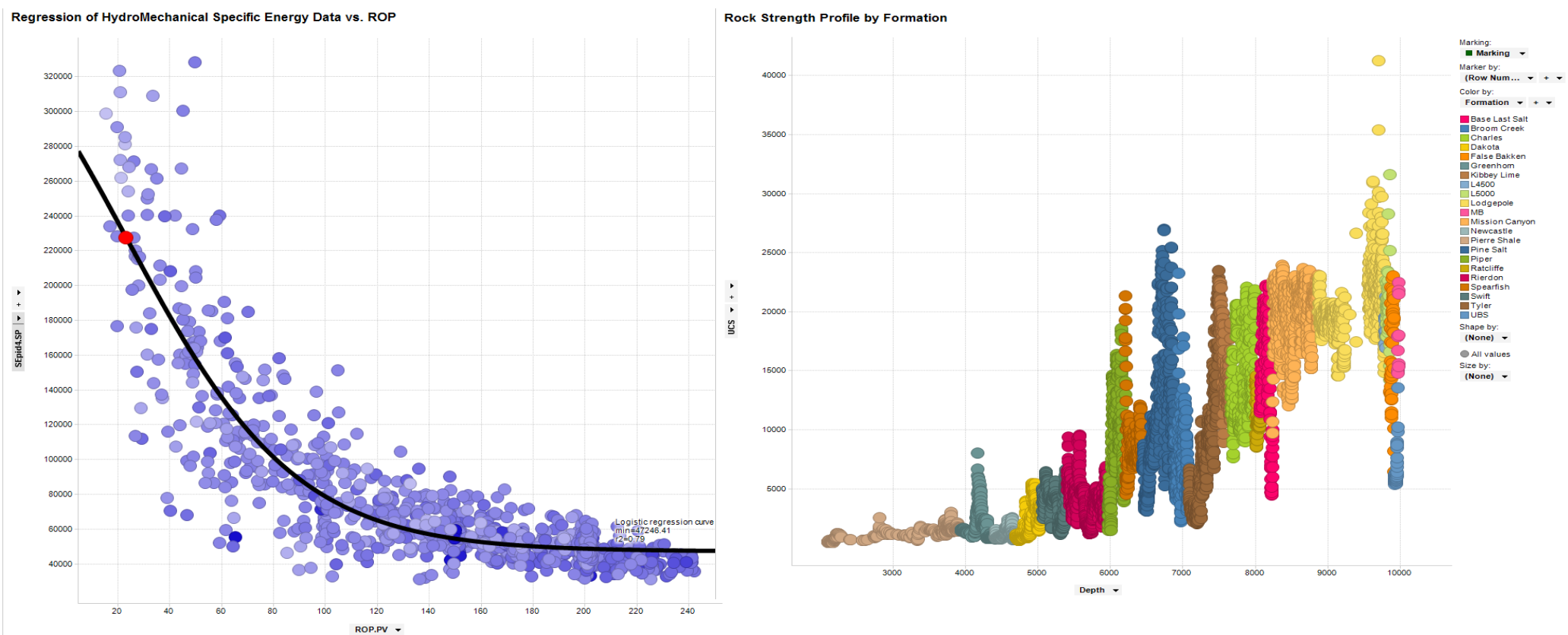


Enables Integration with WellView data

Enables Integration with Spotfire visualization

Post-Well Science Using MaraDrill™ Data in SpotFire

Modeling the rock strength & predicting ROP's on subsequent wells in the area to improve logistics and planning

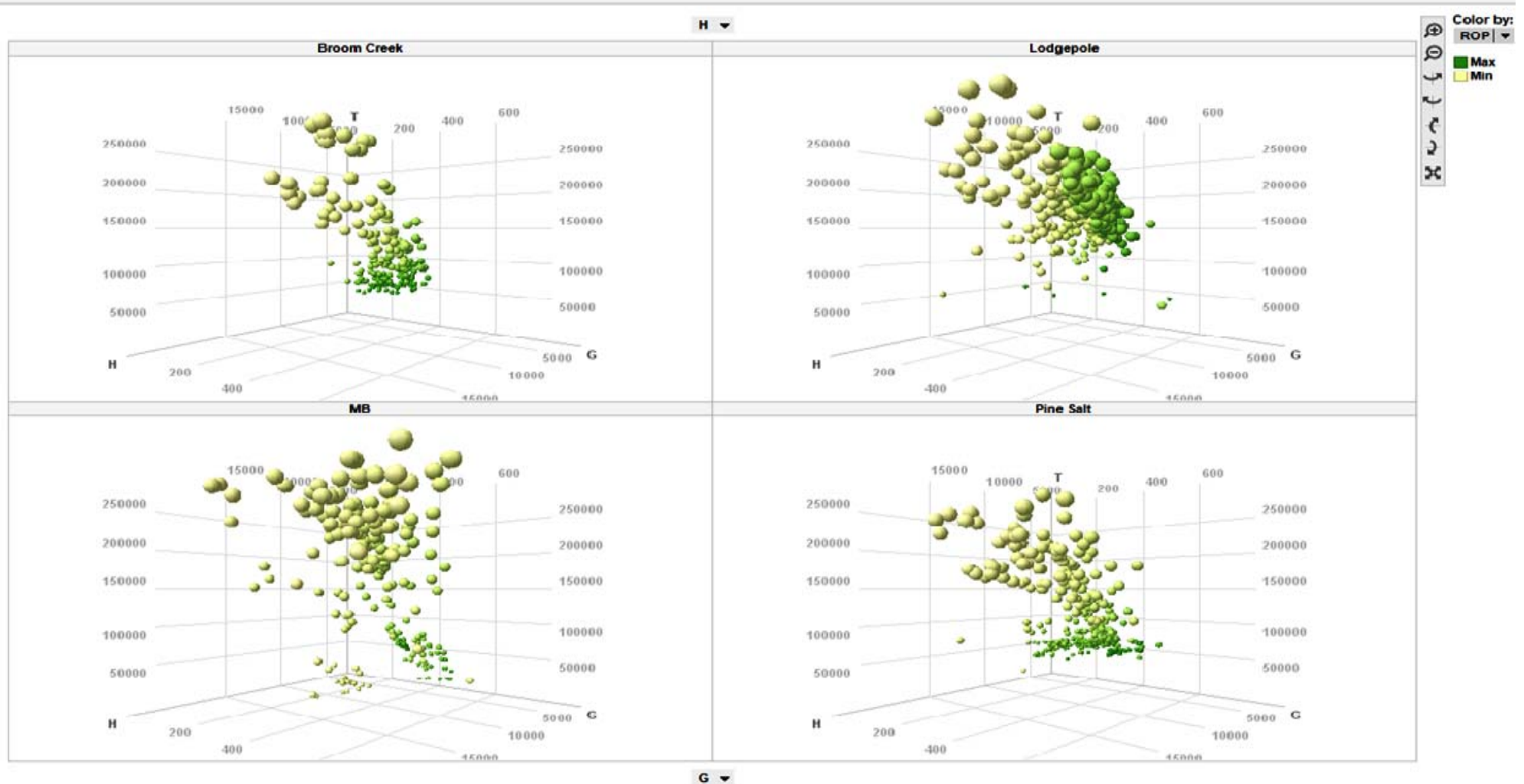


Post-Well Science Using MaraDrill™ Data

Formation Sweet-Spot Analysis

3D Scatter Plot: G vs T vs H

Sweet-Spot Analysis: Greener = Faster, Smaller = more efficient



Extending to PI AF and PI EF to Completions

Drilling Rig 1



AF Element

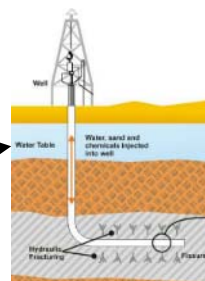
UD_RigT1

General | Attribute Templates | Parts | Analysis Templates

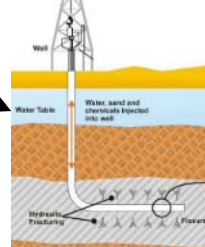
UD_RigT1

Name	Description	Default Value
APP_sigsuite	Sig Suite	
APPs_MaskNumber	Mask Number	
APPs_SplitName	Split Name	
CH_LinkEventTrigger		
CH_AccEventTrigger		
CH_SlidingEventTrigger		
CH_OrthoEventTrigger		
CH_RotDepth	Rot Depth	0 ft
CH_RotDepth	Depth	0 ft
CH_RotPressure	Rot Pressure	0 psi
CH_RotPressure	Rot Pressure	0 ft
CH_RotLoad	Rot Load	0 lb
CH_Rot	Rot	0 ft/s
CH_Rot	Rot	0 psi
CH_StandPipePressure	Stand Pipe Pres.	0 psi
CH_TORQUE	Torque	0 lbf ft
CH_VIB	VIB	0 lb
CH_Velocity	Angular Velocity	0 ft/s
CH_VIB	Hydraulic VIB	0 ft
CH_VIB	VIB	0 ft/s

Well 1



Well 2

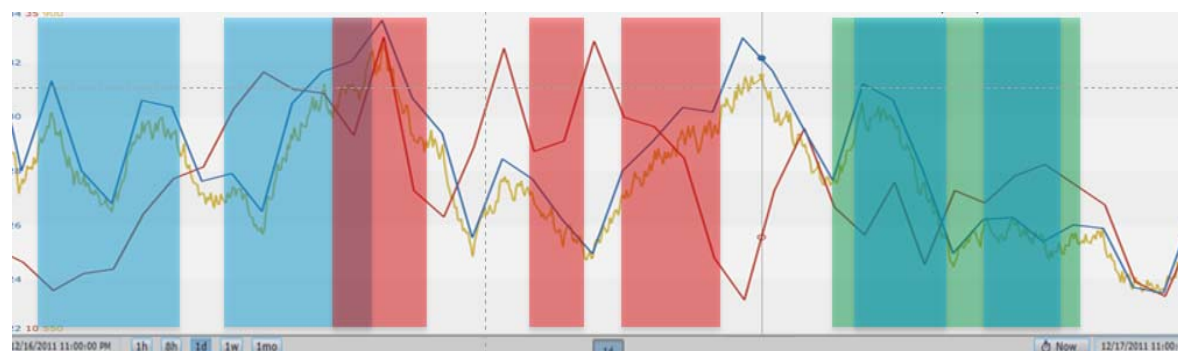


Event Frames

Event	Location	Start Time	End Time	Start Date	End Date
Well 1		24:11:41:12		4/1/2014 2:00:00 AM	4/25/2014 1:41:12 PM
Sliding		0:19:00		4/1/2014 2:40:00 PM	4/1/2014 2:59:00 PM
Rotary ...		4:40:38		4/1/2014 3:33:45 PM	4/1/2014 8:14:23 PM
Sliding		0:28:30		4/1/2014 5:23:04 PM	4/1/2014 5:51:34 PM
Stick-Slip		0:03:30		4/2/2014 5:59:00 AM	4/2/2014 6:02:30 AM
Sliding		0:20:33		4/3/2014 3:42:00 AM	4/3/2014 4:02:33 AM
Rotary ...		8:10:26		4/4/2014 1:33:23 AM	4/4/2014 9:43:49 AM
Stick-Slip		0:00:51		4/5/2014 3:33:45 PM	4/5/2014 3:34:36 PM
Sliding		0:22:01		4/12/2014 10:41:10 AM	4/12/2014 11:03:11 AM

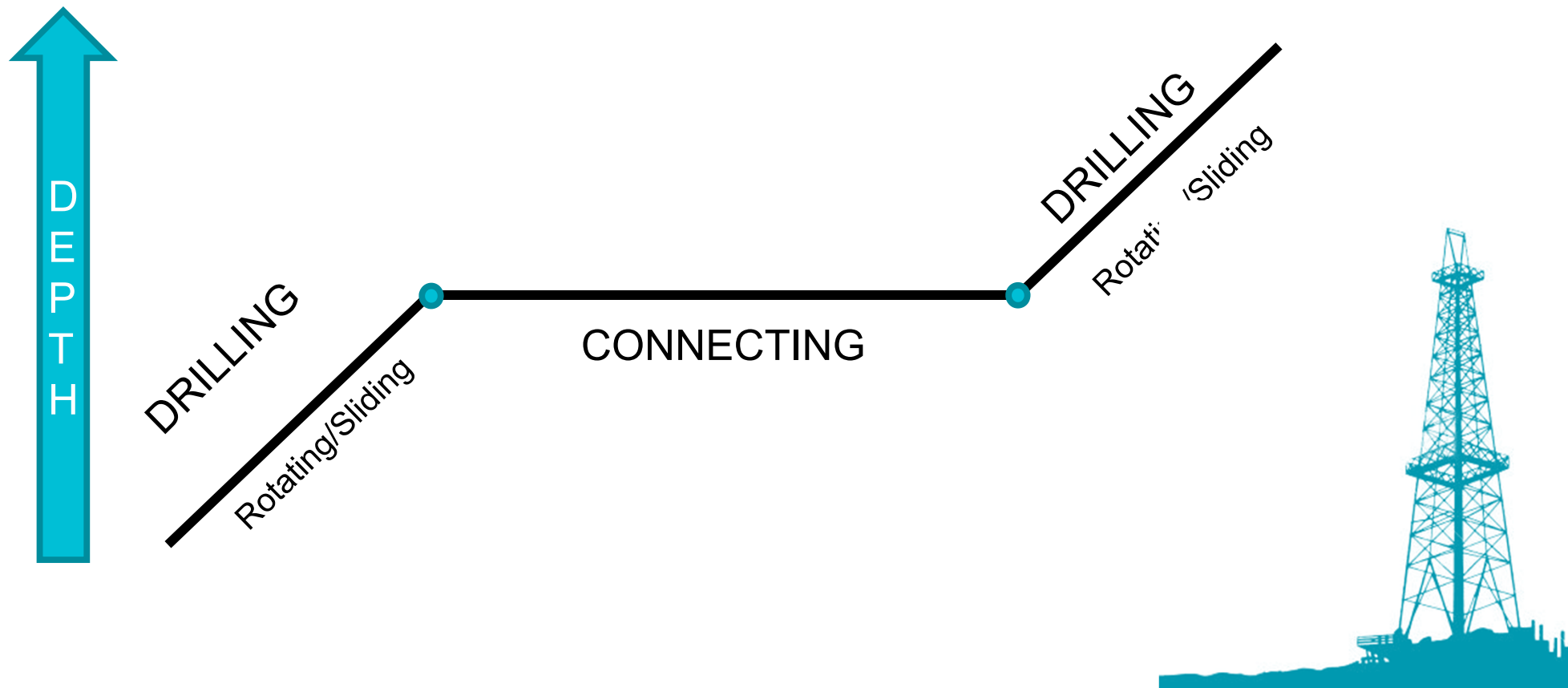
Event Frames

	Well 2		24:00:33	4/27/2014 1:42:00 PM	5/21/2014 1:42:33 PM	
	Sliding		0:18:50	4/28/2014 2:40:10 PM	4/28/2014 2:59:00 PM	
	Rotary ...		7:40:38	4/29/2014 3:33:45 PM	4/29/2014 11:14:23 PM	
	Sliding		1:11:30	5/1/2014 3:23:04 PM	5/1/2014 4:34:34 PM	
	Stick-Slip		1:23:35	5/2/2014 5:39:00 AM	5/2/2014 7:02:35 AM	
	Sliding		0:23:00	5/3/2014 5:32:30 AM	5/3/2014 5:55:30 AM	
	Rotary ...		8:49:59	5/4/2014 1:33:23 AM	5/4/2014 10:23:22 AM	
	Stick-Slip		0:11:29	5/5/2014 4:43:45 PM	5/5/2014 4:55:14 PM	
	Sliding		10:41:00	5/6/2014 10:41:10 AM	5/6/2014 9:22:10 PM	
	Sliding		0:35:04	5/7/2014 8:40:20 AM	5/7/2014 9:15:24 AM	

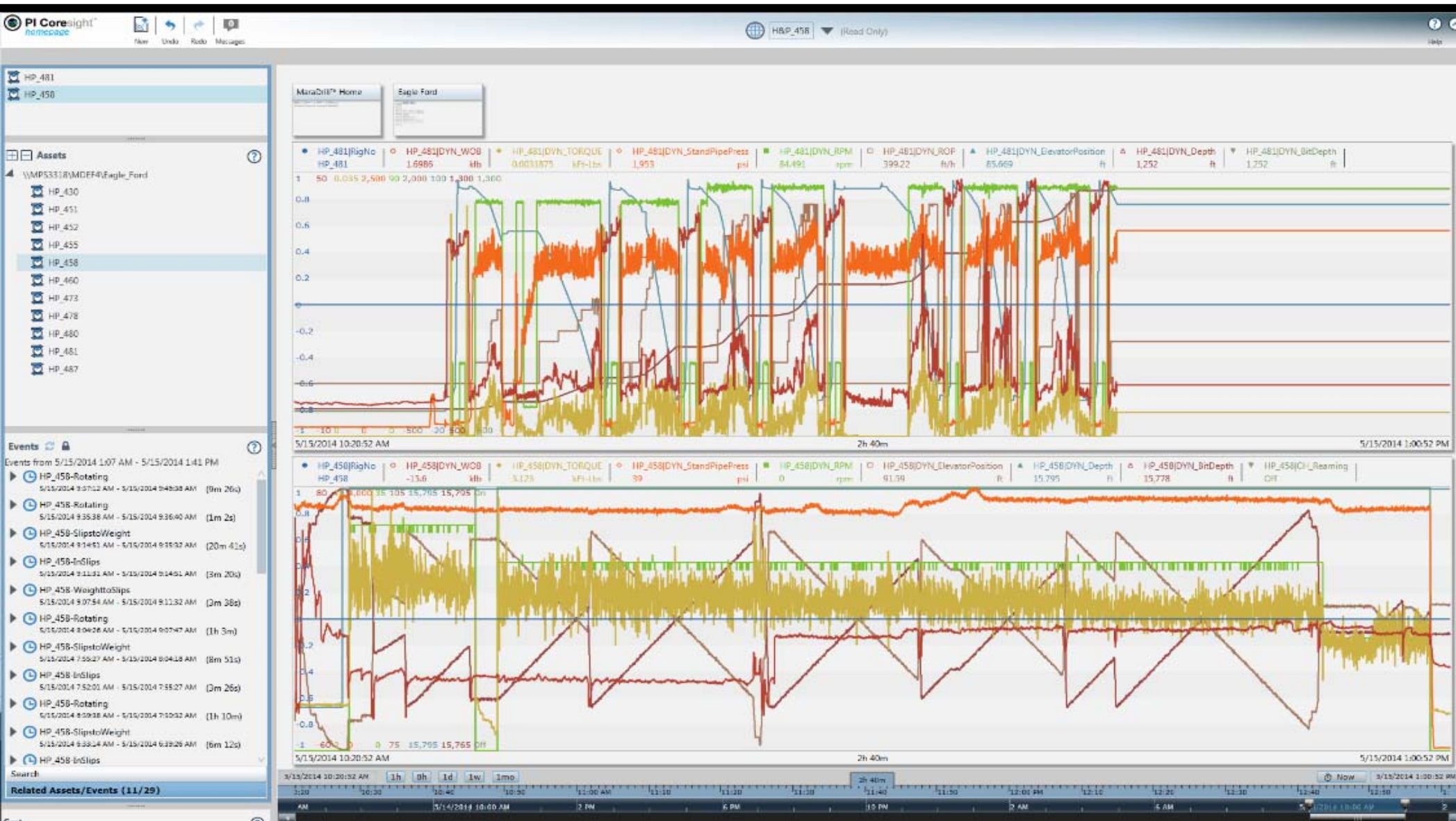


Major Drilling Events

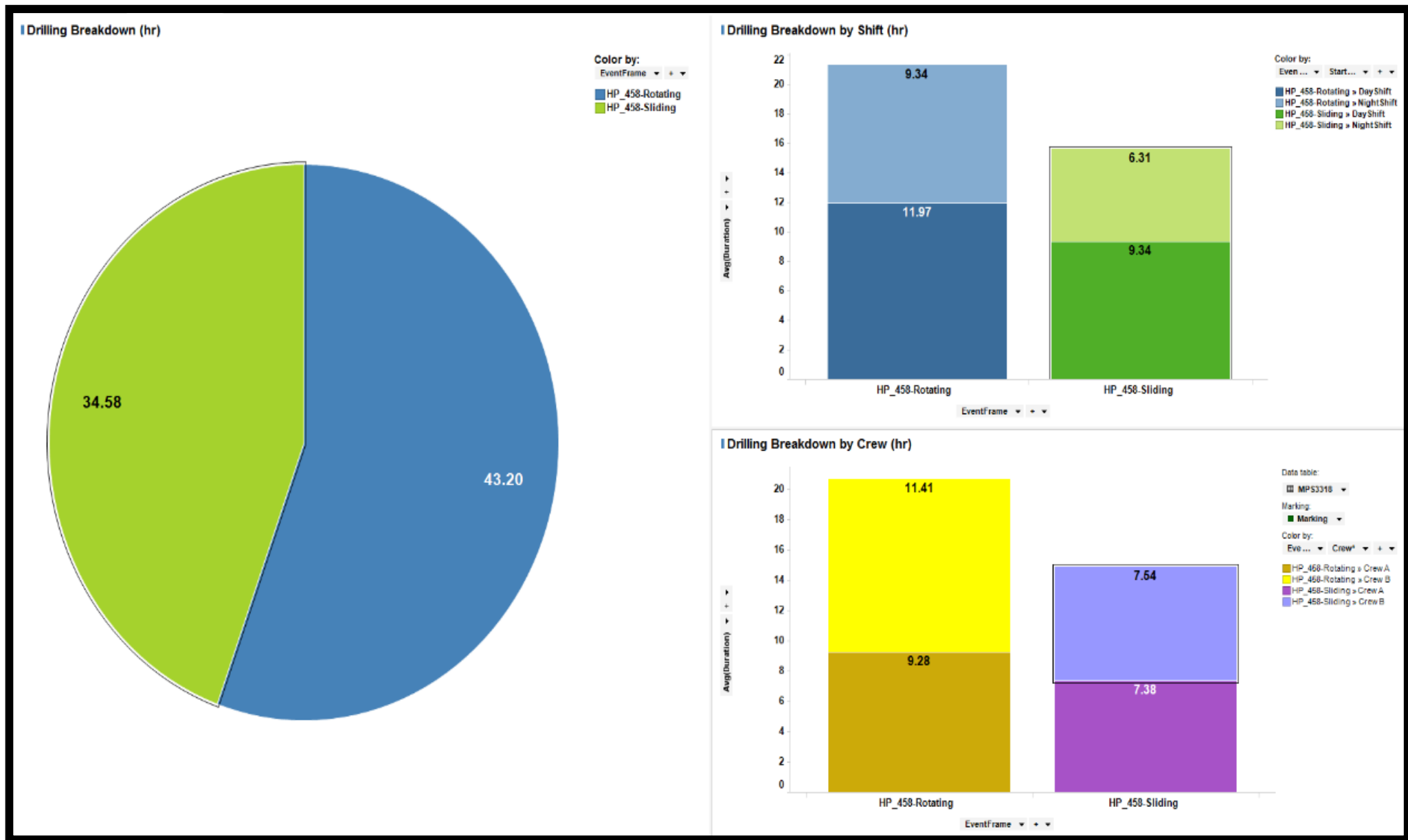
– Looking for Sources of Idle Time

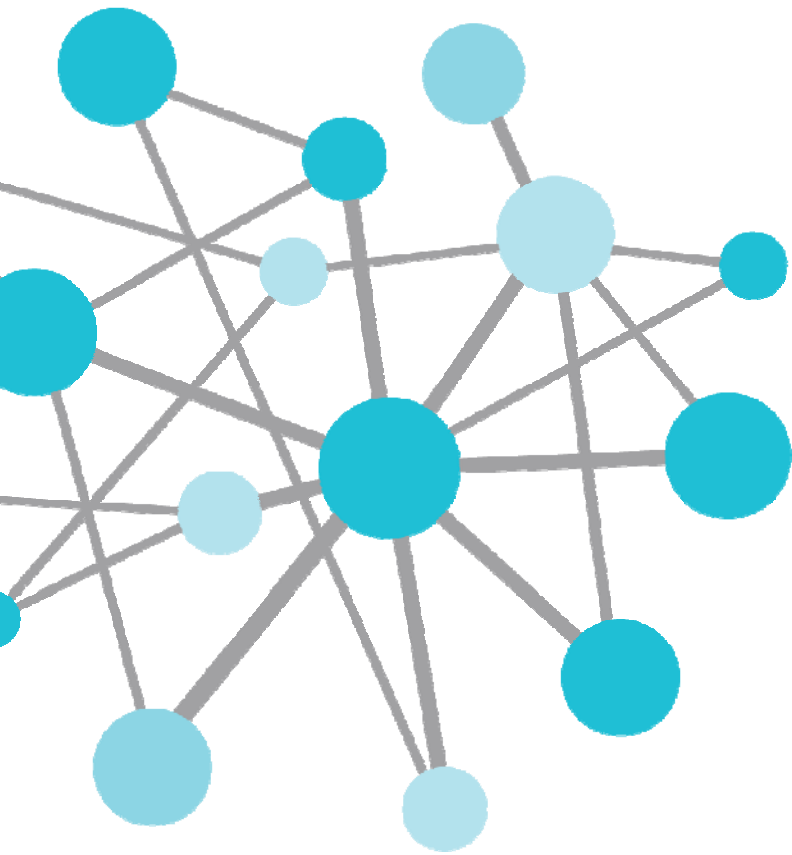


Self Serve Analytics & Visualization, Mobility.....Consistency, Alignment, Simplicity, and in Context – Drilling Events



Microsoft Power BI for Advanced Analytics





Illustrative Case Study – Talisman Energy

Data Consistency and Context
Organizational Alignment
Applications/Solutions Simplicity
Data Transformation Methodology

Moving Applications to & Integrating Solutions with the Data Infrastructure – Simplification & Standardization



Decomposition of Typical “CBM Solution”

(note: concept can be applied to a majority of solutions)

Asset Management CBM “Solution”

Gather Asset Information

Temperature
Flow
Pressure
Vibration
of start/stops, etc.

PI Archive

Transform into “Condition” Information

Efficiency (%)
Design vs Actual
Rate of Change
Cycles per period

PI PE, PI AF,

Perform Analysis Rules - CBM

Time in Service
Total Volume
Performance DvA
Max T or Vib

PI AF, PI ACE

Perform analytics, visualization, propagation:

KPIs
Visuals
Reports
Applications

PI AF, PI Notifications

Integrate into work flow Systems

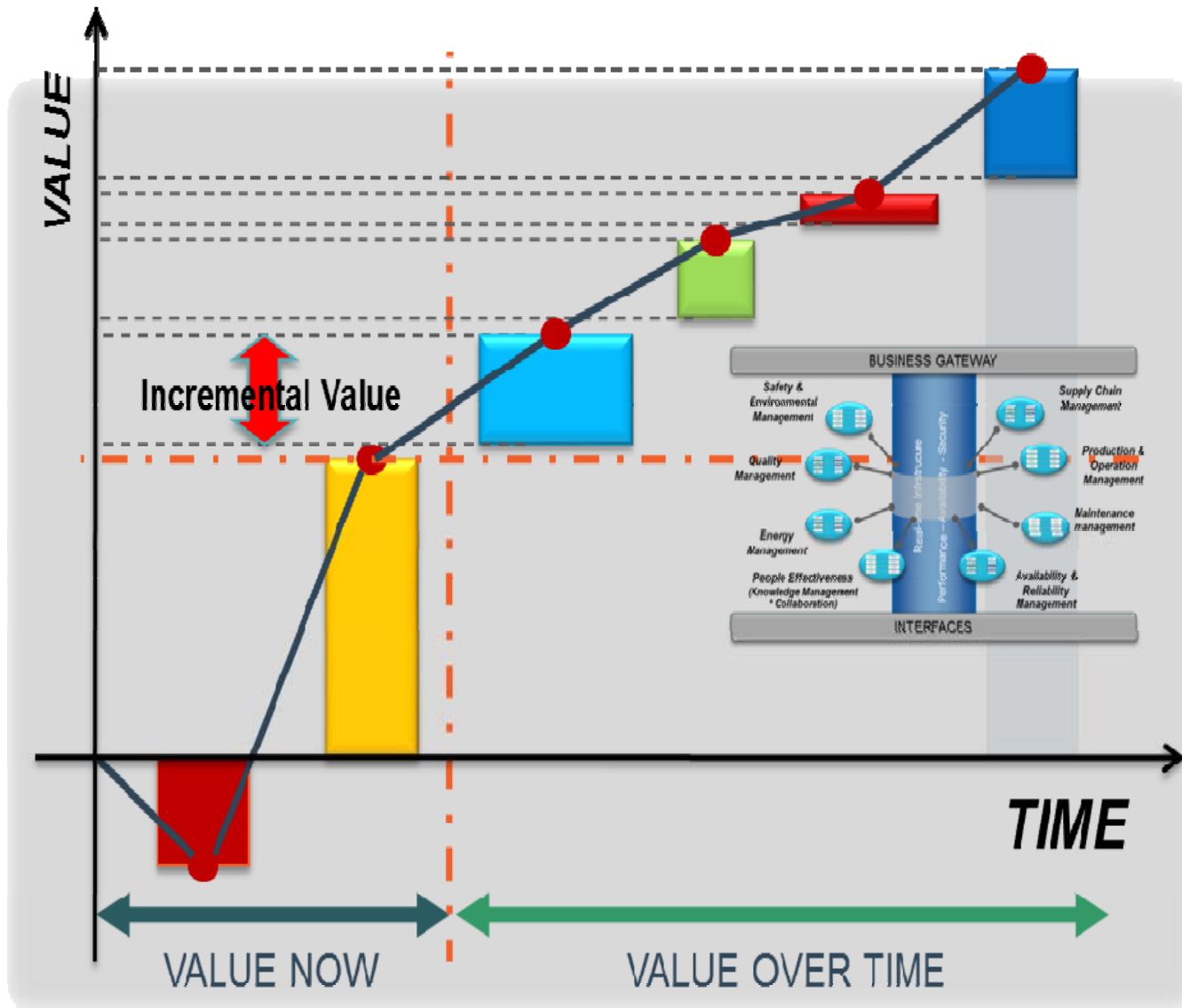
(ie Maximo, SAP, Meridian)

PI System Access

Functionality Configured in the PI System Infrastructure



An Infrastructure Approach

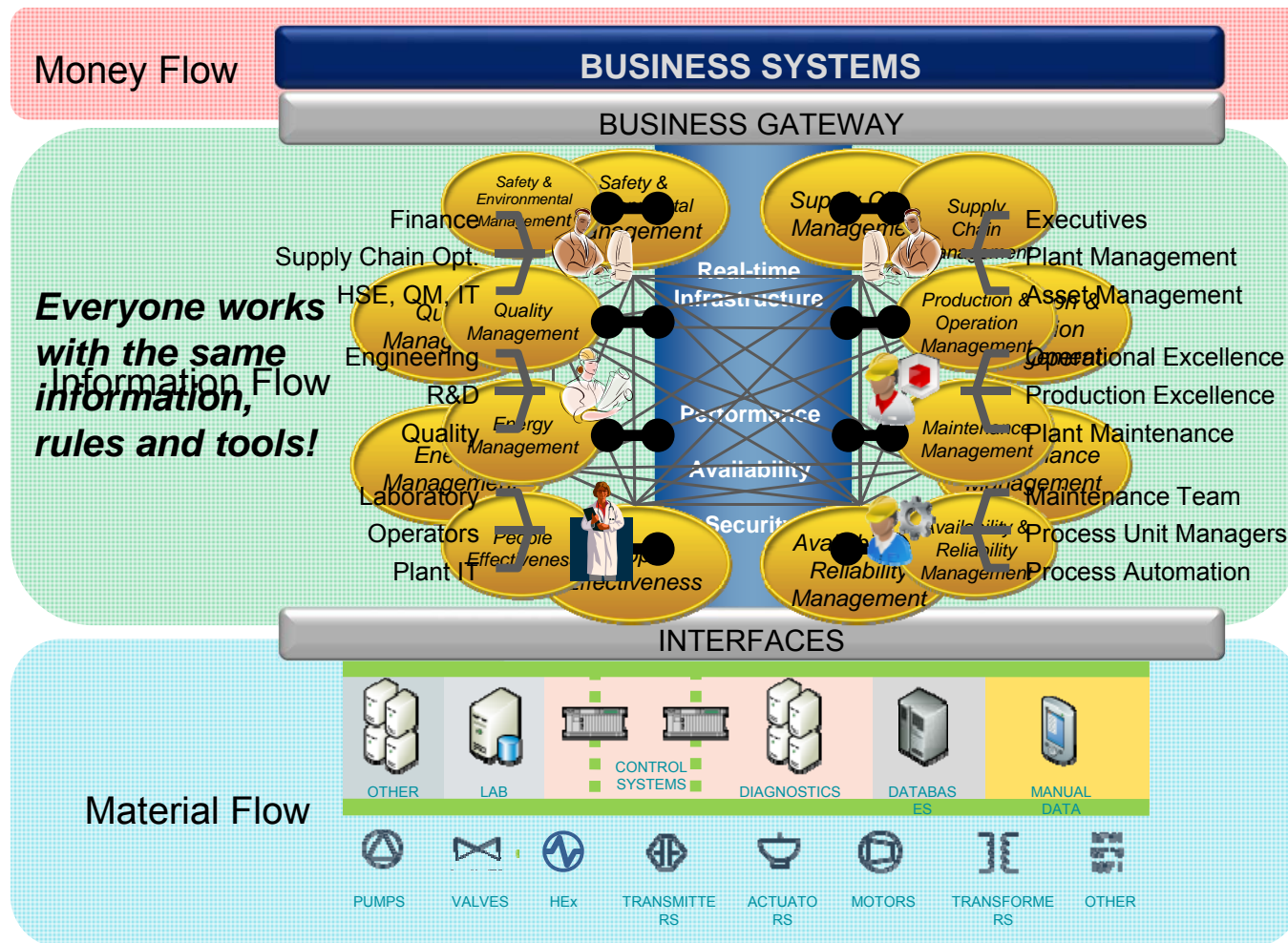


- ← Performance Management
- ← Environmental Reporting
- ← Equipment Health Mgmt.
- ← Operations Management

← Initial Infrastructure Value

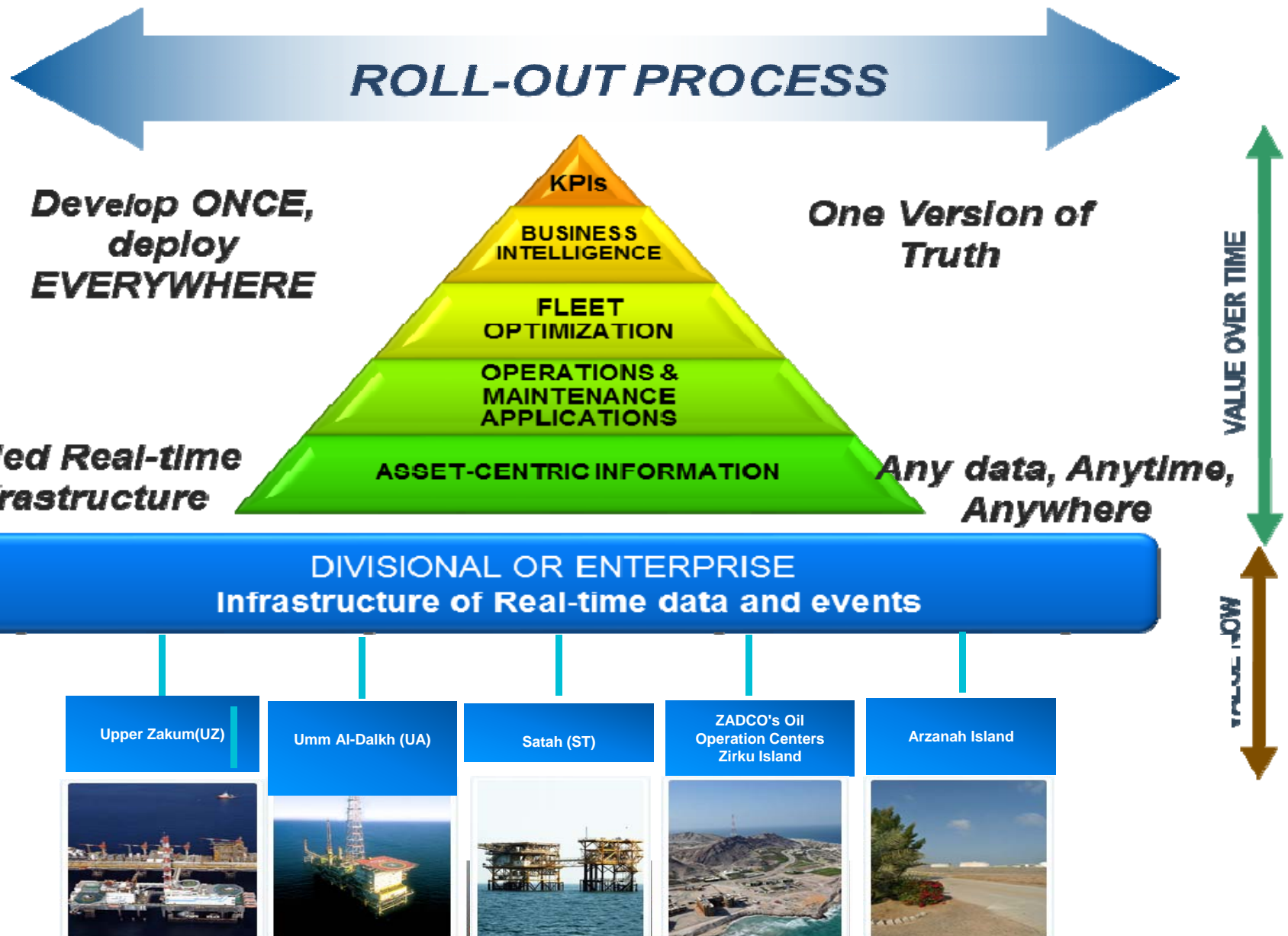
← Infrastructure Initial Investment

Enablement of Business to Operations Value

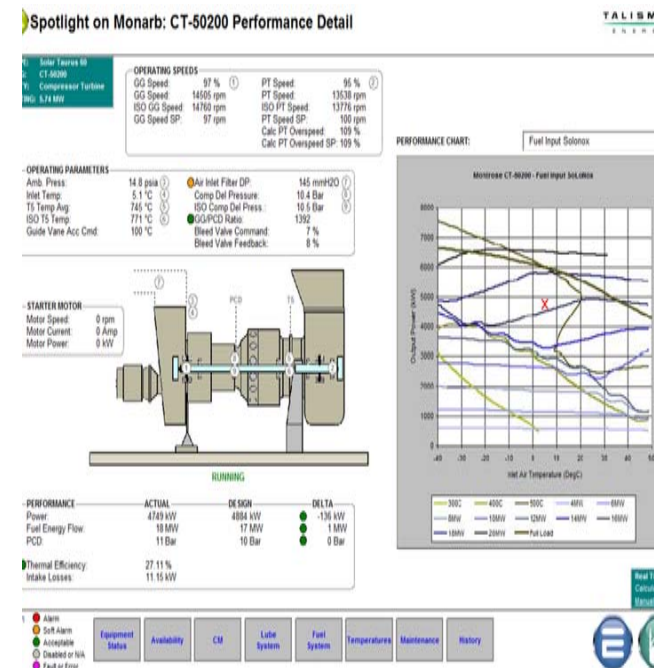
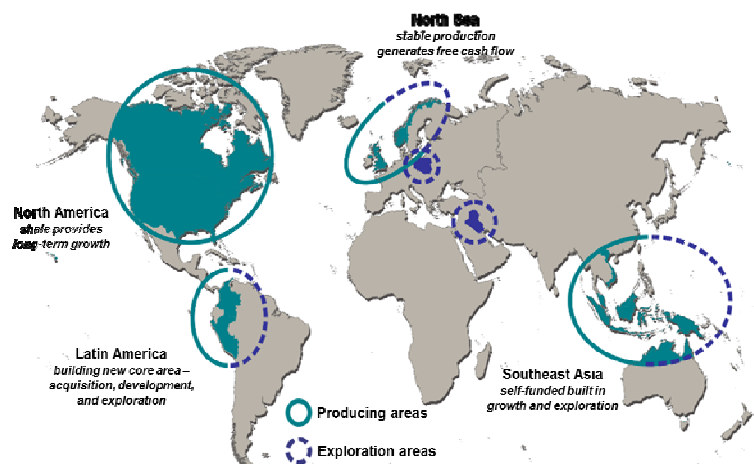


Infrastructure, to harness the Power of Data

Implementing Strategic Initiatives on Enterprise Scale



Real-Time Monitoring of 2,900 Safety, Production, and Water Critical Pieces of Rotating Equipment

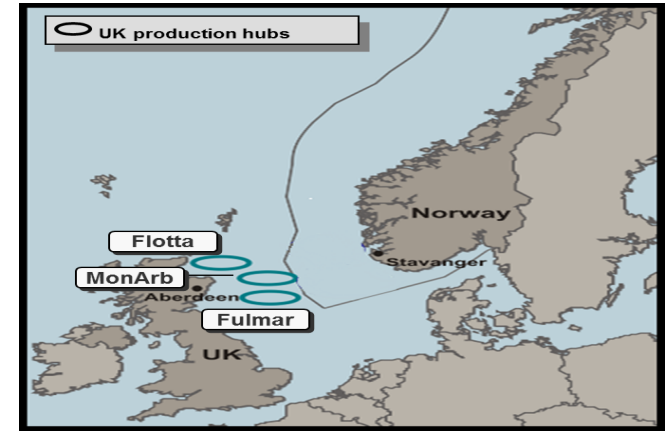
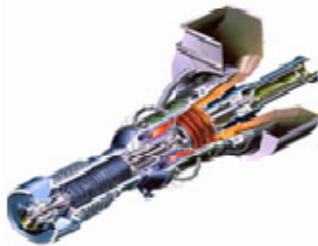


Business Challenge

Offshore – 8 Production Platforms

Safety Critical Equipment

- 39 Diesel Drive Fire Pumps
- 6 Electric Drive Fire Pumps
- 8 Hydraulic drive fire pumps
- 15 Emergency Power Generation Packages
- 26 Bilge / Ballast Pumps
- 53 Other Safety Critical Pumps



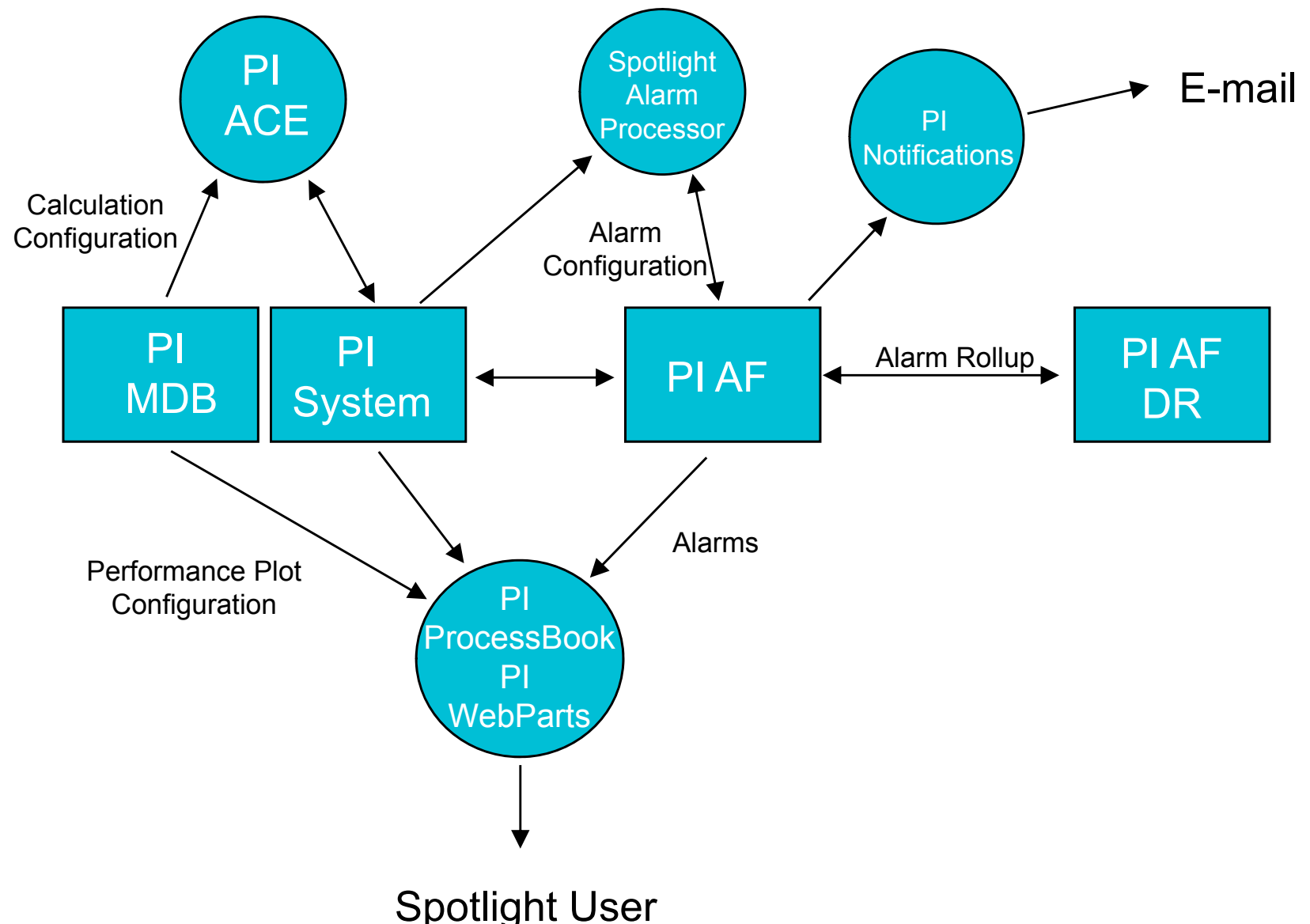
Production Critical Equipment

- 56 Gas Turbines
- 40 Gas Compressors
- 9 Diesel Engines for Main Power Generation
- 27 Main Water Injection, P.W. & Artificial Lift Pumps
- 35 Main Oil Line Pumps
- Circa 2711 Operational Pumps



A total of **2831** pieces of Major Rotating Equipment

Spotlight Architecture



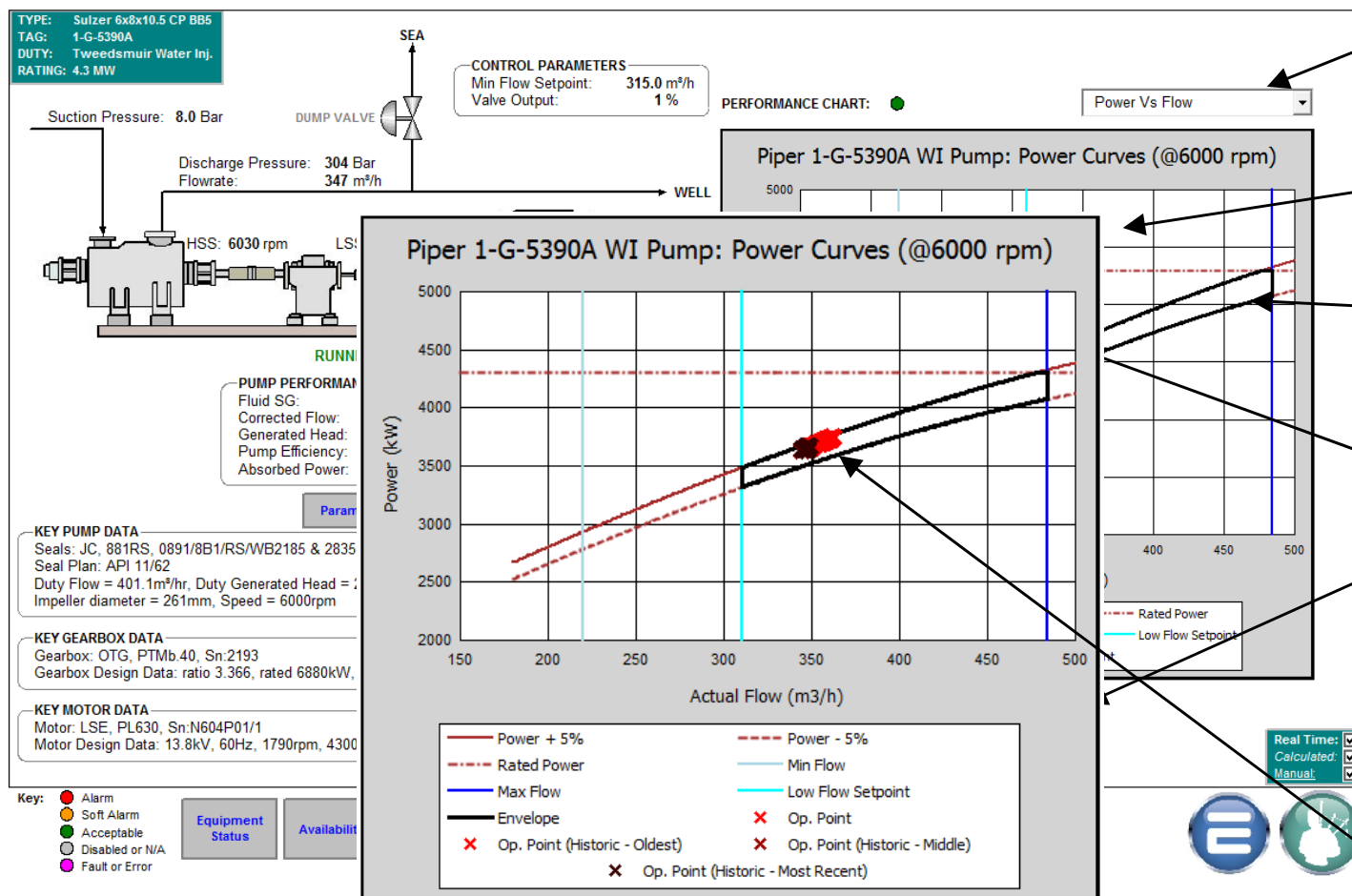
Spotlight User



Spotlight Display - Performance

Spotlight on Piper B: 1-G-5390A Performance Detail

TALISMAN
ENERGY



User can select different charts associated with this item

Chart showing performance constraints

Operating Envelope

Current operating point

View operating point history over varying time periods

Operating point "cloud" shows history

KPIs with High Fidelity “Live” Drill Down



Spotlight on Rotating Equipment: Piper Overview

TALISMAN
ENERGY

Overview	Auk	Bleo Holm	Buchan	Claymore	Clyce	Flotta	Fulmar	MonArb	Piper	Satire	Tartan				
Gas Compression								Main Oil Line							
	Run	Avail.	Perf.	CM	Lube	Seal	Maint		Run	Avail.	Perf.	CM	Lube	Seal	Maint
K-3110A								1-G-2600A							
K-3110B								1-G-2600C							
K-3110C								1-G-2310A							
K-3210A								1-G-2310B							
K-3210B															
K-3210C															
K-3310A															
K-3310B															
Power Generation								Water Injection							
	Run	Avail.	Perf.	CM	Lube	Temp	Maint		Run	Avail.	Perf.	CM	Lube	Seal	Maint
P-8000A								1-G-5390A							
P-8000B								1-G-5370A							
P-8000C								1-G-5370B							
P-8000D								1-G-5370C							

Traffic light shows
rolled up alarm
status for each
sub-display

Links to detailed
displays for each
item of equipment

Links to other
asset overviews

Consistency in KPIs, Alarms, & Transformations



Database Query Date Back Check In Refresh

Elements

Elements
Buchan
Compressors
C-2030-1

General Child Elements Attributes Ports Version

Filter

Name	Value
Alarm Input	0
Current Alarm State	Process Inhibit
Current Alarm State Value	3
Current Priority	Process Inhibit
Current Priority Value	3
H Alarm	True
Limit Priority	Warning
Limit Value	0.3
HH Alarm	True
Limit Priority	Alarm
Limit Value	0.4
Inhibit	False
L Alarm	False
Limit Priority	Warning
Limit Value	0
LL Alarm	False
Limit Priority	Alarm
Limit Value	0
Process Inhibit	True
User Inhibit	False

Na Inhibit
De Monitored E
Co Process Inp
Ca Running Ec
De User Inhibit
Va
Va
Da

Asset/Equipment Tree Structure

Individual Equipment (run indicators, etc.)

Displays (alarm rollup for summary)

Individual Alarms (allows more than one alarm type per measurement)

Alarm limits configuration

Process inhibit (run state)
User inhibit (cascaded down)

Agenda



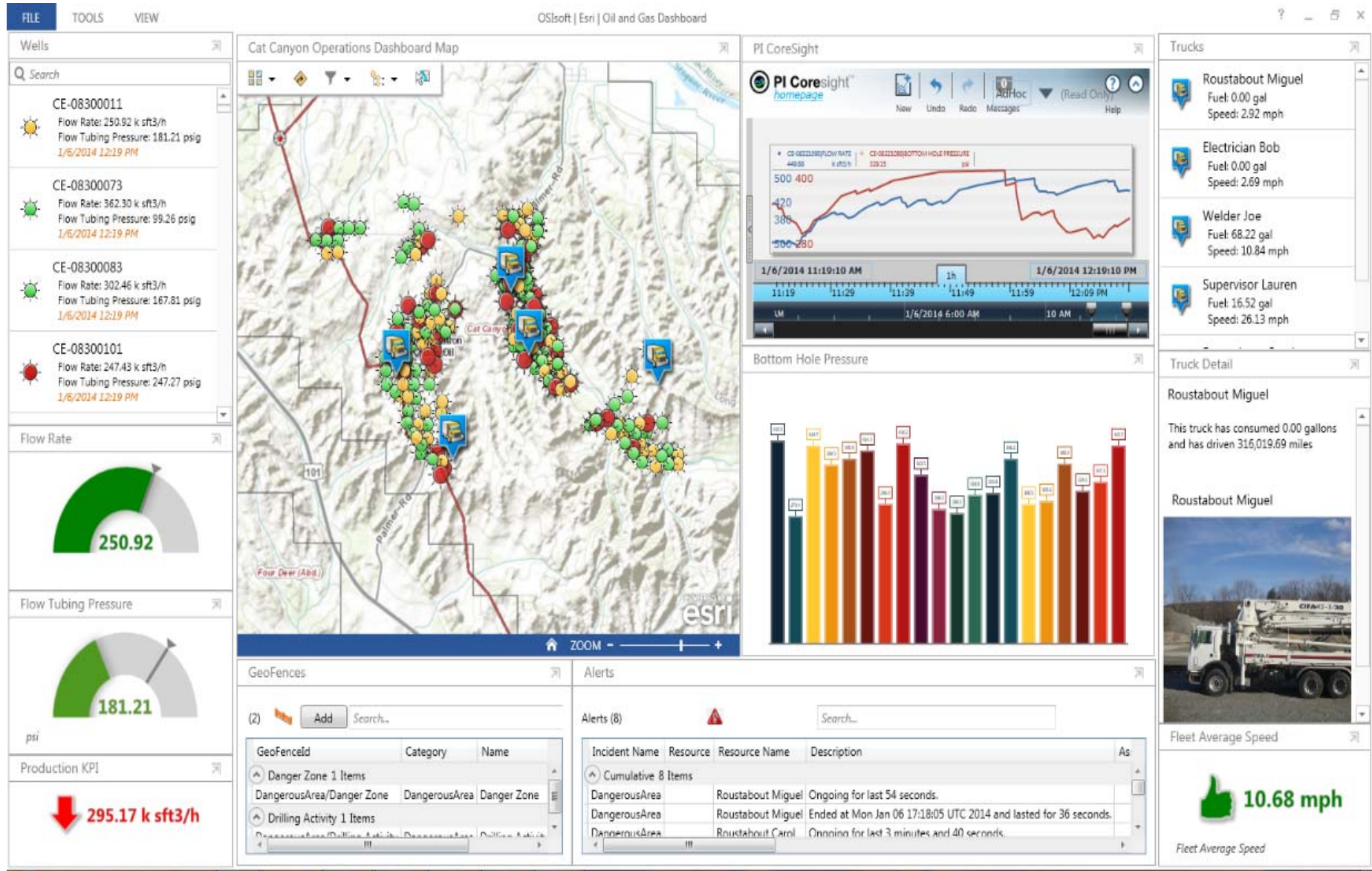
- Business to Operations Data Value Requisites:
 - Data Consistency and Context
 - Organizational Alignment
 - Applications/Solutions Simplicity
 - Data Transformation Methodology
- “Future Proofing” of the Data Infrastructure
- Resulting Value in O&G
- Closing Comments

Future Data – Operational Performance and Model Accuracy



PI Integrator for Esri ArcGIS

Jump



Microsoft BI and the PI System

Extending Analytics and Visualization to the Enterprise

Gas Well Production Report - Excel

FILE HOME INSERT PAGE LAYOUT FORMULAS DATA REVIEW VIEW ADD-INS DATA EXPLORER PI DATALINK PIAF Builder POWERPIVOT ANALYZE DESIGN

Calibri 11 A A+ B I U = Wrap Text General Conditional Formatting Format as Table Cell Styles Insert Delete Format AutoSum Fill Clear Sort & Find & Filter Select

B7 X ✓ fx Field J1

Monthly Gas Well Production to Target
Exploration and Production Division

	Marine Region			North Region			South Region		
	MSCF	% Target	Target % Status	MSCF	% Target	Target % Status	MSCF	% Target	Target % Status
Field J1	1,577,597	93.12 %	●				1,577,598	99.79 %	●
Field J2	1,779,856	93.71 %	●				1,779,857	91.74 %	●
Field J3	1,969,446	95.14 %	●				1,654,016	94.82 %	●
Field J4	2,421,120	95.61 %	●				2,421,120	93.20 %	●
Field J5	723,875	92.63 %	●				723,875	98.16 %	●
Field 101	3,196,148	95.11 %	●						
Field 105	3,848,336	96.38 %	●						
Field 201	2,962,537	98.55 %	●						
Field 210	1,750,906	100.79 %	●						
Field 211	1,426,471	98.21 %	●						
Field 300	1,492,600	94.74 %	●						
Field 301	4,281,977	94.72 %	●						
Field 302	1,684,247	91.63 %	●						
Field 304	2,205,850	93.70 %	●						
Bagre				1,841,490	87.82 %	●			
Blue				1,251,376	100.69 %	●			
Brown				1,495,303	94.88 %	●			
Gold				1,496,741	95.88 %	●			
Maroon				1,662,188	100.31 %	●			
Purple				4,537,183	94.83 %	●			
Red				1,900,530	93.47 %	●			
Yellow				1,871,050	99.36 %	●			
Terminal 2D				1,841,491	94.28 %	●			
Grand Total	31,320,966	95.47 %	●	17,897,351	95.55 %	●	8,156,466	94.91 %	●

Production Performance Summary Production vs. Target Gas Production Field Analysis Geographical ...

READY 100%

“High Fidelity” Business Intelligence (BI) With Microsoft

Gas Well Production Report - Excel

FILE HOME INSERT PAGE LAYOUT FORMULAS DATA REVIEW VIEW ADD-INS DATA EXPLORER PI DATALINK PI AF Builder POWERPivot ANALYZE DESIGN

Clipboard Font Alignment Number Styles Cells Editing

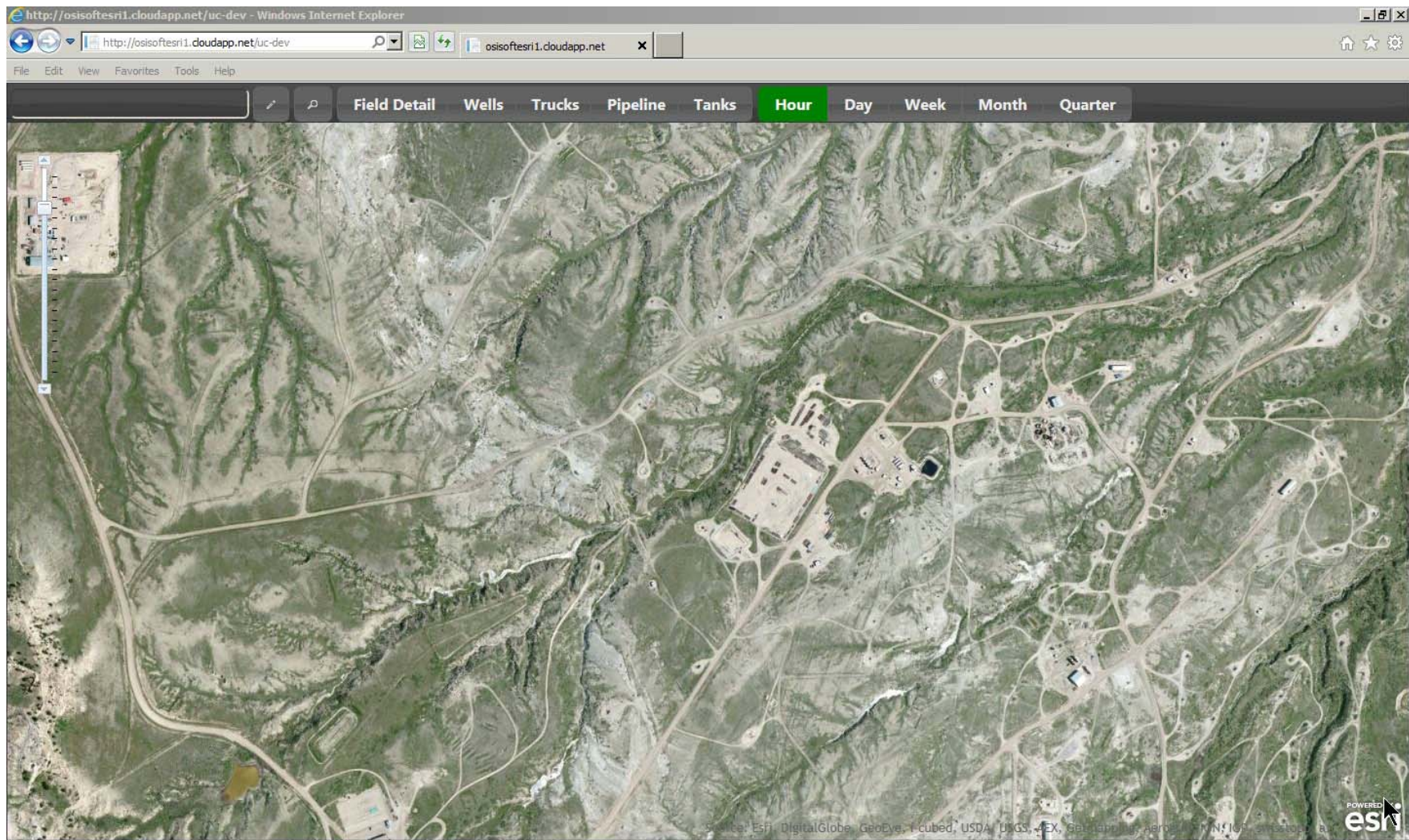
B7 Field J1

Monthly Gas Well Production to Target									
Exploration and Production Division									
Marine Region				North Region			South Region		
	MSCF	% Target	Target % Status	MSCF	% Target	Target % Stat	MSCF	% Target	Target % Status
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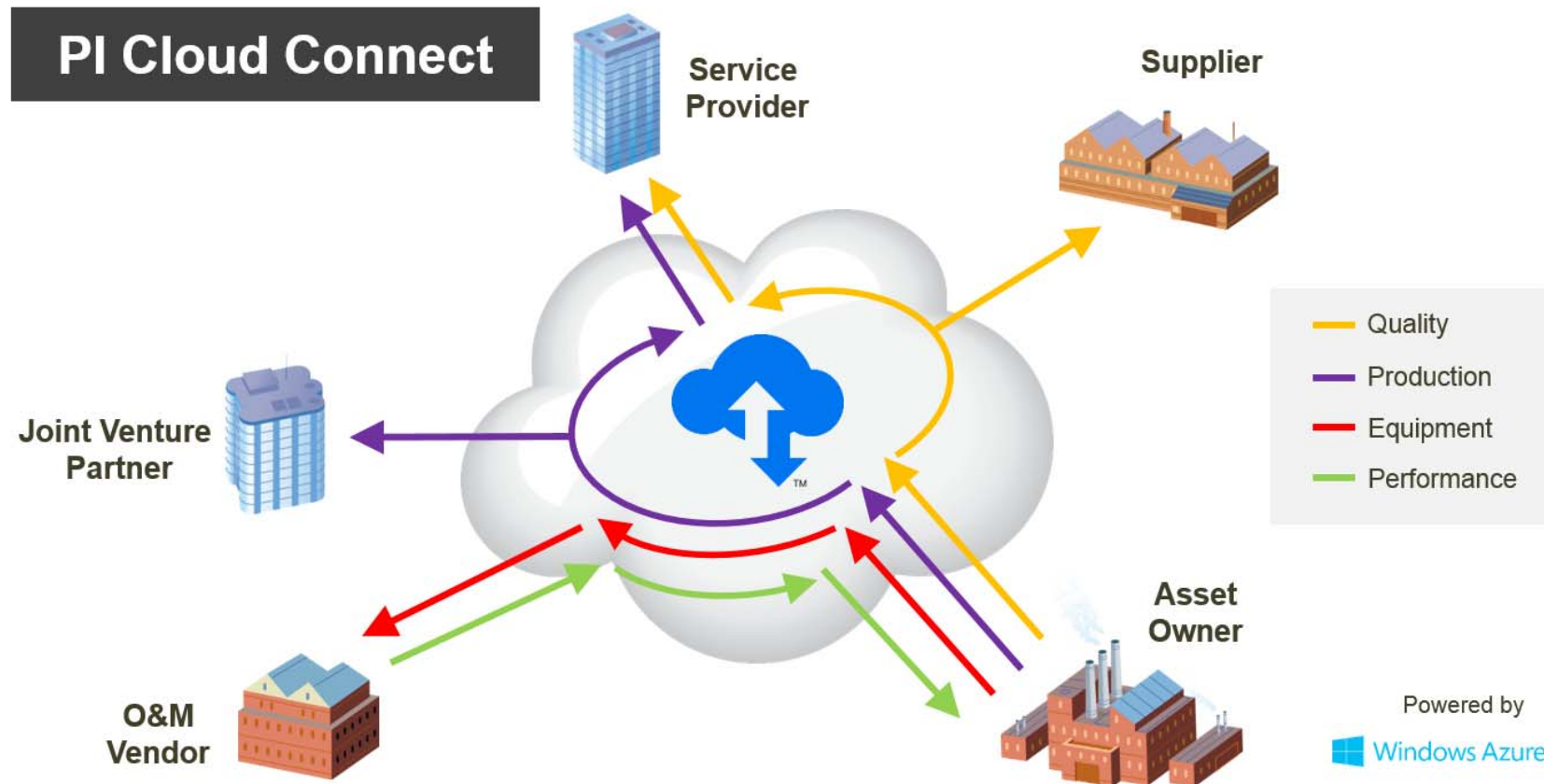
Production Performance Summary Production vs. Target Gas Production Field Analysis Geographical ...

READY

Geospatial Integration with “High Fidelity” BI



Cloud Services



Agenda



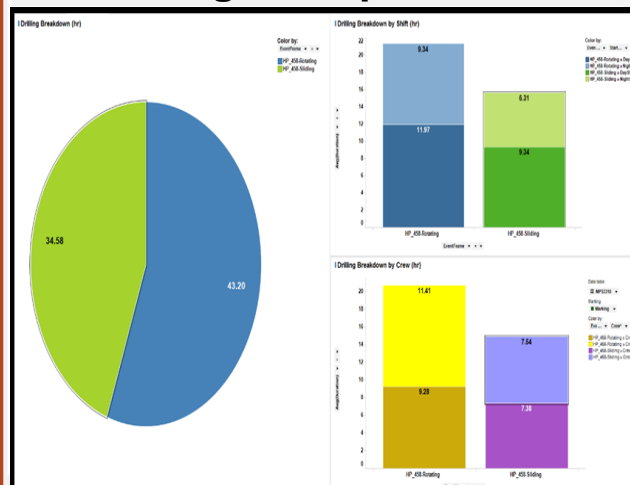
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Enabling Op Ex in All Areas of E&P/Logistics

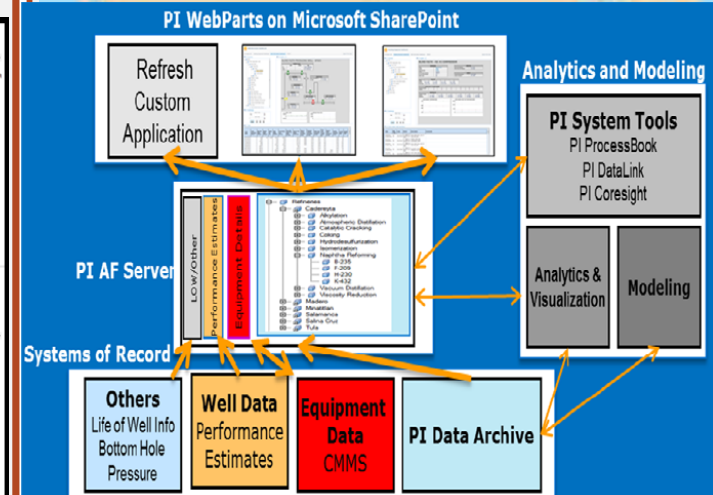
Asset Performance, Reliability, & Portfolio Management



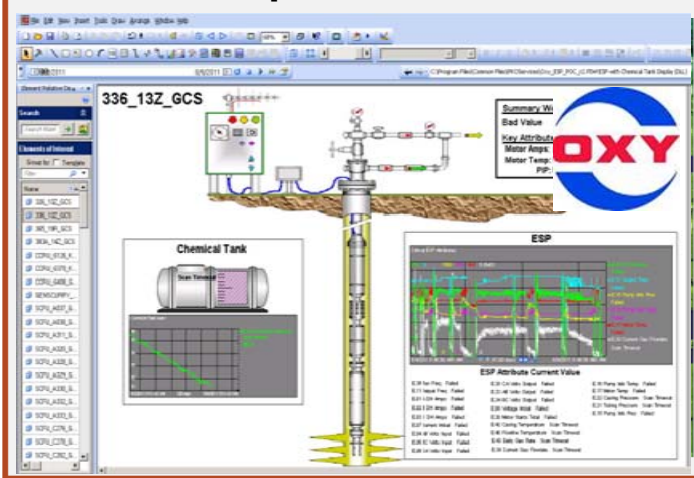
Drilling and Completion Oversight & Optimization



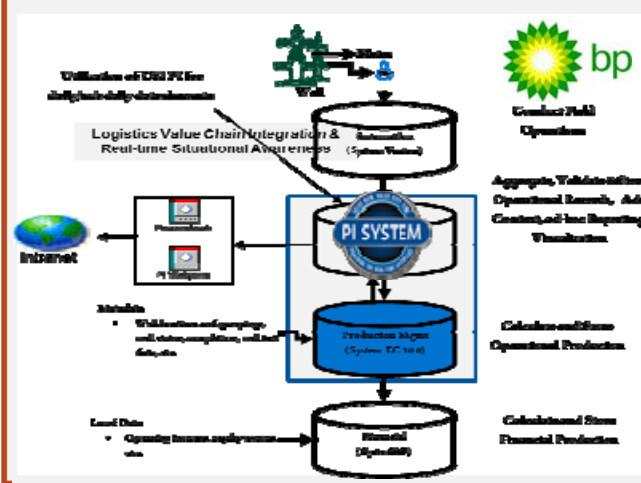
Production Operational Excellence & Optimization



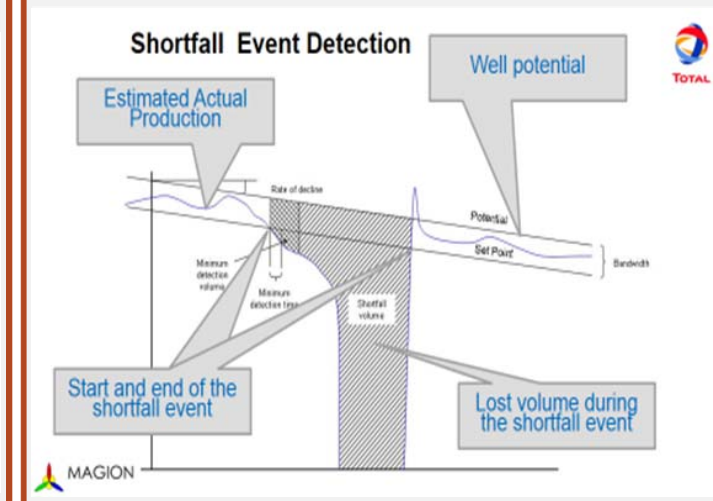
Artificial Lift Reliability and Optimization



Augmentation of "Best of Breed" Solutions

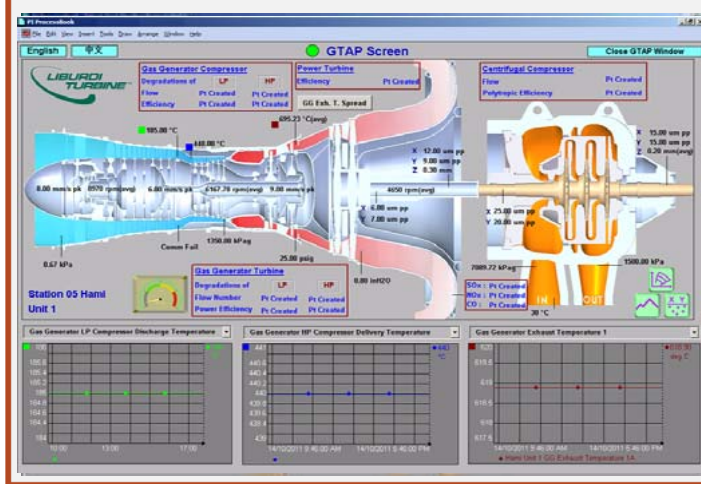


Integration with E&P Analytics & Visualization/Post Well Science



Enabling Op Ex in All Areas in O&G Logistics

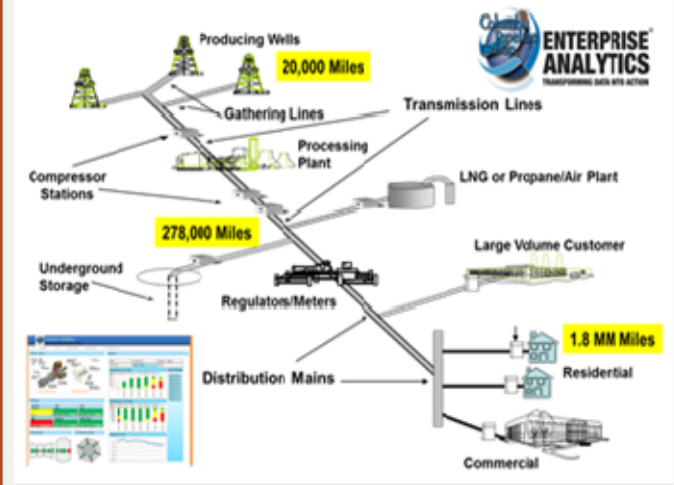
Asset Performance, Reliability, & Portfolio Management



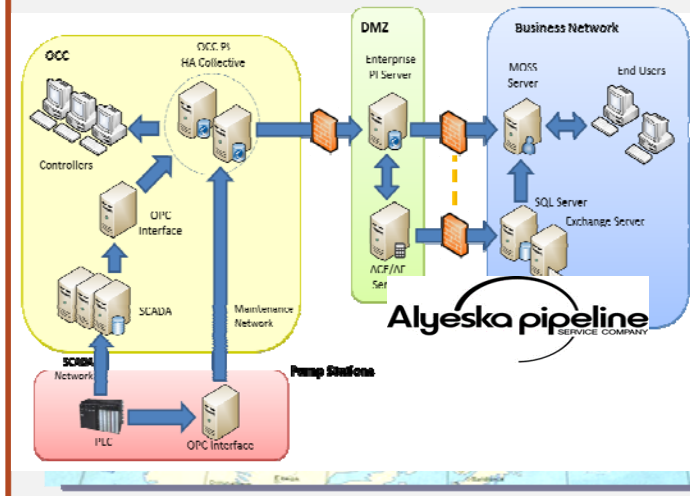
Geospatial Integration "Real-Time & Space"



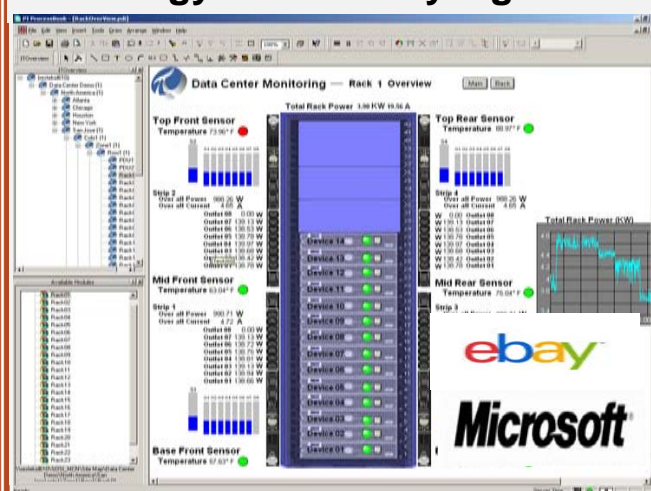
Gas Value Chain Integration & RT Situational Awareness



SCADA/DCS Augmentation



IT/SCADA Infrastructure Energy & Reliability Mgmt



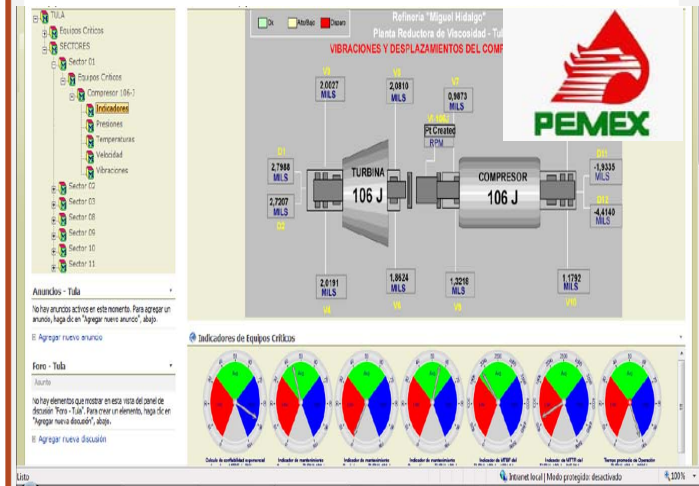
Compliance Reporting, Environmental & Energy Mgmt.

The screenshot shows a software interface for compliance reporting, environmental, and energy management. It features a detailed report with multiple tables and charts. The report includes a 'TOTAL PHYSICAL PIPELINE SUMMARY' table, which provides an overview of the pipeline's physical characteristics. It also includes a 'LINEPACK SUMMARY' table, which details the pipeline's capacity and usage. The report is presented in a clear, organized format, making it easy to understand and use.

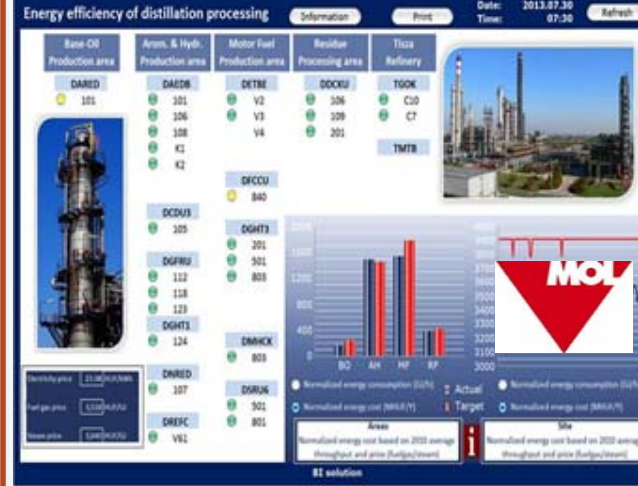
TOTAL PHYSICAL PIPELINE SUMMARY				LINEPACK SUMMARY			
Volume	Energy	Volume	Energy	Volume	Energy	Volume	Energy
MMBtu	CU	MMBtu	CU	MMBtu	CU	MMBtu	CU
207,351.1	8,145.2	1,052,322.2	87,221.4	207,351.1	8,145.2	1,052,322.2	87,221.4
401,200.0	1,028.4	1,054,000.0	1,701,431.2	401,200.0	1,028.4	1,054,000.0	1,701,431.2
1,827,000.0	1,385.4	17,040,000.0	1,821,200.0	1,827,000.0	1,385.4	17,040,000.0	1,821,200.0
1,827,000.0	65.4	7,200,000.0	7,200,000.0	1,827,000.0	65.4	7,200,000.0	7,200,000.0

Enabling Operational Excellence in Hydrocarbon Processing

Asset Performance, Reliability, & Portfolio Management - CBM



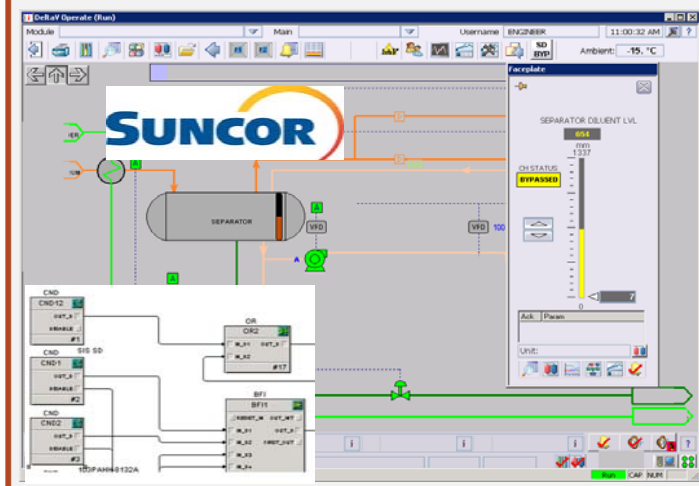
Environmental, Energy & Utilities Management



Ops Visibility, Reporting & Analytics, YA, "live" KPIs, & Model Based PvA

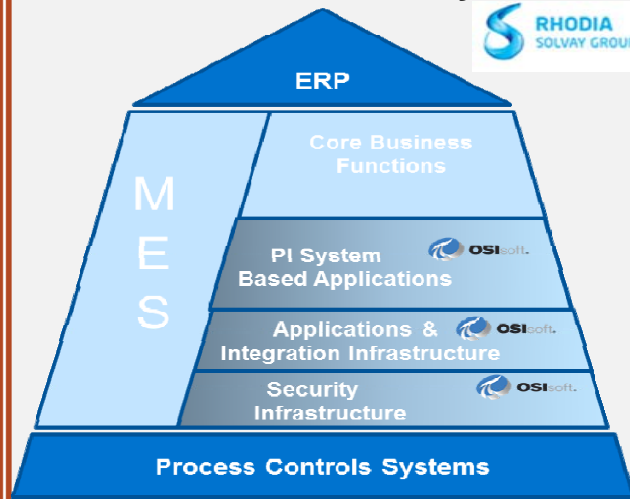


Safety & Reactive/Proactive Integrity Management

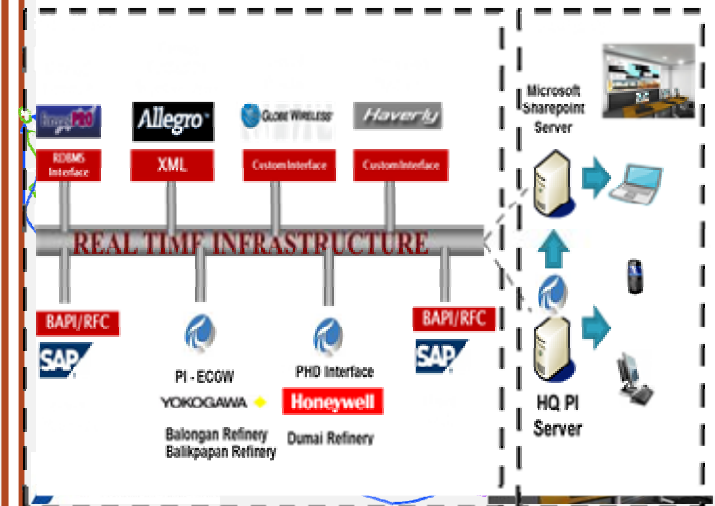


Infrastructure for MES

MES AND The PI System



Value Chain Integration & Real-time Situational Awareness

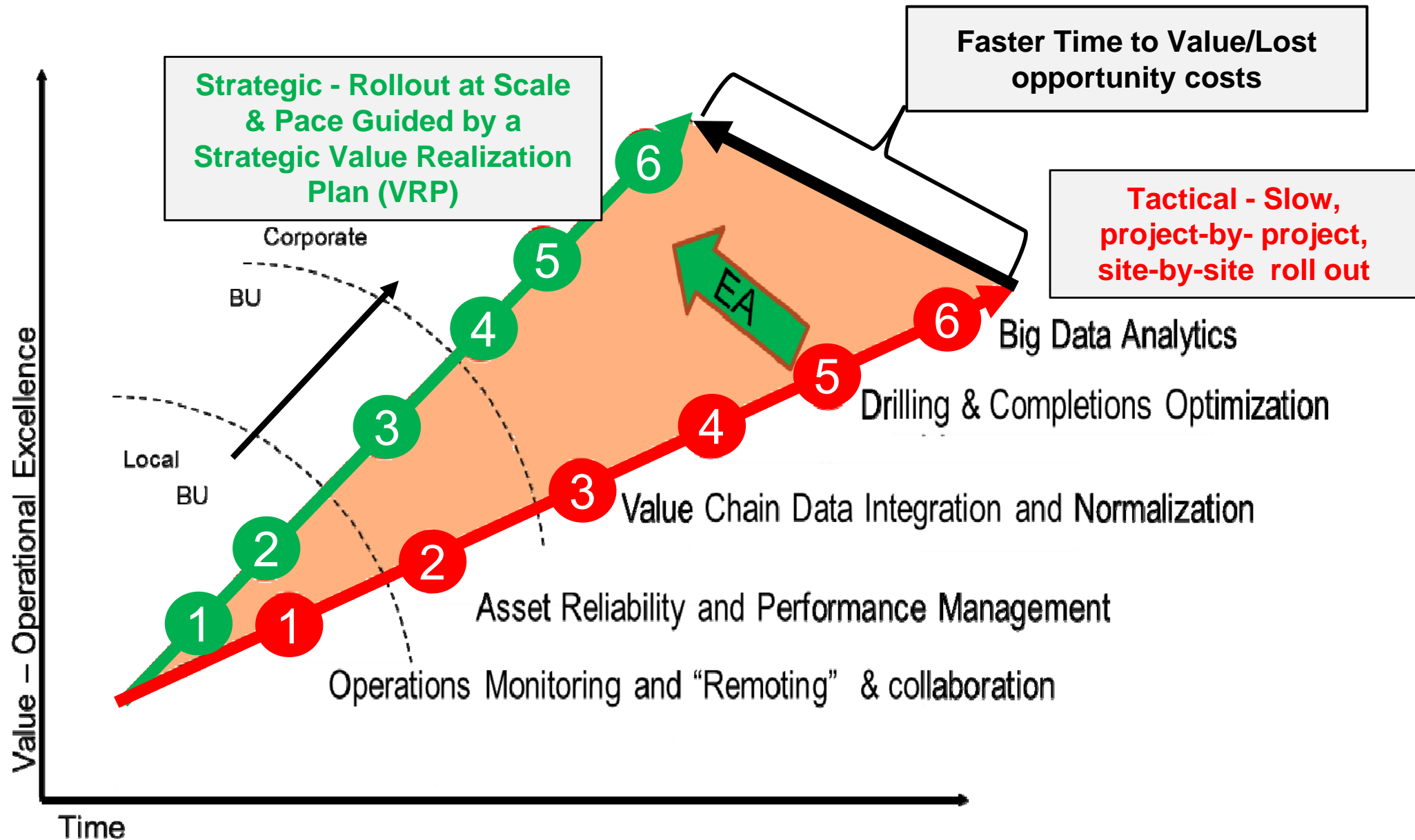


Agenda



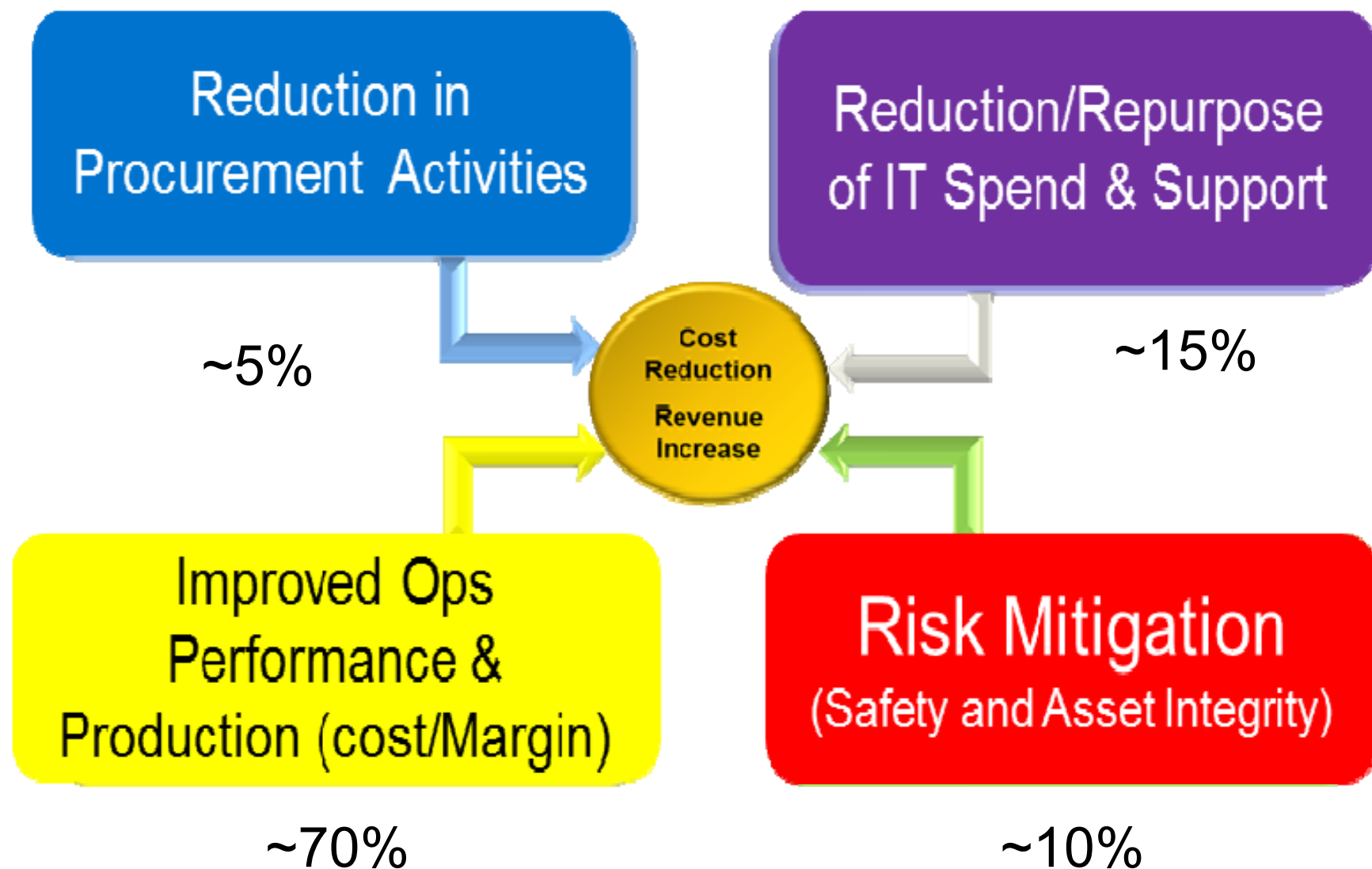
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Accelerating the Benefits of Operational Excellence



Possible Business Case Framework for an EA

% of total EA benefits



Note: Estimate from the 1,100 case studies that can be found on the web.. Your results may differ

Key Takeaways....



- The key to Business to Operations Value is data :
 - Consistency
 - Alignment
 - Simplicity
 - Transformation in the infrastructure vs applications, solutions, and business systems where possible
- Infrastructure vs Custom applications & Solution approach
- PI AF can be and is a strategic enabler
- The PI System Future Proofs the data infrastructure
- The EA is a way to accelerate the benefits from your PI System

Craig Harclerode

charclerode@osisoft.com

Industry Principal

OSIsoft



THANK YOU

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