



Transform Information into Intelligence

Presented by **Anubhav 'Harsh' Sharma**
Field Service Engineer

Transforming the **value** of data



Real-time Decision Support



System
view



Individual
view



Local
view



Operation &
Business insight



Group
insight



Enterprise
insight

Business/Operation Intelligence

Information to intelligence: Insights to drive decisions



Transform



Transform



To **transform** information into operational & business intelligence...

Context: Data without context is limited

Real-time **Visualization:** Make information more consumable and actionable in real-time

- **Investigation:** People must be able to **ask** and **determine how** and **why**
- **Integration:** Information must be able to span across **physical** and **technological** bounds

How does the PI System enable **transforming** information into intelligence?



Capabilities

- PI Datalink
- PI Event Frames
- Future data (New)
- PI Integrator for Business Analytics (New)
- PI Integrator for SAP® HANA® (Coming)*



Enabling Investigation

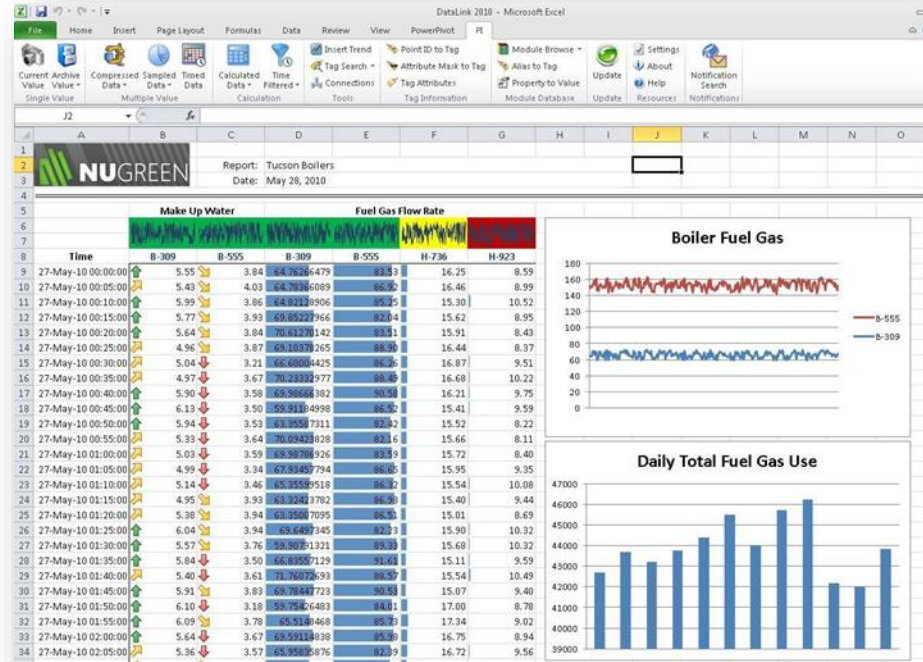
Asking **How** & **Why**: PI DataLink provides seamless PI System access within Microsoft Excel

Create novel insights

Perform rapid investigation

Add-in to Microsoft Excel

- Create Reports
- Apply Calculations
- Retrieve data



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1																			
2	AF Database	\\DFDELOREAN\Petrolux																	
3																			
4	Search Start	3/10/2014																	
5	Search End	5/1/2014																	
6	Event Name	*																	
7	Event Template	*																	
8	Element Name	*																	
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10	# Events:	0																	
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Asking **How** & **Why**: PI Event Frames easily identifies events for deeper root cause investigation

- The most powerful way to automatically bookmark PI time-series data
 - Allows engineers and business users to derive meaning from their data
 - Simplifies searching, analyzing, and reporting

**Downtime
Excursion
Batch**

Related Data

Event Attribute	Value
Name	Ex 20141215-0002
Start	15-Dec-2014 10:35:02
End	15-Dec-2014 10:47:26
Duration	12 min, 24 sec
Asset	Boiler-352
Excursion Type	High Violation
Fuel Gas Flow Avg	37.12 k sft3/h
Fuel Start	823.48 k sft3/ton
myPIKPI Max	47.19 bbl/d

C8 Drill Rig 2

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
					Event name	Start time	End time	Duration	Event template	Primary element	Well Name	Midas Number	Mud Weight In Average	Hole Depth Max	ROP Average	
1																
2	AF Database		\\DFDELOREAN\Petroliu		Drill Rig 2 - 2014-03-29 11:56:00	29-Mar-14 11:56:00	12-Apr-14 04:57:04	13 17:01:04	Well Drilling	Drill Rig 2	Well6	No Data	10.1085675	16208.69	-95.13	
3					Stick-Slip - Drill Rig 2 - 2014-03-30 09:24:00	30-Mar-14 09:24:00	30-Mar-14 09:28:04	0 0:04:04	Stick-Slip	Drill Rig 2	Well6	42-501-20130-08-00			0.048144	
4	Search Start		3/10/2014		Rotary Drilling - Drill Rig 2 - 2014-03-30 09:28:04	30-Mar-14 09:28:04	30-Mar-14 10:12:27	0 0:44:23	Rotary Drilling	Drill Rig 2	Well6	42-501-20130-08-00	10.93031853			
5	Search End		5/1/2014		Sliding - Drill Rig 2 - 2014-03-30 10:12:27	30-Mar-14 10:12:27	30-Mar-14 10:12:27	0 2:44:51	Sliding	Drill Rig 2	Well6	42-501-20130-08-00	9.43496746		113.8426	
6	Event Name	*			Rotary Drilling - Drill Rig 2 - 2014-03-30 10:33:14	30-Mar-14 10:33:14	30-Mar-14 13:40:28	0 3:07:14	Rotary Drilling	Drill Rig 2	Well6	42-501-20130-08-00	9.029625886			
7	Event Template	*			Stick-Slip - Drill Rig 2 - 2014-03-30 11:27:45	30-Mar-14 11:27:45	30-Mar-14 11:29:49	0 0:02:04	Stick-Slip	Drill Rig 2	Well6	42-501-20130-08-00			1.010853	
8	Element Name		Drill Rig 2	*	Stick-Slip - Drill Rig 2 - 2014-03-30 11:51:44	30-Mar-14 11:51:44	30-Mar-14 11:54:58	0 0:03:14	Stick-Slip	Drill Rig 2	Well6	42-501-20130-08-00			0.305763	
9					Sliding - Drill Rig 2 - 2014-03-30 13:40:28	30-Mar-14 13:40:28	30-Mar-14 20:16:09	0 6:35:41	Sliding	Drill Rig 2	Well6	42-501-20130-08-00	8.490364106		169.6429	
10	# Events:				Rotary Drilling - Drill Rig 2 - 2014-03-30 13:40:30	30-Mar-14 13:40:30	30-Mar-14 14:50:54	0 1:10:24	Rotary Drilling	Drill Rig 2	Well6	42-501-20130-08-00	8.422001144			
11	# Attributes:		5,437		Rotary Drilling - Drill Rig 2 - 2014-03-30 15:00:53	30-Mar-14 15:00:53	30-Mar-14 15:21:13	0 0:20:20	Rotary Drilling	Drill Rig 2	Well6	42-501-20130-08-00	8.44529709			
12					Rotary Drilling - Drill Rig 2 - 2014-03-30 15:27:17	30-Mar-14 15:27:17	30-Mar-14 16:36:16	0 1:08:59	Rotary Drilling	Drill Rig 2	Well6	42-501-20130-08-00	8.466646445			
13					Stick-Slip - Drill Rig 2 - 2014-03-30 16:46:21	30-Mar-14 16:46:21	30-Mar-14 16:51:14	0 0:04:53	Stick-Slip	Drill Rig 2	Well6	42-501-20130-08-00			0.059614	
14					Rotary Drilling - Drill Rig 2 - 2014-03-30 16:51:14	30-Mar-14 16:51:14	30-Mar-14 17:36:20	0 0:45:06	Rotary Drilling	Drill Rig 2	Well6	42-501-20130-08-00	8.496953622			
15					Rotary Drilling - Drill Rig 2 - 2014-03-30 17:44:16	30-Mar-14 17:44:16	30-Mar-14 18:09:44	0 0:25:28	Rotary Drilling	Drill Rig 2	Well6	42-501-20130-08-00	8.515142838			
16					Rotary Drilling - Drill Rig 2 - 2014-03-30 18:17:38	30-Mar-14 18:17:38	30-Mar-14 18:41:35	0 0:23:57	Rotary Drilling	Drill Rig 2	Well6	42-501-20130-08-00	8.528867173			
17					Rotary Drilling - Drill Rig 2 - 2014-03-30 18:49:16	30-Mar-14 18:49:16	30-Mar-14 19:08:21	0 0:19:05	Rotary Drilling	Drill Rig 2	Well6	42-501-20130-08-00	8.541156995			
18					Rotary Drilling - Drill Rig 2 - 2014-03-30 19:19:31	30-Mar-14 19:19:31	30-Mar-14 19:38:51	0 0:19:20	Rotary Drilling	Drill Rig 2	Well6	42-501-20130-08-00	8.55377708			
19					Rotary Drilling - Drill Rig 2 - 2014-03-30 19:48:42	30-Mar-14 19:48:42	30-Mar-14 20:10:38	0 0:21:56	Rotary Drilling	Drill Rig 2	Well6	42-501-20130-08-00	8.566003772			
20					Sliding - Drill Rig 2 - 2014-03-30 20:16:14	30-Mar-14 20:16:14	31-Mar-14 13:20:34	0 17:04:20	Sliding	Drill Rig 2	Well6	42-501-20130-08-00	8.842457879		174.3317	
21					Rotary Drilling - Drill Rig 2 - 2014-03-30 20:17:52	30-Mar-14 20:17:52	30-Mar-14 20:42:06	0 0:24:14	Rotary Drilling	Drill Rig 2	Well6	42-501-20130-08-00	8.578162568			
22					Rotary Drilling - Drill Rig 2 - 2014-03-30 20:47:41	30-Mar-14 20:47:41	30-Mar-14 21:11:06	0 0:23:25	Rotary Drilling	Drill Rig 2	Well6	42-501-20130-08-00	8.589957068			
23					Rotary Drilling - Drill Rig 2 - 2014-03-30 21:16:01	30-Mar-14 21:16:01	30-Mar-14 21:40:58	0 0:24:57	Rotary Drilling	Drill Rig 2	Well6	42-501-20130-08-00	8.601627908			
24					Rotary Drilling - Drill Rig 2 - 2014-03-30 21:47:03	30-Mar-14 21:47:03	30-Mar-14 21:57:58	0 0:10:55	Rotary Drilling	Drill Rig 2	Well6	42-501-20130-08-00	8.611260027			
25					Rotary Drilling - Drill Rig 2 - 2014-03-30 22:05:57	30-Mar-14 22:05:57	30-Mar-14 22:11:06	0 0:05:09	Rotary Drilling	Drill Rig 2	Well6	42-501-20130-08-00	8.617683668			
26					Rotary Drilling - Drill Rig 2 - 2014-03-30 22:19:27	30-Mar-14 22:19:27	30-Mar-14 22:42:35	0 0:23:08	Rotary Drilling	Drill Rig 2	Well6	42-501-20130-08-00	8.626704171			
27					Rotary Drilling - Drill Rig 2 - 2014-03-30 22:46:37	30-Mar-14 22:46:37	30-Mar-14 23:25:14	0 0:38:37	Rotary Drilling	Drill Rig 2	Well6	42-501-20130-08-00	8.6407045			
28					Stick-Slip - Drill Rig 2 - 2014-03-30 23:18:12	30-Mar-14 23:18:12	30-Mar-14 23:20:16	0 0:02:04	Stick-Slip	Drill Rig 2	Well6	42-501-20130-08-00			0.083413	
29					Stick-Slip - Drill Rig 2 - 2014-03-30 23:21:08	30-Mar-14 23:21:08	30-Mar-14 23:23:38	0 0:02:30	Stick-Slip	Drill Rig 2	Well6	42-501-20130-08-00			1.146923	
30					Rotary Drilling - Drill Rig 2 - 2014-03-30 23:25:48	30-Mar-14 23:25:48	30-Mar-14 23:26:21	0 0:00:33	Rotary Drilling	Drill Rig 2	Well6	42-501-20130-08-00	8.648785854			
31					Rotary Drilling - Drill Rig 2 - 2014-03-30 23:27:54	30-Mar-14 23:27:54	30-Mar-14 23:28:06	0 0:00:12	Rotary Drilling	Drill Rig 2	Well6	42-501-20130-08-00	8.649557894			
32					Rotary Drilling - Drill Rig 2 - 2014-03-30 23:31:15	30-Mar-14 23:31:15	31-Mar-14 02:04:02	0 2:32:47	Rotary Drilling	Drill Rig 2	Well6	42-501-20130-08-00	8.681498664			
33					Stick-Slip - Drill Rig 2 - 2014-03-30 23:52:26	30-Mar-14 23:52:26	31-Mar-14 02:06:13	0 0:33:47	Stick-Slip	Drill Rig 2	Well6	42-501-20130-08-00			0.012255	
34					Rotary Drilling - Drill Rig 2 - 2014-03-31 02:04:18	31-Mar-14 02:04:18	31-Mar-14 02:04:45	0 0:00:27	Rotary Drilling	Drill Rig 2	Well6	42-501-20130-08-00	8.712333778			
35					Rotary Drilling - Drill Rig 2 - 2014-03-31 02:06:30	31-Mar-14 02:06:30	31-Mar-14 02:07:07	0 0:00:37	Rotary Drilling	Drill Rig 2	Well6	42-501-20130-08-00	8.713249531			

Asking **How** & **Why**: PI Event Frames are integrated across the PI System

Event detection
Root cause event
identification

Event Generation

Hierarchical & batch
event generation

A scalable event
Infrastructure

Event Database

Event storage
Related data
Calculations
Event auditing

Exploring & comparing
events in Excel
Ad-hoc reporting

Event Visualization

Event trending
Root cause trending
Hierarchical trending
Event attribute visualizing
Event comparing

Reporting &
BI integration
3rd party integration

Event Integration

SOAP access
Mobile app
compatibility
Programmatic access



Integrating Information to Drive Insights

Integration: What could you do if you knew the future of your...

PRODUCTION

Are we on track to hit our production targets?

Do the fiscal projections justify deviating from standard operation?

DEMAND

How much power will our customers need in the next 24 hours?

How much material are we obligated to deliver?

ENVIRONMENT

Are there enough units online to handle the storm?

Is there an abnormal heat wave that will compromise the grid?

Historical



01

Real-Time



Future Data



Integration: Integrate forecasts directly into your PI System

California ISO

ABOUT US PARTICIPATE STAY INFORMED PLANNING MARKET & OPERATIONS RULES

Joining us

Going green

Looking ahead

Today's Outlook Mon Jun 1 08:54:06 2015

Current Demand: 26,827 MW Forecast Peak: 29,796 MW

Calendar

News Releases Recent Documents

MONDAY, 06/1/2015
iCal 12:00 AM - 11:59 PM

TUESDAY, 06/2/2015
iCal 10:00 AM - 11:00 AM Peak Reliability Coordination
iCal 10:00 AM - 11:00 AM Technical Users Group

WEDNESDAY, 06/3/2015
iCal 10:00 AM - 11:00 AM Market Settlement User Group
iCal 1:00 PM - 3:00 PM Outage Management System Customer Page

QUICK LINKS

Board
Business Practice Manuals
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Tariff

STAY INFORMED

Alerts, Warnings and Emergency Notifications
Market Notices
Notification Signups
Recent Documents

RELATED WEBSITES

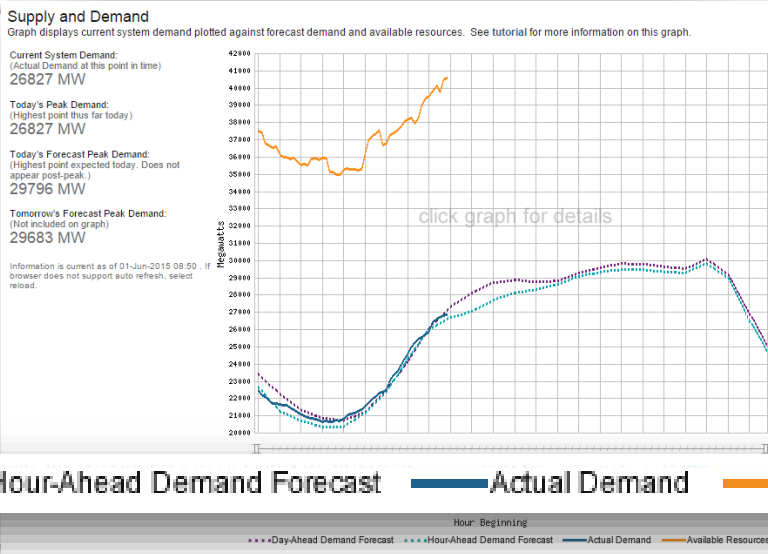
California's Clean Energy Future
Market Participant Portal

STAY CONNECTED

Today's Outlook Mon Jun 1 08:54:06 2015

Current Demand: 26,827 MW Forecast Peak: 29,796 MW

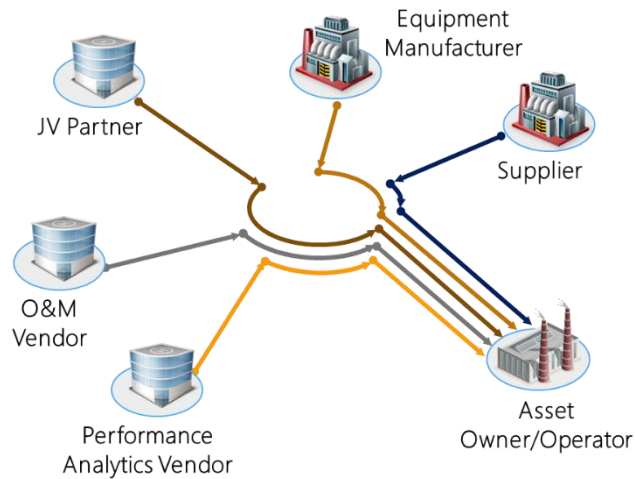
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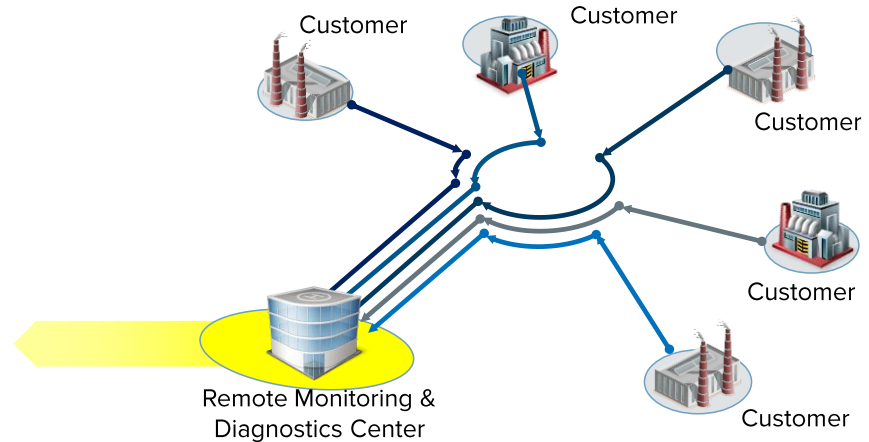
■ ■ ■ Day-Ahead Demand Forecast ■ ■ ■ Hour-Ahead Demand Forecast — Actual Demand — Available

Integration: Leverage external expertise to deliver intelligence with Connected Services

Multiple stakeholders...

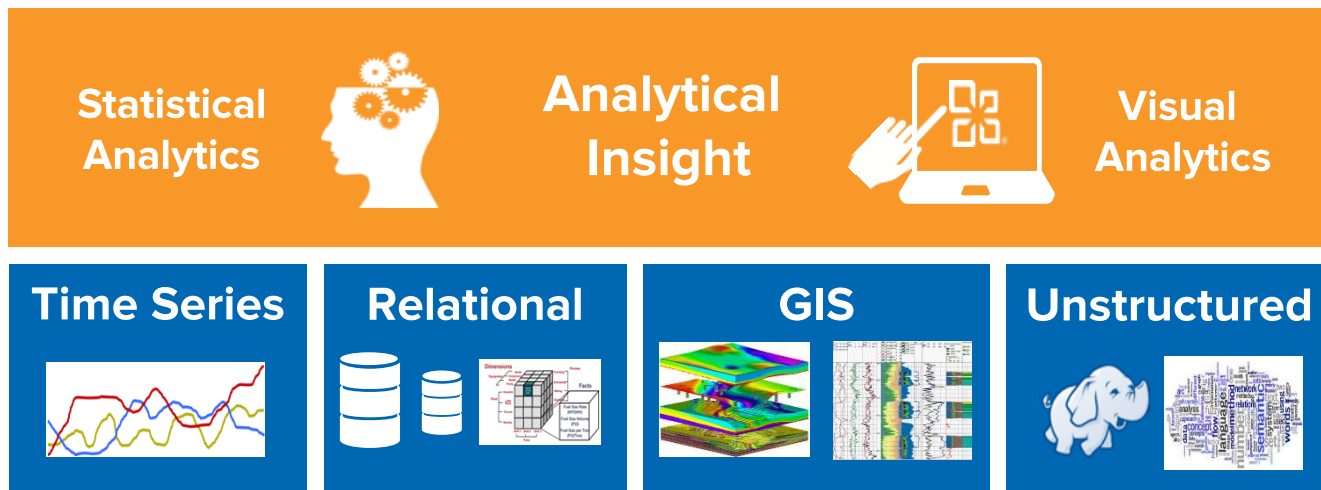


... a Service Provider perspective



Connected Services is a simple, secure, technical and **commercial framework** for **service providers** to obtain the data they need to drive service excellence

Integration: Derive Big Data insights and intelligence from your PI System data



The Internet of Things Creates Big Data

The PI System let you Leverage Big Data for Insights

Integration: Employ PI Integrators to gain Business Intelligence for the **Physical** World

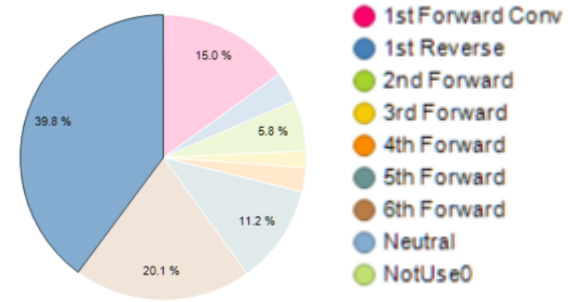


3 Contexts / 3 Perspectives

- Time-series: Time Focus
- Assets: Equipment Focus
- Events: Event Focus

PI
Integrators

Gear Select by Operator



2015-04-23 15:59:50	23.6547420812366	23.2147636153275	28.3663721651326
2015-04-23 16:00:00	23.6547420812366	23.2147636153275	28.3663721651326
2015-04-23 16:00:10	23.6547420812366	23.2147636153275	28.3663721651326
2015-04-23 16:00:20	23.6547420812366	23.2147636153275	28.3663721651326
2015-04-23 16:00:30	23.6547420812366	23.2147636153275	28.3663721651326
2015-04-23 16:00:40	23.6547420812366	23.2147636153275	28.3663721651326
2015-04-23 16:00:50	23.6547420812366	23.2147636153275	28.3663721651326
2015-04-23 16:01:00	23.6547420812366	23.2147636153275	28.3663721651326
2015-04-23 16:01:10	23.6547420812366	23.2147636153275	28.3663721651326

Integration: Overcome the challenges to discovering insights



Increasing systems
complexity



Scarcity of domain &
industry **expertise**



Cost and resource
constraints



Not everyone has direct access to information, leaving many potentially **impactful** insights **undiscovered**

Noble Energy presents on the value of integrating data

Our Approach Data as a Strategic Asset

Gain New Insights Into Production Dynamics

- Across a wide variety of disparate data sources and variables such as well information systems, SCADA data, sensors, and unstructured data

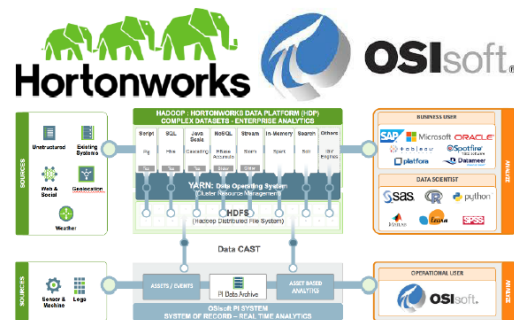
Build Executive Consensus and Business Sponsorship

- Start with a single business unit – prove the value
- Recognition that data provides sustainable competitive advantage
- Widespread, systemic value creation because data is managed as professionally as capital or labor

Rely on Trusted Partners to Assist

- Combination of Noble team members along with Hortonworks (Hadoop) and OSIsoft (PI / CAST)
- High performing operational and data science team (Python)

<http://www.osisoft.com/Templates/item-abstract.aspx?id=12337>



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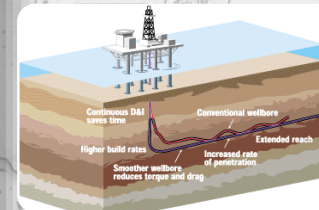
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Devon presents on data integration

What do we gain?

- BI tools become more responsive (Spotfire)
- Users can build queries ad hoc (SQL)
- Scheduled and ad-hoc reporting (SSRS)
- Historical data available to existing BI tools
- Real-time data in Hadoop
- Align data for BI within a common time scheme
- Enable unique uses for real-time data



Integration: PI Integrator Roadmap - Q3 2015

PI Integrator for Business Analytics: BI Edition

- Create PI Views
- Access decision ready data via ODBC
 - First class support for Tableau, Tibco Spotfire, and Microsoft BI
 - Works with any software with an ODBC data source connection

PI Integrator for SAP® HANA®

- Automatically creates Virtual Tables via Smart Data Access
- Native integration with SAP HANA
 - Linux and SAP HANA Cloud Platform
- Available through SAP

The slide features several decorative elements: a large blue circle with a white three-leaf logo in the top left; a large blue circle with a white three-leaf logo in the top right; a medium blue circle with a white three-leaf logo in the bottom right; a small blue circle with a white three-leaf logo in the bottom right; and a small blue circle with a white three-leaf logo in the bottom left. The text "We believe **People** with **Data** can **Transform** their world" is centered in the middle of the slide.

We believe **People** with **Data** can **Transform** their world

감사합니다

谢谢

Danke

Merci

Gracias

Thank You

ありがとう

Спасибо

Obrigado



Questions

Please wait for the
microphone before asking
your questions



State your
name & company

Please don't forget to...

Complete the Survey
for this session



The **Power of Data**
DECISION READY IN REAL-TIME

Evaluation Form (Seminar Location - Date)

Name: _____

Company: _____

Email: _____

Quality and content of the presentations

Poor Good Excellent N/A

Welcome	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The Journey To Real-Time Operational Intelligence	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The Power of Connection	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tank Level Management System	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Using the PI System to Aid in Troubleshooting Operational Aspects of Oil and Gas Well Drilling and Completion	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Unleash your Infrastructure	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Information on the Spot	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wrap-up/Seminar Conclusion	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Quality and organization of the seminar

Choice of date	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Time allowed for lunch/breaks	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Choice of presentations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Break and time allowed for the presentation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Come See Us At The Pods!

Bring your questions, comments, and suggestions!

