

OSIsoft REGIONAL S SEMINARS S The Power of Data

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Infrastructure for Streaming Data and Events The PI System

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Examples of infrastructure

- ✓ Water
- ✓ Electricity
- ✓ Gas
- ✓ Telephone
- ✓ Transportation
- ✓ Internet



Data as a Utility

Data be available without a lot of friction

Data challenges

- Heterogeneous data landscape
- Sampling rate, fidelity, scale
- Adapt to changing business requirements
- New regulations, new corporate initiatives
- Why Infrastructure instead of point solutions

Challenge

Heterogeneous data landscape

Challenge: Heterogeneous Data Landscape



Geography



Data Consolidation



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Asset reliability

Asset Management CBM "Solution"

Gather Asset Information Temperature Flow Pressure Vibration # of start/stops, etc.

Transform into "Condition" Information

Efficiency (%) Design vs Actual Rate of Change Cycles per period Perform Analysis Rules - CBM

> Time in Service Total Volume Performance DvA

Max T or Vib

Perform analytics, visualization, propagation: KPIs Visuals Reports Applications Integrate into work management Systems

(Maximo, SAP PM, Oracle, Infor EAM,...)

Functionality done in the PI System Infrastructure

Asset health score

Address 🔕 http://njnwkdev29/Asset%20Managment2/WebPages/LtcsCA-ActionSummaryNew.aspx

🗱 Home Documents and Lists Create Site Settings Help

PSEG

LTC CA-Action New Summary Report

CA Records

Details	Division	Floc	Floc Descr	-C Equipment	Equip Descr	Score	Person	Status
-0-	CE	IPE-CE-POH -T1	# 1 Transformer	00000000010504694	Load Tap Changer (UVT)	6.25		
-0-	CE	IPE-CE-SDN -1TRX	500-1 Transformer	00000000010505424	Load Tap Changer A (LRS700)	4.9	George	Pending Action
-0-	so	IPE-SO-SLA -T1LTC	220-1 Transformer Tap Changer	00000000010526193	Load Tap Changer SEL 220-1	4.4	Mark	Pending Action I
-0-	ME	IPE-ME-HAW -T2	# 2 Transformer	00000000010507132	Load Tap Changer	3.1	Paul	ок
-0-	CE	IPE-CE-SDN -1TRX	500-1 Transformer	00000000010505426	Load Tap Changer C (LRS700)	3	George	Pending Action
-0-	CE	IPE-CE-SDN -2TRX	500-2 Transformer	00000000010505430	Load Tap Changer C (LRS700)	3	Mark	Pending Action
-0-	CE	IPE-CE-SDN -2TRX	500-2 Transformer	00000000010505427	Load Tap Changer A (LRS700)	3	Mark	Pending Action
-0-	PA	IPE-PA-HOE -T1	# 1 Transformer	00000000010542713	Load Tap Changer B	3	Paul	Pending Action
•	CE	IPE-CE-WOR -T3	# 3 Transformer	00000000010540520	Load Tap Changer (LR 200)	3	George	Pending Action
-0-	PA	IPE-PA-NEW -T40	# 40 Transformer	00000000010542737	Load Tap Changer	3	Paul	Pending Action
-0-	CE	IPE-CE-SBB -2TRX	500-2 Transformer	00000000010621130	Load Tap Changer C	3	George	Pending Action
-0-	CE	IPE-CE-SDN -1TRX	500-1 Transformer	00000000010505425	Load Tap Changer B (LRS700)	3	George	Pending Action
-0-	CE	IPE-CE-GSE -31G	26-3 Transformer	00000000010023775	Load Tap Changer	2.8		14
-0-	CE	IPE-CE-SOS -T2	# 2 Transformer	00000000010503189	Load Tap Changer (URT)	2.65	George	Pending Action
-0-	PA	IPE-PA-SWK -4PAR	# 4 PAR E-2257	00000000010542778	Load Tap Changer 4A	2.65		
-0-	CE	IPE-CE-GSE -132-7	132-7 Transformer	00000000010501565	Load Tap Changer	2.6	Mark	Pending Action
-0-	so	IPE-SO-MAR -T2	# 2 Transformer	00000000010522898	Load Tap Changer Vacuum	2.5	George	Pending Action
•	so	IPE-SO-SNF -4TRX	500-4 Transformer	00000000010523970	Load Tap Changer 500-4A	2.5		31 1
-0-	so	IPE-SO-MRO -T1	# 1 Transformer	00000000010525854	Load Tap Changer	2.5	Mark	Pending Action
-0-	PA	IPE-PA-HOM -T3	# 3 Transformer	00000000010515806	Load Tap Changer	2.4		
-0-	CE	IPE-CE-SDN -3TRX	500-3 Transformer	000000000010505433	Load Tap Changer C (LRS700)	2.4	Paul	Pending Action

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Content Editor Web Part					▼ Delta	X Total Comb	ustible Gas				-				
 View and Trend Equipment CA LTC New Action Algorit 	PI Points nm Rules				Detail	s ApprType LTC	Sample Date 07/06/2009	CO H2 Acetylene 475 305 4915	Ethane Ethylene 40865 2.1297E+05	Methane 10714	< > Combustible Gas 2.7024E+05				
Algorithm Factors					÷ •0•	LTC	04/05/2007	47 0 0	1 4	2	54				
Factor	Raw Value	Case Value	Weight %	Score	••	LTC	08/29/2006	168 37 0	1 3	3	212				
Detectable Acetylene	4915	10	25	2.5	-0-	LTC	05/11/2006	10 0 0	1 0	2	13				
Gas Rate of Change High Total Gas	6.08 270243	5 10	20	0.75	-0-	LTC	04/28/2006	48 0 0	8 28	5	89 Chamina 1 to 5 of 22				
High Water	48	0	10	0							Showing 1 to 5 of 23				
Low Dielectric	34.4	0	10	0	Delta	X Water									
LTC THRU NEUTRAL	95	10	10	1											
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7			cel.tcNewActionTrendS 6.25								Showing 1 to 5 of 23				
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					6 Mor	aths Counter	Operations								
					0 110	icits counter	operations								

Enterprise data presentation



- Disparate systems
 - distributed process control systems
 - stand-alone instruments with paper printouts
- Capture and aggregate data
 - for visualisation, reporting & analysis

Unicorn

		nie e elete en				
PI Syste	em = enterp	rise data pr	esentation a	ind metadat	a layer 🛛 🔄	
						2/
Various	Emerson	GE	Siemens	ABB	Various PLC's/	

PCS7

BMS – Building Management System

DeltaV

PLC – Programmable Logic Controller

800xA

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BMS's

Instruments

Manufacturing requirements

- Collect all data (GMP & non-GMP)
 - Process, Alarm & Events, Batch Events
- Deliver a consistent infrastructure globally
 - no differentiation from R&D to Pilot to Commercial
- Provide common visualisation
 - Consolidated data visualization for improved process monitoring and historical batch analysis
 - Consolidated alarm reporting for process control, building management, laboratory equipment, utility systems, warehouse equipment...
- Targeted compliance reporting
 - Autoclaves, washers (non-MES related!)

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Practice

Integrated Manufacturing Systems



Challenge

Data fidelity, sampling rate, scale...

What could you be missing?



Active Power - 10 minute vs 1 second sampling



Even better ...



10 minute drive train vibration data vs. 1 second data...

SCADA:

-11/24/2011 6:00 J/M	-1U24/2011 12:00 PM	-11/24/2011 6:00 PN	-11/25/2011 12:00 AM	1U25/2011 6:00 JW	1U25/2011 12:00 PM	-11/25/2011 6:00 PN	-11/26/2011 12:00 AM	-11/26/2011 6:00 MM	11/25/2011 12:00 PM	-11/26/2011 6:00 PN	11/27/2011 12:00 AM	-11.127/2011 6:00 JVM	11/27/2011 12:00 PM	-11/27/2011 6:00 PM	-11/28/2011 12:00 AM	-11/28/2011 6:00 JW	-11/28/2011 12:00 PM	-11/28/2011 6:00 PM	-11/20/2011 12:00 AM	11/29/2011 6:00 JVM	-11/29/2011 12:00 PM	11/29/2011 6:00 PH	-11/30/2011 12:00 AM	MY 00:9 1102/00/11	-11/30/2011 12:00 PM	-11/30/2011 6:00 PH	12/1/2011 12:00 JVM

PI System:



Suzion: Direct to Controller Integration...



"Having all analog values, digital states, fault states, user info, controller KPIs, and parameter settings adds a significant amount of value to a PI System."

Chris Wozniak – Senior SCADA Engineer, Suzlon

More Data Challenges



Nalco Company: Essential Expertise for Water, Energy, and Air^s

- World's leading process improvement company
- 70,000 customers in more than 130 countries
- 75 years of experience in the hydrocarbon industries



Nalco's Value Proposal



"This solution allows us to offer our customers high-quality performance data, and allows them and our service engineers to optimize treatment programs for maximum cost/performance and sustainability credits, as well as benchmark their operations ."

- Visibility Across Customer Chain
- Software + Services
- Enabling People to Provide Value-Add

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The Result: Dynamic Access to Real-Time Data



- Integration of Nalco and Customer data to provide the whole picture
- Condition-based maintenance and performance optimization
- Role-based visibility into plant operations and performance
- Summary and KPI information to customers and Nalco management
- Client-based tools to provide plant engineers with additional customized information analysis

Put the results in customers hands to bring greater value to the service Nalco provides

Nalco View - ProcessBook





Challenge

New regulations, or

New corporate initiatives (sustainability)

Regulations

- Clean Air Act
- FERC
- NERC CIP
- Sarbanes Oxley
- 21CFR Part 11
- OSHA Cal/OSHA



"We're doing this so everyone will be used to more government regulations. "

PULP & PAPER

International Paper

Environmental Monitor: Automation Journey

"The CEMR system allowed us 30 days to analyze data before (Information Collection Request) deadline."



missions Inventory - Source Detail (020912)	
ated On: 3/5/2012 4:39:25 PM	
uation Period: 1/1/2011 12:00:01 AM To 12/31/2011	11 59 59 PM

Mill - Blooch - Blooch Plant A&B-

								B						
		ADBTP-(HVID)												
NODE	Pollutant	Activity	Activity Units	Emission	EFWOM	Control	Emissions	Emissio						
1	CO	362/36	ADRIP (HVD)	7.9936-931	LEVICITEP	8.00 %	761.492	IONE						
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- 1	12-Chrysteratogana	387,126	ADRIP-(HVD)	9.7688-696	BALDTEP	900%	1206-083	IONE						
	Acetudebade	387,126	ACHITP-(HVD)	15088-002	LINIACITAR	800%	877	lose						
- 1	Acettes	367/26	ADBTP (HVD)	37008-003	BALOTER	8.00%	8.72	NONE						
- 1	Academ	387/36	ACETP (HVD)	623ME-605	BMDTBP	800%	041	10115						
1	Beszählehalle	387/76	ADBTP (HND)	6.308-004	\$44,018/P	0.00%	01	lons.						
- 1	Descene	367/76	ACIDTP-(FIND)	57446.495	BAADTDP	0.00%	041	lans.						
- 1	CaliconDoulide	367/76	ACOTP-(-MOI	15926-004	MADTOP	9.00 N	142	lohe						
- 1	Caton Terrationite	062/26	ACOTP-(HND)	50635-006	8/4/DTDP	9.00 N	0.895-004	10ht						
- 1	CMuree	067/76	ACOTP-(HMD)	20002-000	LEIACTEP	9.00%	3.45	lons						
	Oxerine Disside	067/76	ADDIP-(-/VD)	2265-000	LEUXOTEP	0.0016	9.40	long						
	Chlorobenome	367/36	ACOTP (-(vO)	1070E-008	NM.OTEP	9.00 N	2,975-000	lons						
	Chierolom	007/20	ACOTP (-/wD)	4.000E (003	LDIACTEP	9.00%	920	ions.						
- 1	Crepole Invited isomeral	069/726	ACREP-p-(vD)	GSENE CRO	BMDTDP :	0.0014	1.00	long						
- 1	Crotonaldekede	262,126	ADDIP (HMD)	4.005-005	BM.01BP	9.00 N	7.945.003	long						
1	Cumere	367,/36	ADRIP (HVD)	2.1%E.004	BMD18P	9.00%	354	lon2						
1	Cyclohosancee	387/36	ACIUTP (HVD)	A ADDRE CUS	\$45,018F	3.00%	9,62	lond						
	Citrates Citration	387,126	ACRIP (HVD)	11405-004	BALDIRE	300%	0.8	IONE						
	Children Salide	3870,126	ACREP (HMD)	22208-083	8MOTR#	8.00 %	343	IONE						
	Etunol	387/26	ACHIP-(HVD)	25688-683	BR/018P	8.00%	248	IONE						
CIMANE	EthelElectrola	362/26	ACRITP (HMD)	1450E-005	BMOTEP	\$00 ×	2.936.033	lone						
	Formattengte	362/26	AC6TP (HVD)	7 6605 404	LBIADTEP	900%	0.6	101/5						
- 1	Hydrochlorio Acid	367,/76	ADBTP-(HND)	22258-462	EAADTEP	200%	4.31	10/16						
	In the second se	000.000	ADDRESS & M. POL	A ACCE COST	IN LA CORDO	300.00	5.64							

Solution Customer Results / Benefits • Consolidate environmental reporting using live process measurements • Built solution around the PI System installed in the 1990's • Achieved cross report consistency • Gained ability to respond to "Impossible" data requests • Enabled sustainability goals by providing a common data source

Why Infrastructure approach is better?

Solutions vs. Infrastructure

- Cost curves (Capital vs. Operational)
- Support Lifecycles
- Where does the knowledge end up
- Probability of Success
- Evolution of requirements over time
- Project N+1 costs less
 - Faster delivery of value
 - Start when people are ready (less RFP process if you already have it)

Systems you build evolves over time



Energy reduction



Functionality done in the PI System Infrastructure

PI System infrastructure in MOM and EMI



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Neutral Vendor

• Pure play vendor

- Unique capabilities
 - Asset centric capabilities
 - Event Management
 - Industry leader in data security
 - Highest performing and best scaling total solution

And, there is more...

- World class technical support
- Center of Excellence (CoE)
- Partner Solution Showcase
- OSIsoft vCampus <u>http://vCampus.osisoft.com</u>
- Ecosystem

Contact

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Product Manager OSIsoft, LLC

Call to action

What's your new initiative that leverages the PI System infrastructure?





