


Merck's Journey with OSIsoft's Enterprise Agreement & Standardizing on a PI System Core Build



Presented by **Salla Diop, Project/Product Manager**



About Me

Salla Diop

Project/Product Manager Manufacturing Data Systems

MSD Manufacturing Division - IT (MMD-IT)

Background:

- *MSD Since 2003 (12 years)*
- *Automation Engineer, Production Support
Vaccine Formulation and Filling, Packaging and Utilities areas*
- *Capital Project Support
Vaccine Formulation and Filling, Packaging and Utilities areas*
- *Manufacturing Data Systems
Siemens PAT-IT System (SIPAT), OSIsoft PI System, Other PAT Applications*
- *Training: BE & MSE in Electrical Engineering*

GNU/Linux & Open Source Software Enthusiast!

Agenda

- **About MSD/Merck** (US/Canada)
- Background on MSD & OSIsoft PI System
- Business Challenges
- Solution
- Results and Benefits
- Conclusion, Challenges and Future Plans



MSD

Helping the World Be well.

Key Company Facts

WHO WE ARE

We are known as **MSD**. We are known as **Merck** in the United States and Canada.

RICH HISTORY

Operating since 1851

BUSINESSES

Pharmaceuticals, Vaccines, Biologics and Animal Health

2014 REVENUES

\$42.2 billion; 61% of sales come from outside the United States

2014 R&D EXPENSE

\$6.5 billion; 25 drug candidates in late-stage development; key areas: oncology, CV, diabetes, respiratory & immunology, neurology, infectious disease and vaccines

HEADQUARTERS

Kenilworth, New Jersey, U.S.A.

EMPLOYEES

Approximately 70,000 worldwide (as of 12/31/14)

Business Areas of Focus

PRESCRIPTION PHARMACEUTICALS & VACCINES



Major Therapeutic Areas

- Cardiovascular
- Diabetes & Obesity
- Infectious Disease
- Neurosciences
- Oncology
- Respiratory & Immunology
- Vaccine-preventable diseases

ANIMAL HEALTH



- Livestock
- Poultry
- Companion Animal
- Aquaculture

Our Mission

To discover, develop and provide innovative products and services that save and improve lives around the world.

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Background - OSIsoft and MSD/Merck

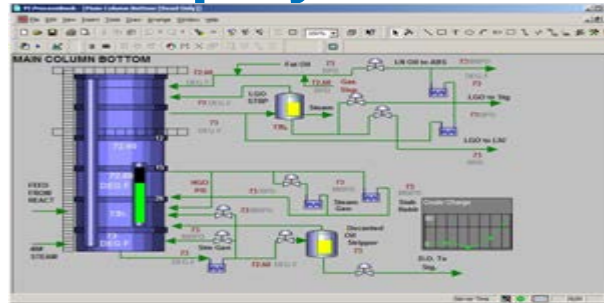
- First OSIsoft PI System implementation was 1993 (22 years ago)
- The PI Server is at ~ 18 sites around the world
- Manufacturing, Research, and Utilities
- >700,000 tags
- >400 interfaces
- >200 servers
- 24x7x365 availability
- >1000 users

PI Core Use Cases & Displays



Excel PI DataLink

- Proactive processes analysis & optimization
- Process investigations
- Batch reporting
- Multivariate data analysis
- Shop floor displays

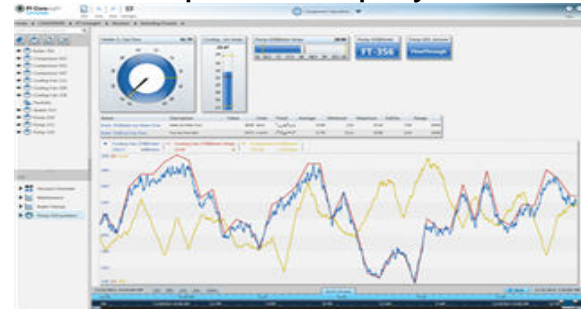


PI ProcessBook

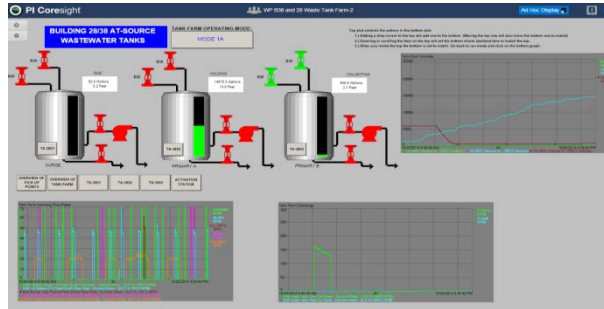
- Remote alerting
- Environmental monitoring and reporting
- Utilities cost reduction
- Annual product reports



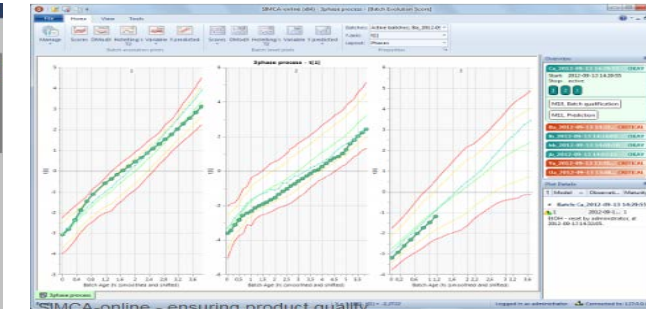
RtReports



Web (PI Coresight)



Mobile (PI Coresight)



Multivariate analysis

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Business challenges

“Provide more process data capability and consistency across MSD for less cost and with fewer resources”

Do More

- Real-time process analysis & PAT (Process Analytical Technology)
- Batch reporting
- Support New Functionality from OSIsoft
- Broader data access

Consistency

- Quality approach (documents, procedures)
- Rationale of where to use PI (merger with Schering-Plough in 2009)
- Drive what data is appropriate to store in the PI Server
- Reduce Hardware and Software versions/variety

Less Cost

- Architecture (infrastructure, interfaces, security)
- Maintenance and operations
- Issue solved at one site not applied to others
- Short-term cost savings that cost much more over life of system

Fewer Resources

- Support through Partners - MSD focus on *using* the system rather than *running* the system
- Project work through Partners
- Reduce Re-engineering

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MSD PI Core System Solution Overview

- Where to deploy PI Core
- STANDARDS, STANDARDS, STANDARDS:
 - PI Use Cases
 - Software & Version
 - Architecture
 - Integration
 - System Life Cycle Documentation
 - Deployment Model
 - Support Model
- Managed enhancements
- Leverage and rely more on “Partners”
- Deployment Timeline

Solution – Where to deploy the PI System

- Factory selection criteria
 - High revenue products (% of total revenue)
 - Product with process monitoring requirements
 - New products (Early in product lifecycle)
 - Key sites strategic including former Schering-Plough
 - Opportunistically during automation upgrade projects

Solution - Business Objectives to PI System Function Mapping

BUSINESS OBJECTIVES		OSIsoft Product Functions												INFRAST.				
		INTF	SERVERS		ANALY	CLIENTS												
PI System Functions -->		Data Collection, Buffering, Failover	Manual Data Entry	Data Storage & Secure Access	Equipment Context / Data Abstraction	Event / Batch Context	Real-Time Calculations	Real-Time Critical Event Notification	Real-Time & Historical Data Visualization	Web Portal / Broad Access to Data	Web Portal Reports & Charts	Ad-Hoc Analysis; Fast Access to PI Data	Electronic Batch Reports	Integrate PI Data w/Other Systems				
PI System Products -->		PI Interfaces	PI Manual Logger	PI Server	PI AF	Event Frames / PI Batch	PI ACE / 7 for StreamInsight	PI Notifications	PI Client: (PB, DL, BV)	PI WebPorts	PI DataLink Server	PI Coresight	RtReports	PI Data Access Products	SQL Server 2008 R2	SharePoint Foundation	SharePoint Enterprise	PI TEST
1	Standard Data Collection & Data Abstraction Layer	X		X	X	X			X	X	X	X						
2	Transparency of Time Zone Issues to End Users	X		X	X	X			X	X	X	X						
3	Real-Time Process Monitoring	X		X	X	X		X	X	X	X	X						
4	Batch Trending and Comparison Analysis	X		X	X	X			X	X	X	F						
5	Atypical Investigations and Root Cause Analysis	X		X	X	X			X			X						
6	Proactive Process Analysis (PPA)	X		X	X	X		X	X	X	X	F						
7	Electronic Batch Reporting	X		X	X	X							X					
8	Data Source & Integration with Various Analysis Systems	X		X	X	X		X							X			
8a	Umetrics SIMCA-Batch On-Line (SBOL)	X		X	X	X									X			
8b	Siemens SIPAT	X		X											X			
8c	Minitab	X		X	X	X			X						X			
8d	SAP MII	X		X	X	X		X							X			
8e	Maximo / SAP (Enterprise Asset Management System)	X		X	X			X							X			
9	Analyze Correlations Between Process Parameters and Release Results	X		X	X	X			X			F		X				
10	Manual Data Records Aggregation		X	X	X	X			X	X	X							
11	Monitor Environmental Parameters	X		X	X	F		X	X	X	X							
12	Monitor Secondary Parameters (Utility Consumption, etc.)	X		X	X	F		X	X	X	X							
13	Process Notifications and Report Scheduling	X		X	X			X		X	X	F						
14	Remote Process Performance Monitoring and Dashboards	X		X	X	X				X	X	X						
15	Equipment Performance & Health Monitoring	X		X	X	F		X	X	X	X	X						
16	Process Learning Tool	X		X	X	X			X			X						

LEGEND:

	Not Selected
X	Selected Function
F	Future Function
B	Dependent on Business Use Case (Optional)

Solution - Standard PI System Components

Adopted standard PI System components with standard Design Specification & Pre-Approved Qualification Documents

- | | |
|-----------------------|--|
| • PI Server | PI Server |
| • PI AF | PI Asset Framework Server |
| • PI Coresight | Regional PI Coresight Server |
| • PI WebParts | PI WebParts Server (one site only) |
| • mPI | Regional Managed PI Server (crosslink) |
| • RtReport | RtReports Server |

PI System enhancements/new features:

- | | |
|--|-----------------------------|
| • PI AF, PI Coresight, PI WebParts, mPI | (new features for MSD) |
| • PI HA | High Availability (HA) |
| • WIS | Windows Integrated Security |

Other

- **Topview** (global)

Solution - Standard Clients & Interfaces

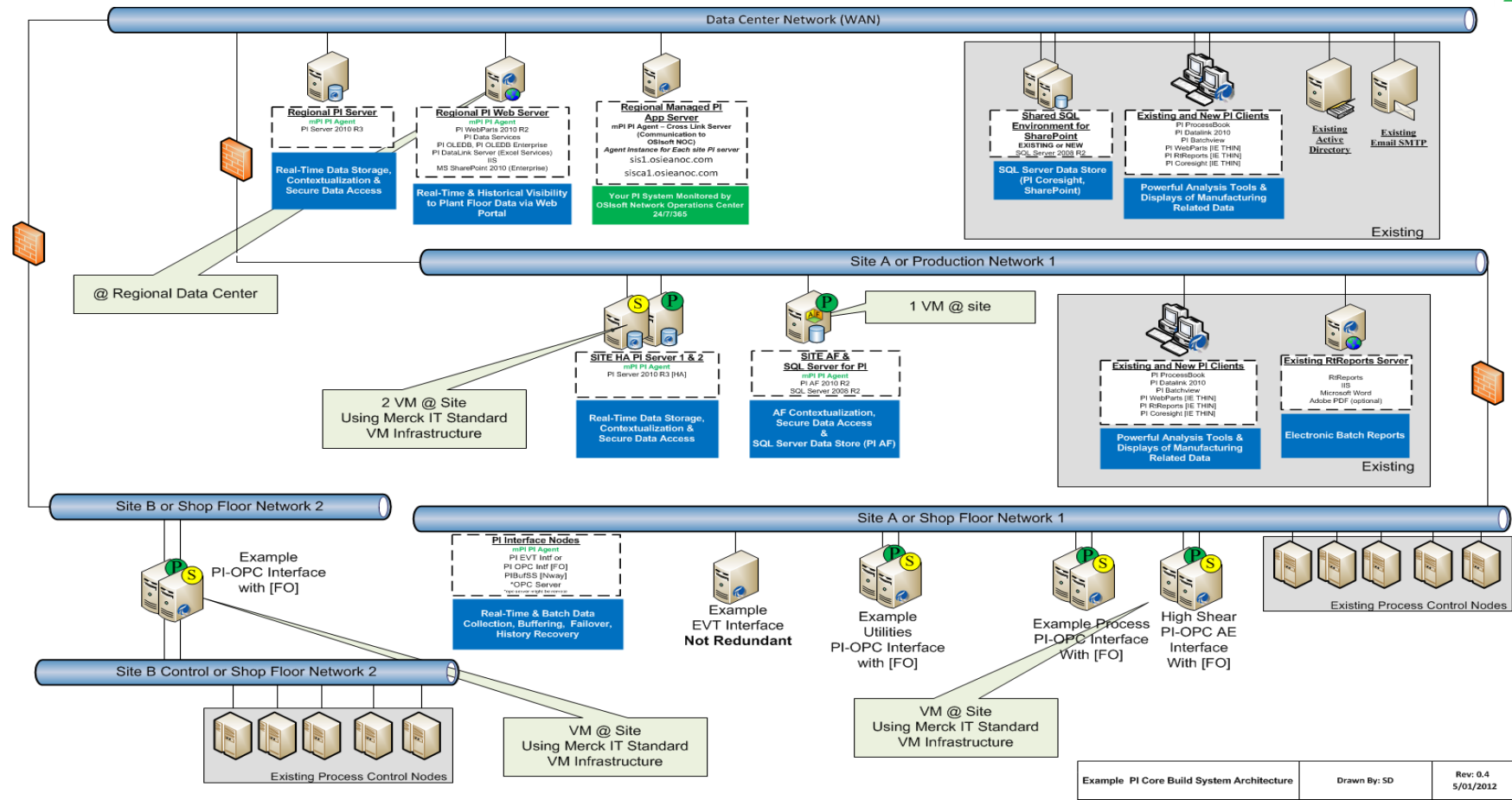
Adopted standard qualified clients (available through company wide software repository/install system)

- **PI ProcessBook**
- **PI DataLink**
- **PI BatchView**

Adopted standard interfaces with standard Design Specification & Pre-Approved Qualification Documents

- **OPC DA** Data Access
- **OPC AE** Alarm & Events
- **EVT** Event Interface
- **EMDVB** Emerson DeltaV Batch Interface
- **UFL** PI Universal File Loader Interface
- **MODBUSE** Modbus Ethernet Interface
- **MODBUSP** Modbus Plus Interface
- **PIML** PI Manual Logger (requires business case)
- **RDBMS** PI Relational Database Management System Interface
- **PIBagen** PI Batch Generator

Solution - Standard PI Core Build Architecture



Solution – Standard Integration with embedded PI Server

Source data types

- 1. Continuous
 - Auto tag creation
- 2. Alarm & Events
- 3. Batch (executed recipes)
- 4. Physical / equipment (S88, state)
- 5. Control Recipe Master & formulas
- 6. User Management
- 7. Graphics / HMI

DeltaV
data

Data exposure to analytics

Continuous

•PI Server via PI-PI with auto tag creation

A&E

•PI Server via EMDVB interface

Batch

•PI Server via EVMDB interface

Physical
Equipment

•PI Server via AF Client (reqs. manual export in DV)

Control Recipe

•No solution – Ad-hoc manual DV export

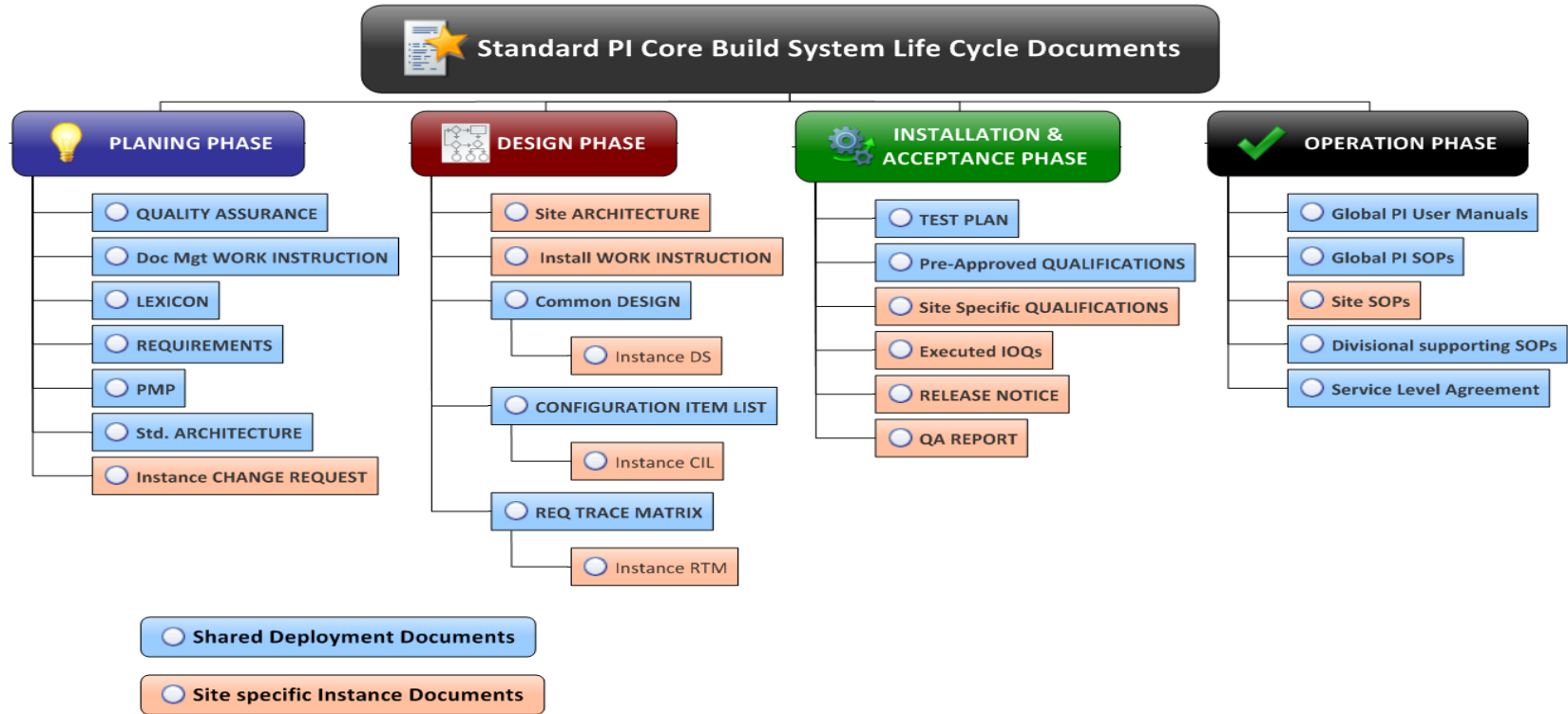
User Manager

•No solution – Ad-hoc manual DV export

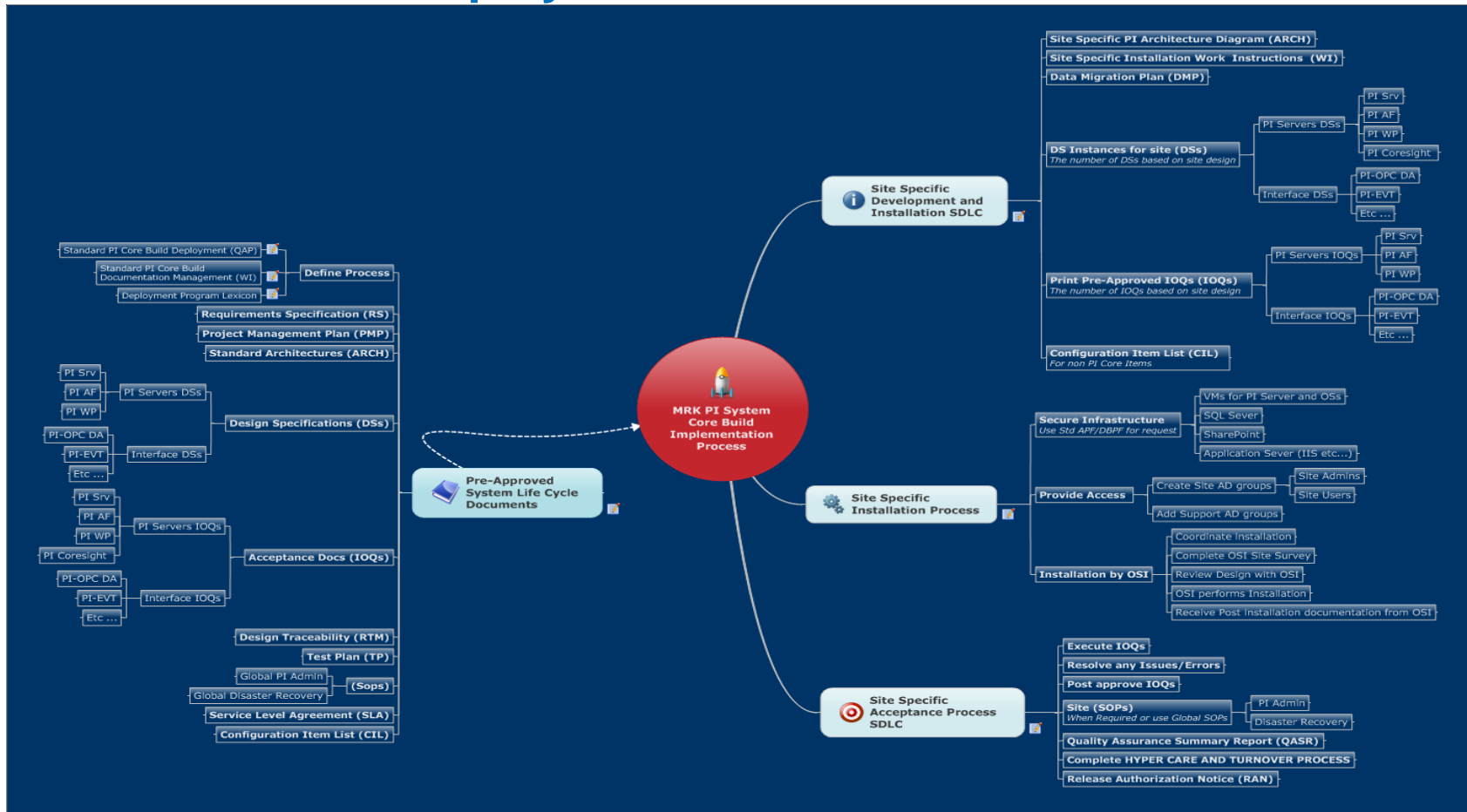
Graphic / HMI

•No solution – Ad-hoc manual DV export

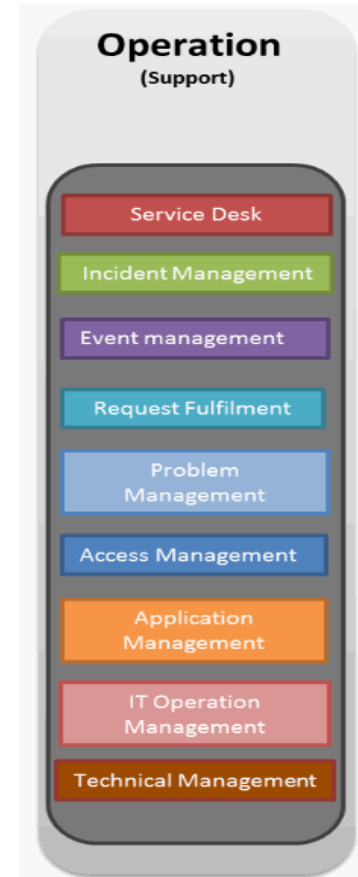
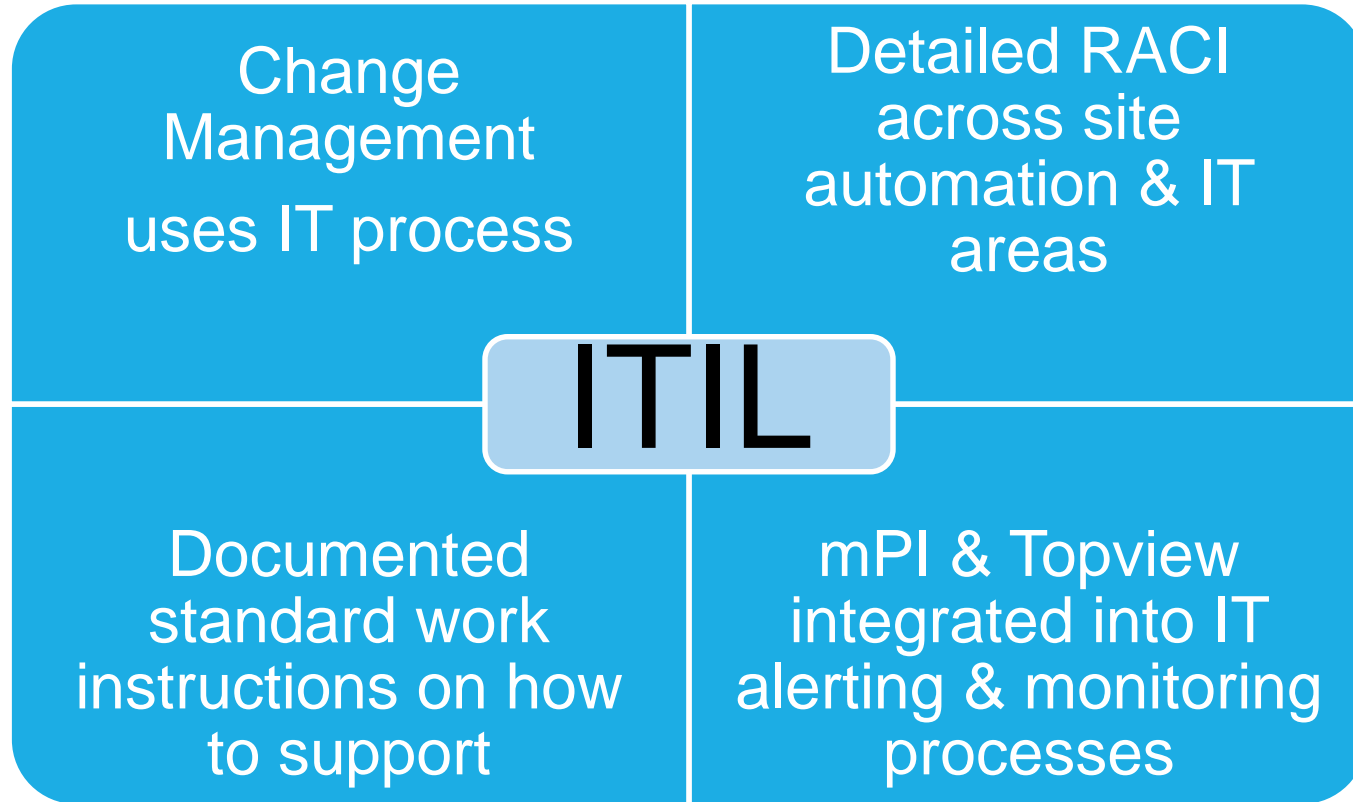
Solution – Standard Documentation & Qualification



Solution - Standard Deployment Process



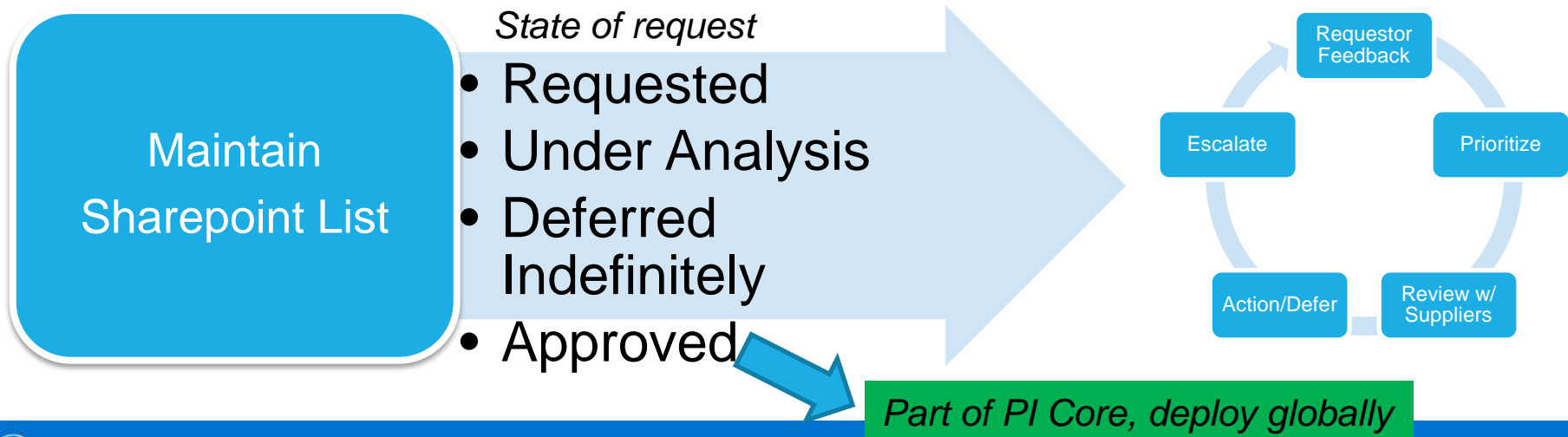
Solution – Maintenance and Operations



Information Technology Infrastructure Library - [Wikipedia](https://en.wikipedia.org/wiki/Information_Technology_Infrastructure_Library)

Solution – Enhancement Management

- “Product management” of the PI System at MSD
- **Examples**
 - New interface type needed for automation system
 - Windows server versions or Internet Explorer obsolete
 - New tools like Coresight requested
 - Change processes for non-GMP tags for utilities

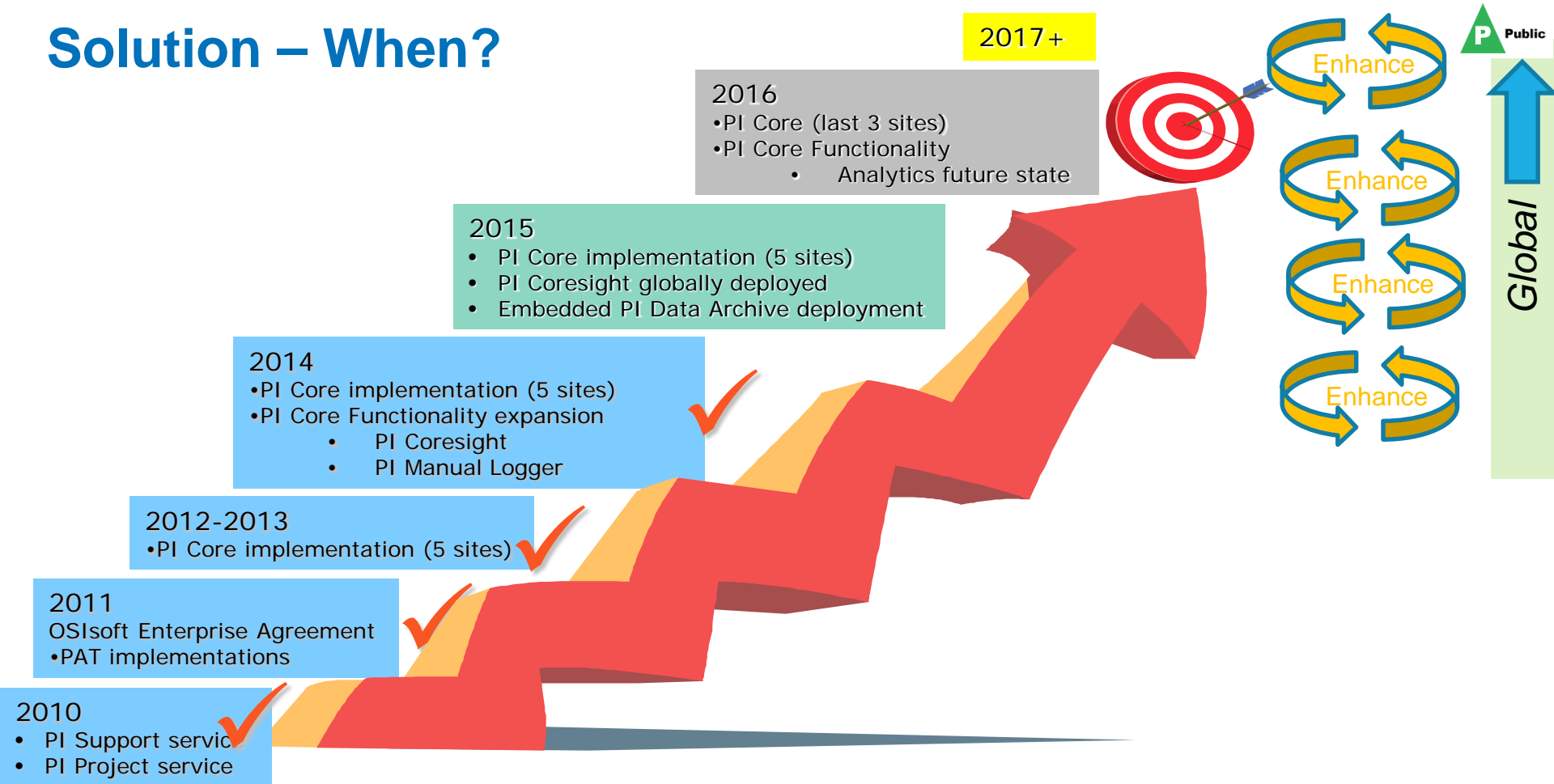


Solution – “Connected” Partners

MSD	OSIsoft w/ EA (4 years)	IT Offshore supplier for maintenance and operations (5 years)	2-3 key automation suppliers for PI (5 years)
<ul style="list-style-type: none"> • A Global approach • Above-Site IT funded 5 year program • At site Business and IT key to each project • At site Quality key to each project 	<ul style="list-style-type: none"> • Expert support • Installations • License management • Architecture guidance • Proactive monitoring • Complex root cause analysis 	<ul style="list-style-type: none"> • Same partner as other IT systems • Run just like other IT systems • PI more complicated management due to non IT source systems 	<ul style="list-style-type: none"> • Do project work (upgrades, interface installs, reports) • Work consistently across sites as same people involved across sites

Ongoing Collaboration

Solution – When?



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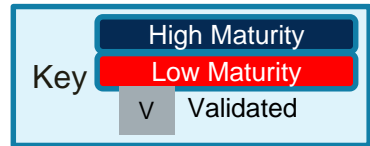
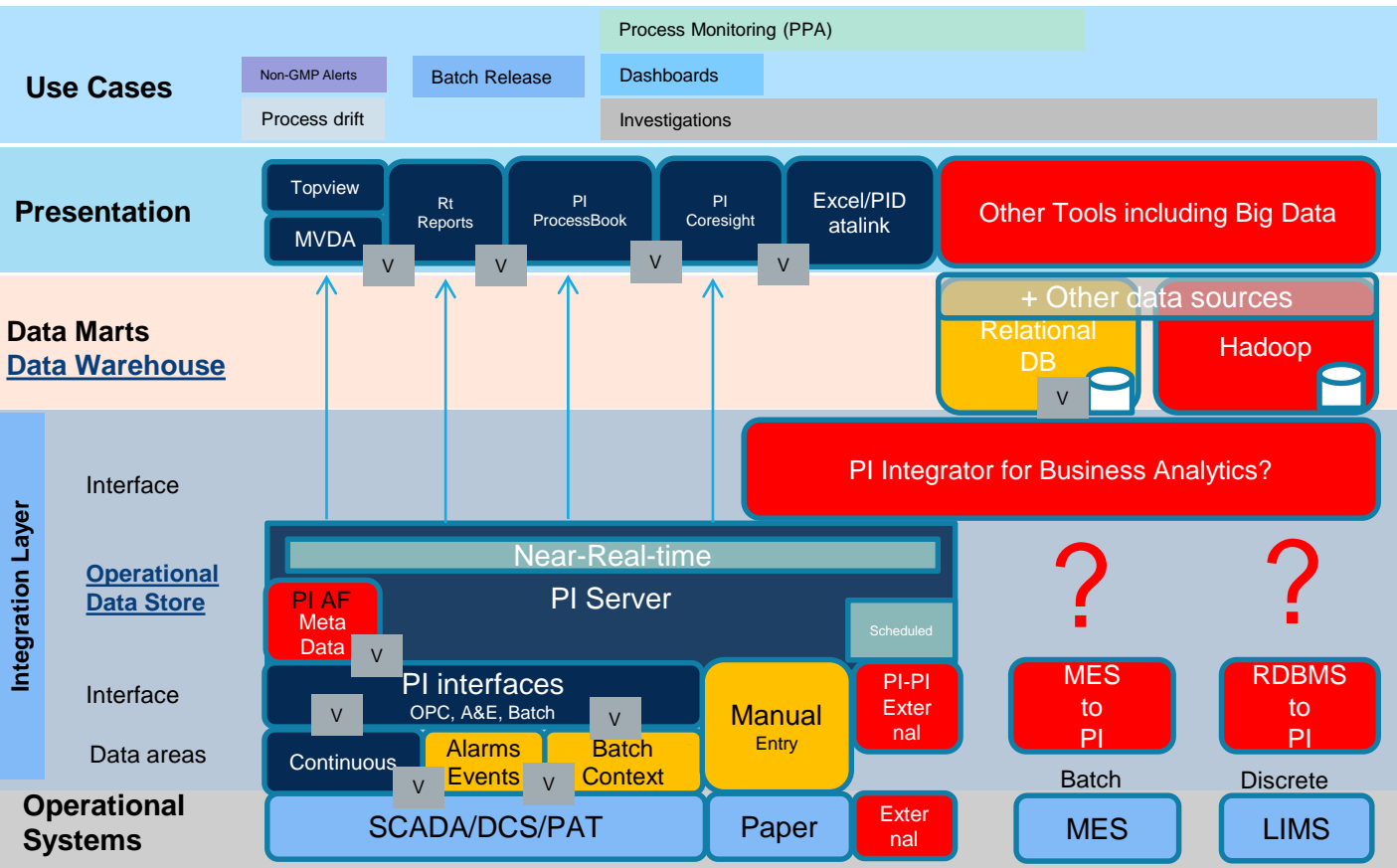
Results and Benefits

Yes	• Reduce employee burden through leveraging partners
Yes	• Make right architecture decisions for the future
Yes	• Bring clarity to who owns what
Yes	• OSIsoft part of the team to MSD's success
Yes	• Be able to adopt new technologies quicker
Likely	• Proactive monitoring reduces downtime and work
Yes	• Reduce issue reoccurrence
Yes	• Costs - Project
Likely	• Costs - Support (hard to measure)

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Challenges and Future Plans



- Data governance
- AF & Metadata
- PI System approach with other systems like MES
- mPI not replacement for Topview
- Data access for 3rd party tools approach
- GMP vs. non-GMP data sources
- Globalization of some PI System components (like Notifications)
- External data integration
- Overall manufacturing data architecture of analytics & big data
- Batch context and visualization
- Non-DeltaV DCS approach
- Right PI expertise in the right place (site, global, partner)

“Team” that made it happen

Team	Role/Area	Company
Elyse Easson Peter Ellames Jerry Hill Salla Diop Sean Dippold Nghia Do Christopher Purcell	MMD-IT Manufacturing Data Systems	MSD
David Burman Timothy Elliott Scott Haas Patrick Fitzgerald Michael Maltman	Business Quality Engineering	
Joseph Leshko Leslie Zwennes	IT Infrastructure	
Nate Anderson David Casazza Mike Hayden Ashley Howard Glenn Hummel Mark Knox Heather Twigg	CoEs, EPMS, Account Manager	OSIsoft

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MSD

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"/>
Days and time allowed for the presentation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



감사합니다

谢谢

Danke

Merci

Gracias

Thank You

ありがとう

Спасибо

Obrigado