OpenO&M™ and ISO 15926 Collaborative Deployment

POSC Caesar Members Meeting

Oct 20, 2009

Kuala Lumpur, Malaysia

Alan Johnston
OpenO&M Initiative Chair
MIMOSA President

MIMOSA™

FIATECH

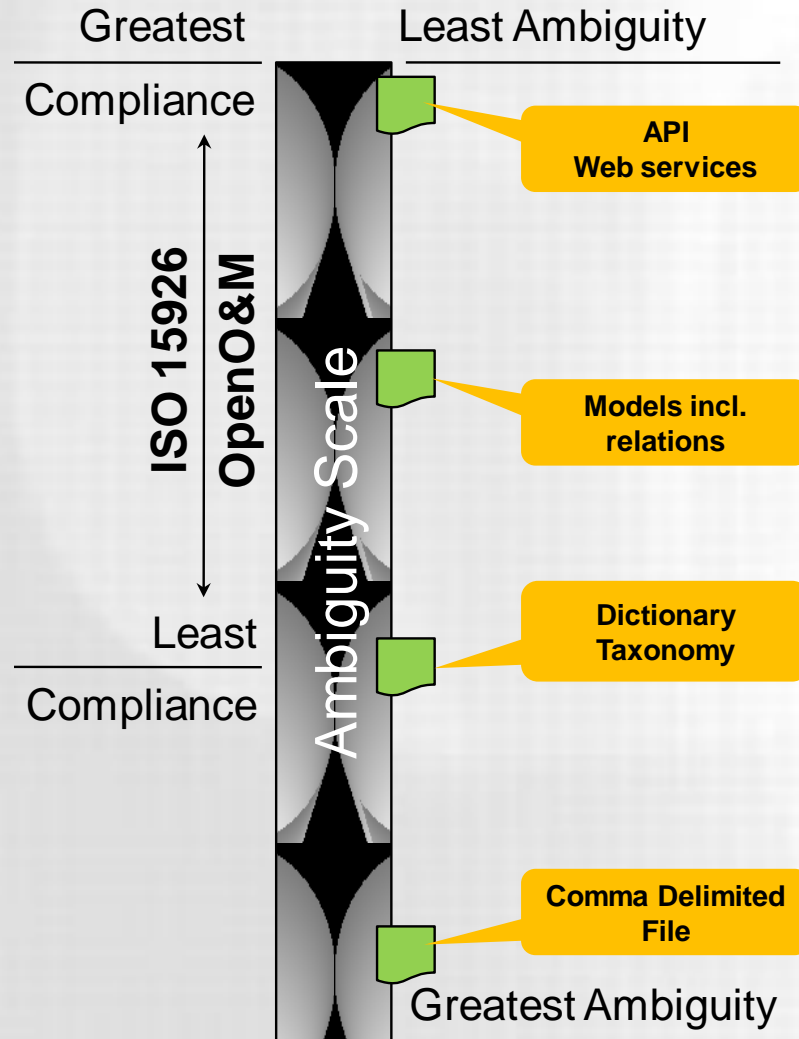PCA POSC Caesar Association

The OpenO&M™ Initiative

Does Interoperability Matter?

- Does your organization need more ability to systemically share/maintain information important to multiple internal functional units?

- Will you gain business value from improved systemic sharing of data and information with your key suppliers and business partners?

- Will you gain business value from sharing technology, methods and standards with other related major industry groups including aerospace/defense/military?

- Will technology and best practices evolve quicker or slower in the future versus in the past?

- Does the ability to follow evolving best practices matter to your organization?

- Will the future pace of evolution of best practices and technology be likely to result in "orphan" products with painful and/or limited migration options?

- Does the ability to systemically institutionalize organizational knowledge, information and processes matter?

- Does the ability to separate value added knowledge/information/processes from raw technology change matter to your organization?

Information Ambiguity

- Data exchanges operate most successfully when <u>ambiguity</u> is eliminated
- Ambiguity between exchanging partners can require significant effort (labor) to remove
- The higher the ambiguity, the higher the cost to implement effective and efficient data exchanges
- While SOA can be implemented without a common information model, this approach does little to reduce ambiguity and cost

Ambiguity = Cost

Greatest

Least Ambiguity

Compliance

ISO 15926
OpenO&M

Ambiguity Scale

**API
Web services**

**Models incl.
relations**

Least

**Dictionary
Taxonomy**

Compliance

**Comma Delimited
File**

Greatest Ambiguity

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POSC Caesar and OpenO&M Collaboration
Enabling An Industry-Focused Solutions Process

- Collaboration and Coordination with key standards organizations
- Enables an use case driven "best practices" solutions model
  - ✓ Use Cases collected from and prioritized by owner/operators
  - ✓ Not a solution looking for a problem
- Owner/Operator leadership
  - ✓ Governance
  - ✓ Prioritization and Oversight
- Supported by key suppliers
  - ✓ Automation/Controls
  - ✓ Engineering/Construction
  - ✓ Enterprise Systems (Business and IT)

The OpenO&M™ Initiative
Brings People Processes and Technology Together

Enterprise Business Systems
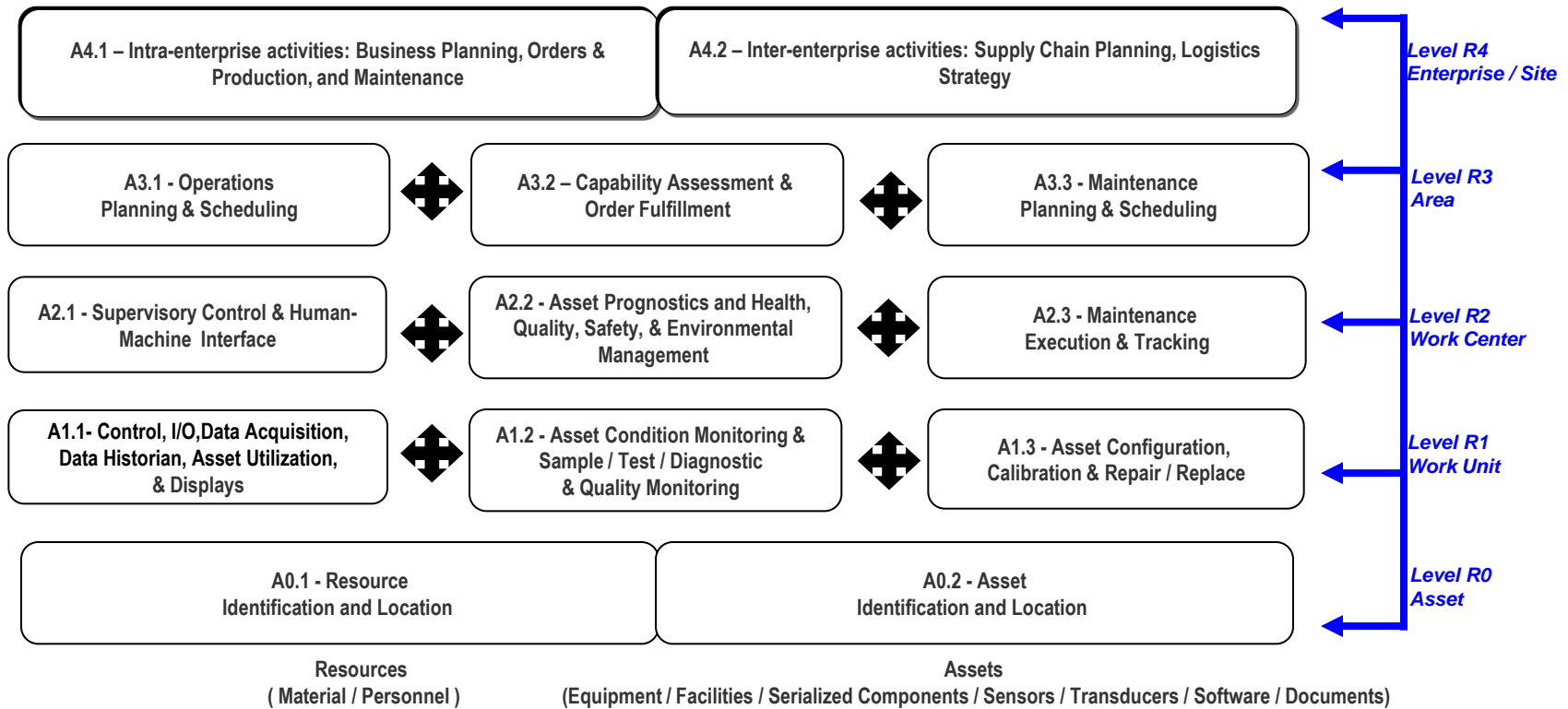**Enterprise Resource Planning (ERP)**

Operations

OpenO&M™

Maintenance

WBF

OAGi
Open Applications Group

ISA

OPC
FOUNDATION

MIMOSA

Physical Asset Control
Real-time Systems

ISO 18435
Application Domain Integration Diagram

A4.1 – Intra-enterprise activities: Business Planning, Orders & Production, and Maintenance		**A4.2 – Inter-enterprise activities: Supply Chain Planning, Logistics Strategy**	*Level R4 Enterprise / Site*
A3.1 - Operations Planning & Scheduling	**A3.2 – Capability Assessment & Order Fulfillment**	**A3.3 - Maintenance Planning & Scheduling**	*Level R3 Area*
A2.1 - Supervisory Control & Human-Machine Interface	**A2.2 - Asset Prognostics and Health, Quality, Safety, & Environmental Management**	**A2.3 - Maintenance Execution & Tracking**	*Level R2 Work Center*
A1.1- Control, I/O,Data Acquisition, Data Historian, Asset Utilization, & Displays	**A1.2 - Asset Condition Monitoring & Sample / Test / Diagnostic & Quality Monitoring**	**A1.3 - Asset Configuration, Calibration & Repair / Replace**	*Level R1 Work Unit*
A0.1 - Resource Identification and Location		**A0.2 - Asset Identification and Location**	*Level R0 Asset*

Resources
(Material / Personnel)

Assets
(Equipment / Facilities / Serialized Components / Sensors / Transducers / Software / Documents)

Some Relevant ISO Related Activities

ISO TC 67
Materials, equipment and offshore structures for petroleum, petrochemical and natural gas industries

ISO TC 108
Mechanical vibration and shock

ISO TC 184
Industrial automation systems and integration

SC5
Condition monitoring and diagnostics of machines

SC4
Industrial Data

SC5
Architecture, communications and integration frameworks

ISO 14224

Petroleum, petrochemical and natural gas industries-- Collection and exchange of reliability and maintenance data for equipment

ISO 13374

MIMOSA OSA-CBM

WG6

Formats and methods for communicating, presenting and displaying relevant information and data

15926- Data for Process Industries

10303-Product data representation and exchange

STEP/PLCS

OASIS

Collaborating on the deployment of an international standard for product data exchange (ISO10303)

ISO 18435

MIMOSA OSA-EAI

WG7

Diagnostic and maintenance applications integration

ISO TC184 SC5

Oil & Gas Use Cases

Suppliers

Customers

Enterprise Systems
ERM Enterprise Risk Management **PORT** Event Portals
ERP Enterprise Resource Planning **DASH** KPI Dashboards

PDM
OEM
Production
Data Model
Mgmnt Sys.

Production Forecasting & Scheduling Systems

Operational Optimization Systems

EIS
Plant-Process
Engineering
As-designed
As-built
Network,
Segments, Tag,
Config Mgmnt.
Recording Sys

Control & Automation
DCS, PCN, HMI,
Historians ...

EHSM
Equipment Health
& Safety Mgmt.
(SHES, PSMS, AHMS, QMS)

EAMS
Enterprise Asset
Mgmnt. Sys.

Asset Performance Monitoring
Measurements, Events, Inspections, Calibrations, Conditions, Usage, and Sensed O&M Actions

I&CDS	**PMS**	**CMS**	**RMMS**
I&C Device Monitoring	Process Monitoring (sand, water, gas, crude)	Corrosion Monitoring	Rotating Machinery Monitoring

REQ
O&M requirements
repository &
15926-MIMOSA
Transform Engine

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Common Interoperable Registry

Plant-Process
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I&CDS
I&C Device
Monitoring

PMS
Process Monitoring
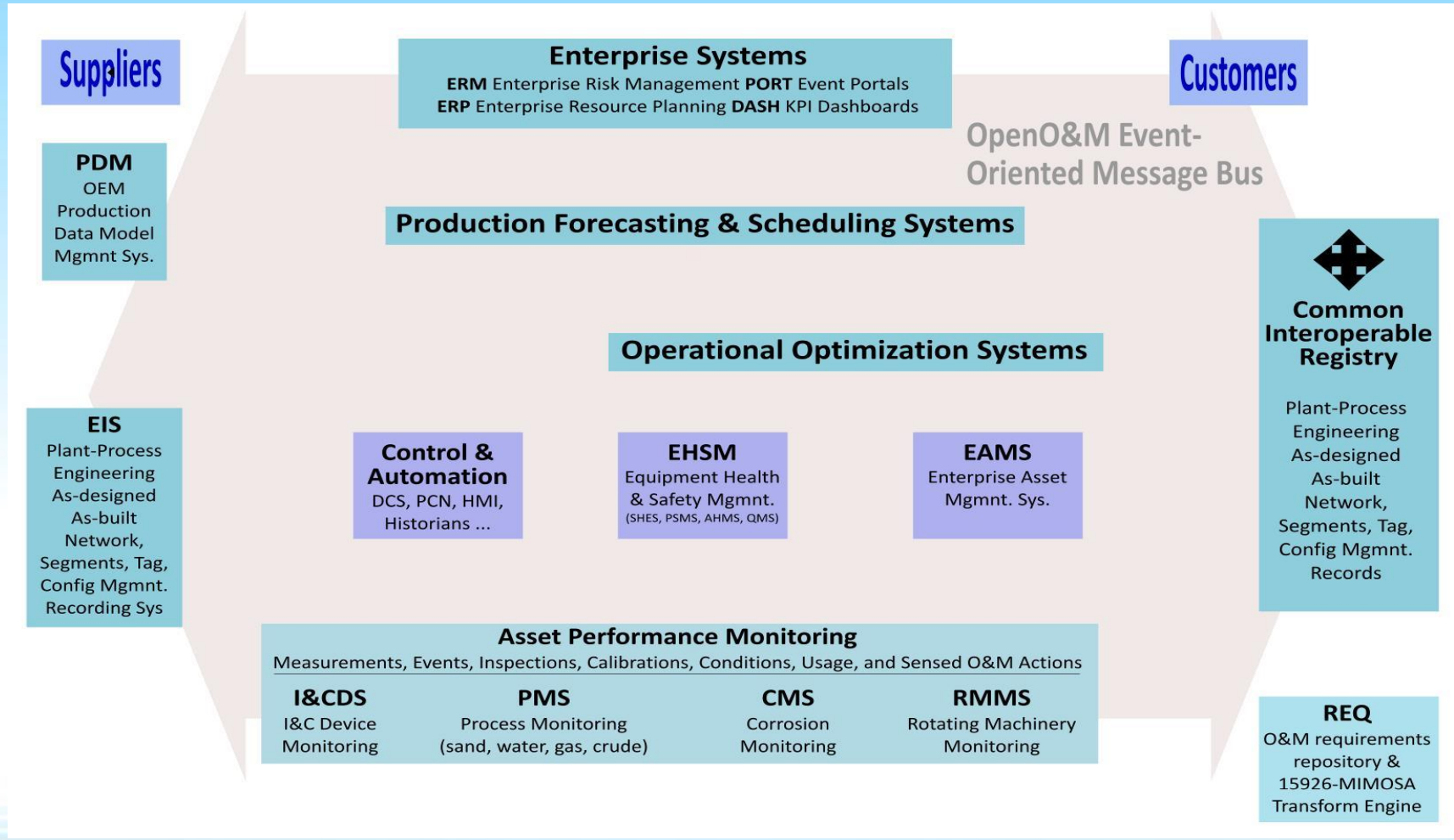(sand, water, gas, crude)

CMS
Corrosion
Monitoring

RMMS
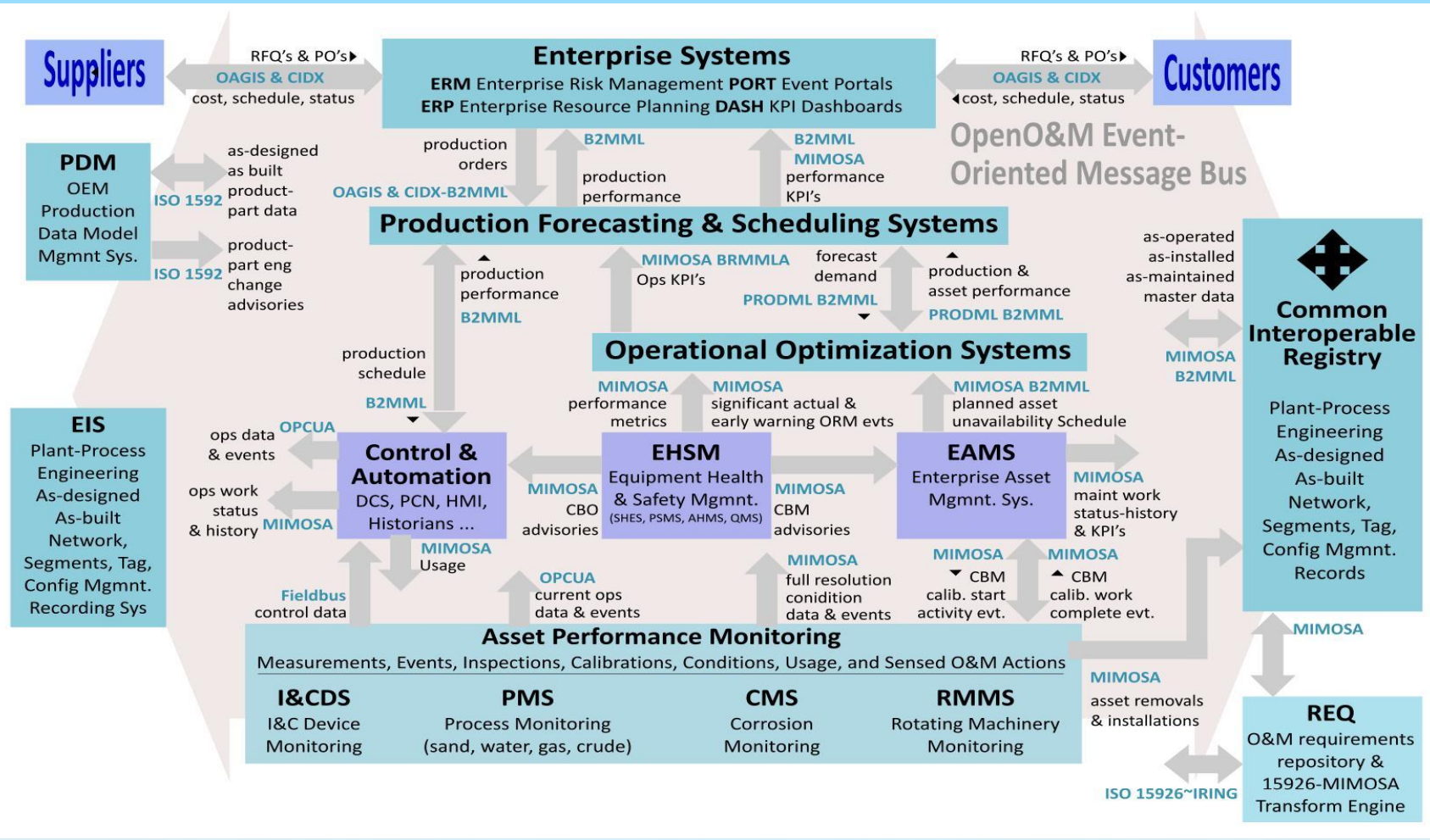Rotating Machinery
Monitoring

REQ
O&M requirements
repository &
15926-MIMOSA
Transform Engine

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Oil & Gas Use Cases

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Customers

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OpenO&M Event-Oriented Message Bus

PDM
OEM Production Data Model Mgmnt Sys.

Production Forecasting & Scheduling Systems

Common Interoperable Registry

Plant-Process Engineering As-designed As-built Network, Segments, Tag, Config Mgmnt. Records

Operational Optimization Systems

EIS
Plant-Process Engineering As-designed As-built Network, Segments, Tag, Config Mgmnt. Recording Sys

Control & Automation
DCS, PCN, HMI, Historians ...

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Equipment Health & Safety Mgmt.
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I&C Device Monitoring

PMS
Process Monitoring (sand, water, gas, crude)

CMS
Corrosion Monitoring

RMMS
Rotating Machinery Monitoring

REQ
O&M requirements repository & 15926-MIMOSA Transform Engine

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An Executable Strategy
Provides a Pragmatic Path Forward

- We do not need to chose between correctness and expedience
- Brown field friendly
- Green field enabling
- Works **<u>now</u>** and continuously improves for the future
- Synthesizes Top-down and Bottom-up activities with Life-cycle Management

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Context for Collaboration
Bringing Enterprise Business Systems Together with Engineering and O&M Systems (Working Draft)
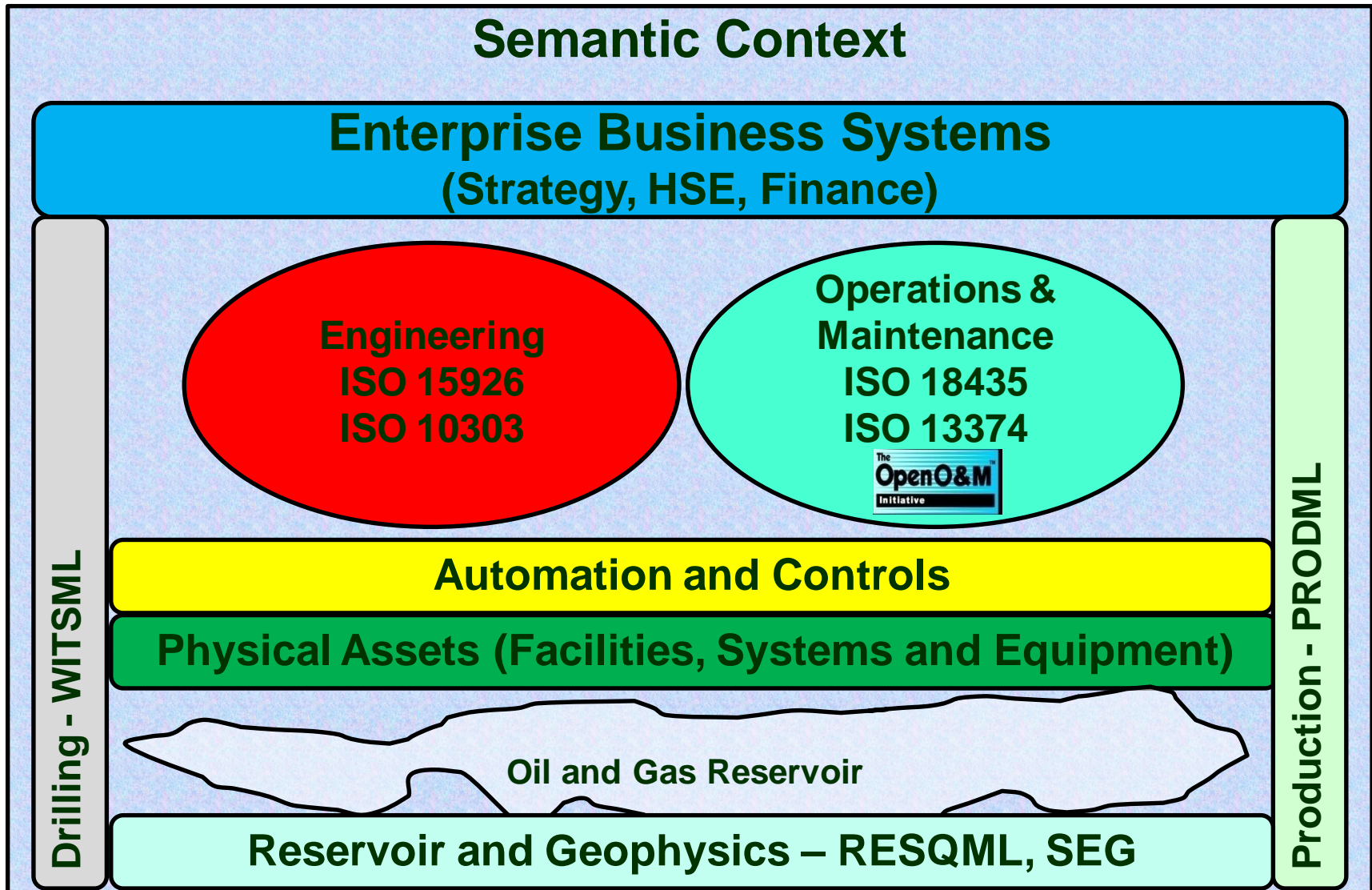
Context for Collaboration
The Safe Technology Roadmap for Interoperability

Context for Collaboration
Step 2- Link ISO 15926 and 10303 Based Engineering Systems with OpenO&M Execution Environment

Semantic Context

Enterprise Business Systems

ISO 15926
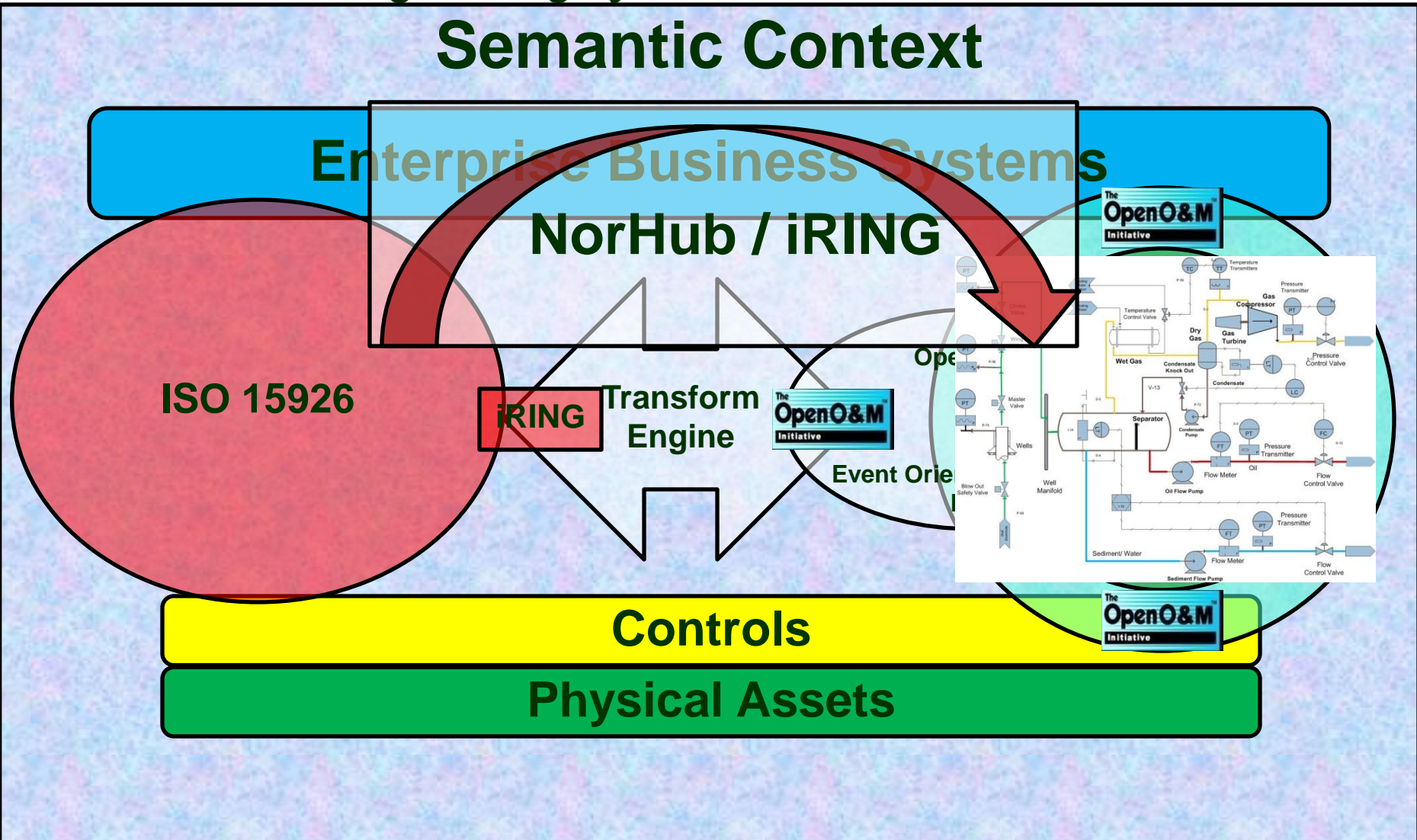
iRING

Transform Engine

OpenO&M

Event Oriented

Controls

Physical Assets

Rules-based Transform Engine

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POSC Caesar Association

OpenO&M

Context for Collaboration
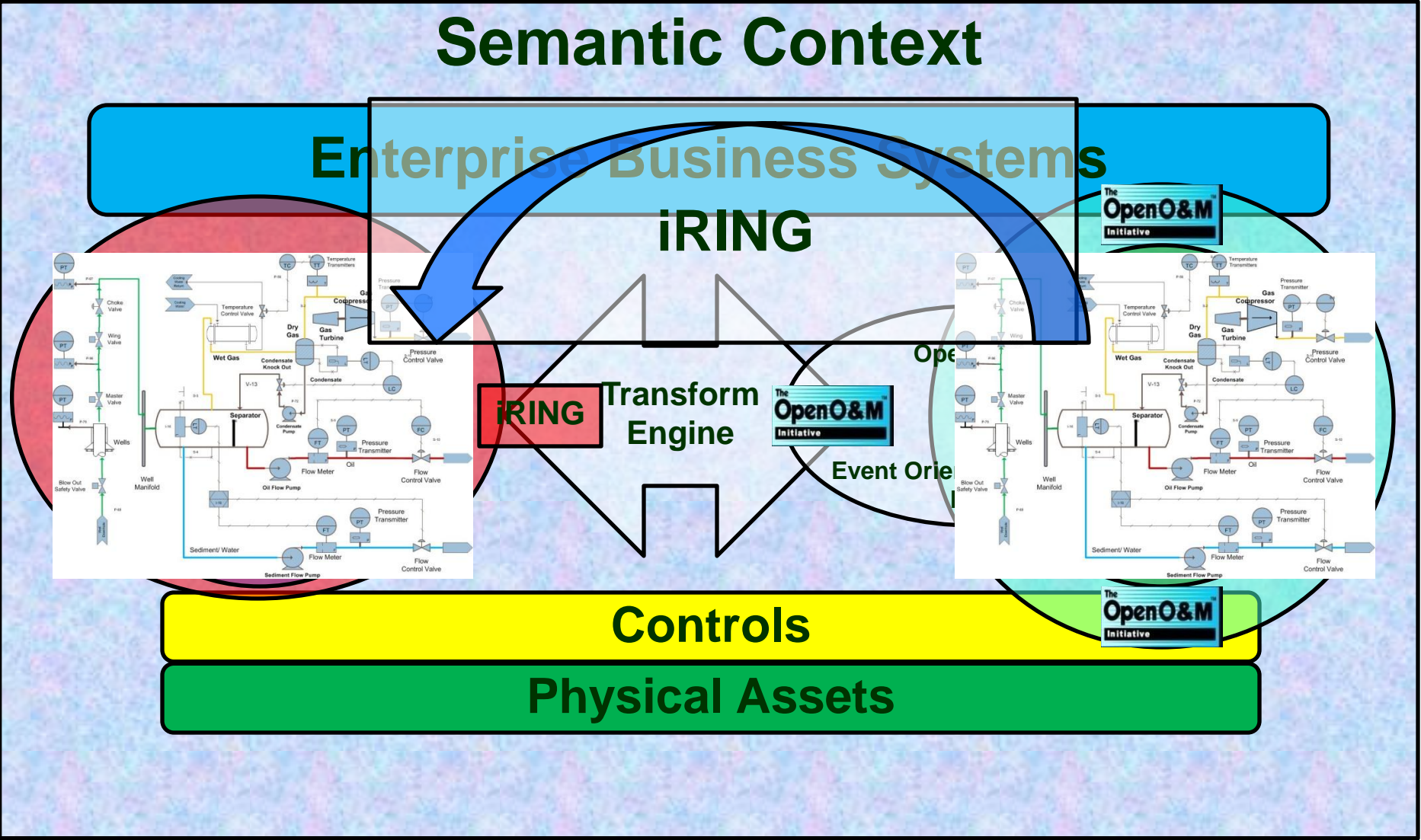## Step 3- Pull Rich Equipment Data From ISO 15926 Based Engineering Systems – NorHub / iRING

Semantic Context

Enterprise Business Systems

NorHub / iRING

The OpenO&M Initiative

ISO 15926

iRING

Transform Engine

The OpenO&M Initiative

Op...

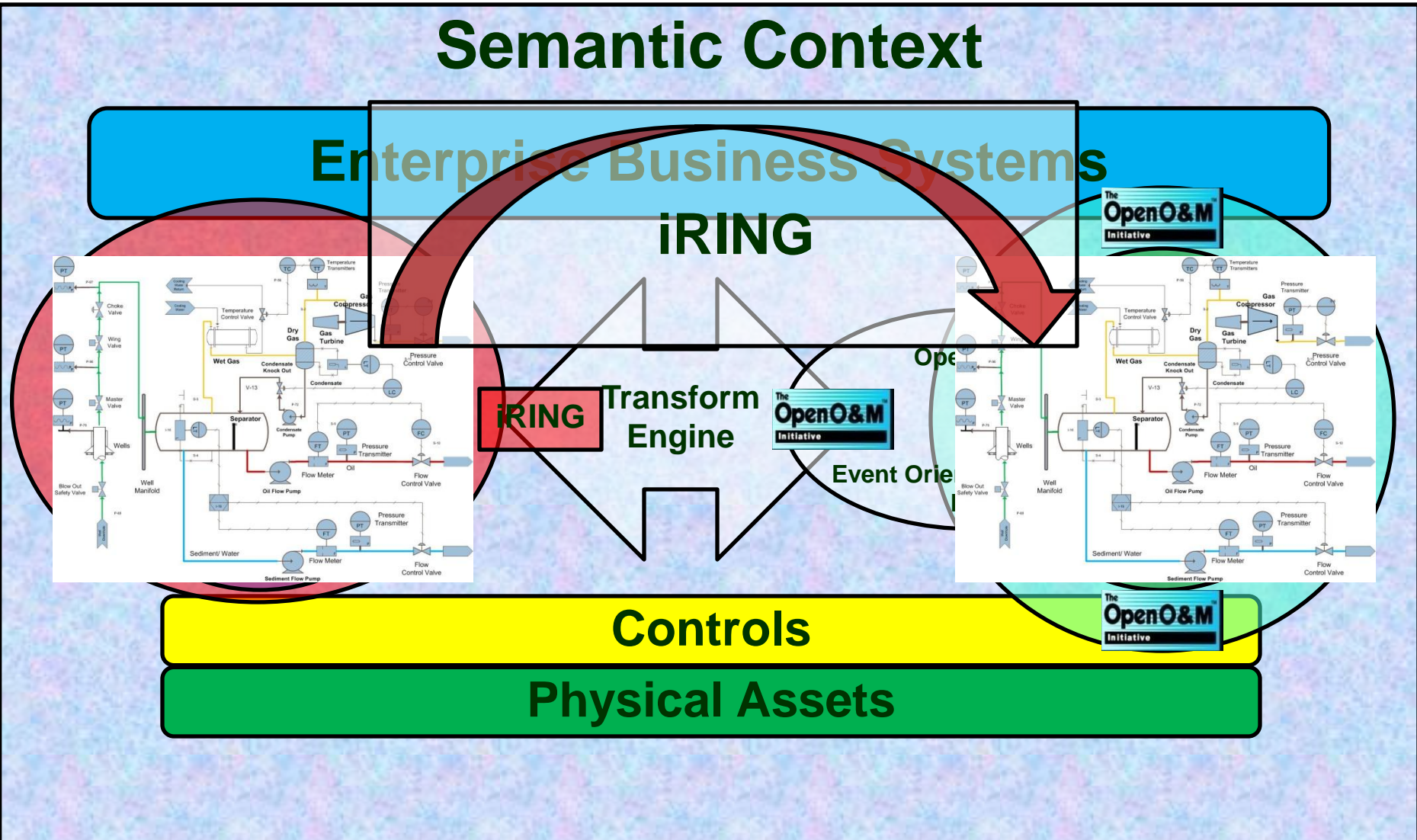Event Orie...

The OpenO&M Initiative

Controls

Physical Assets

Context for Collaboration
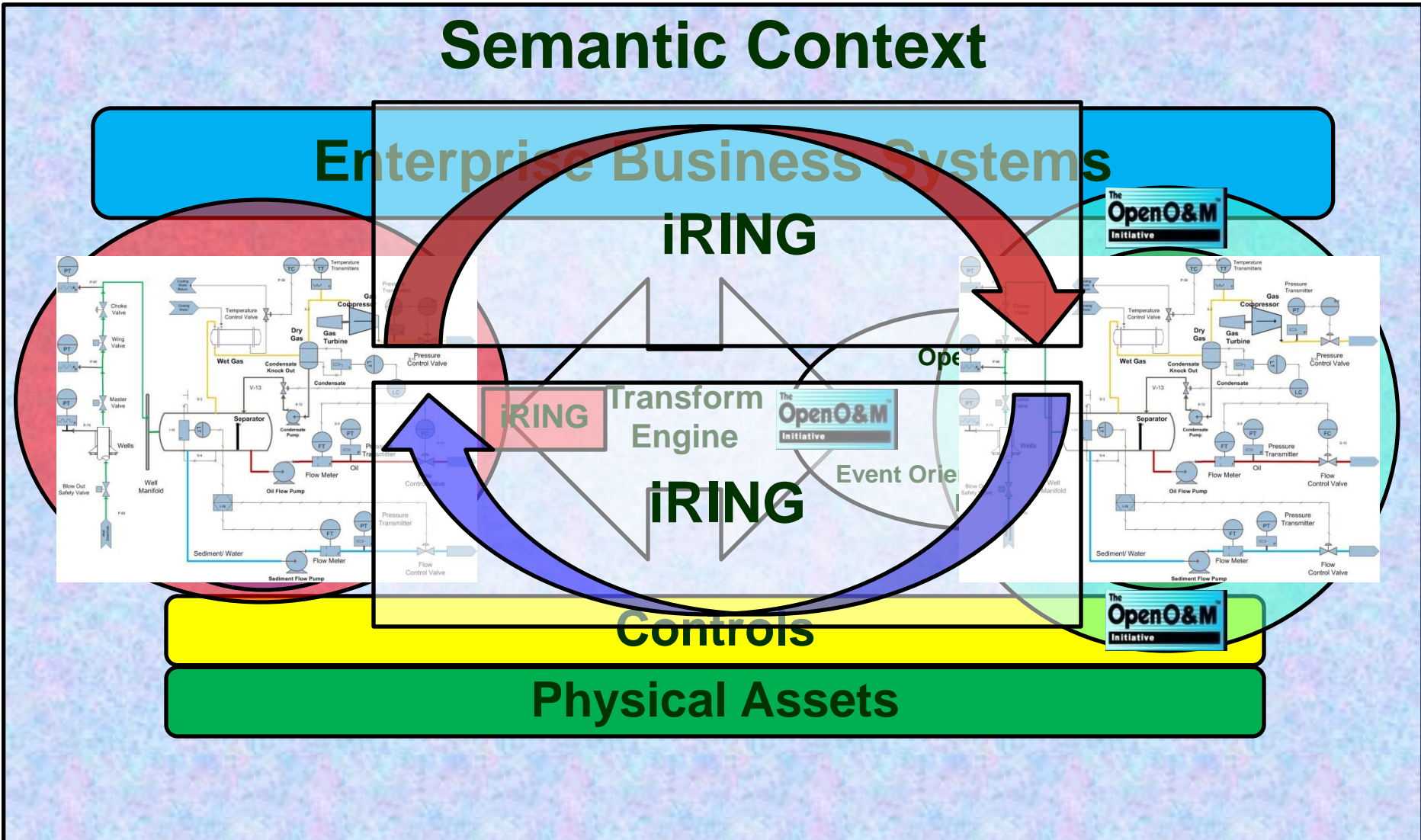## Step 5- Round-tripping From ISO 15926 and ISO 10303 Based Engineering Systems – RING (Forward Engineering)

Semantic Context

Enterprise Business Systems

iRING

iRING

Transform Engine

Controls

Physical Assets

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Context for Collaboration
Step 6- Permanent Synchronization

Semantic Context

Enterprise Business Systems

iRING

iRING | Transform Engine | OpenO&M

iRING

Controls

Physical Assets

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Critical Infrastructure Management
Integrated Energy, Aerospace/Defense/Military and Communications

- From an Engineering Point of View, Oil and Gas platforms are very much like Aerospace/Defense/Military platforms

- By policy, military is to follow industry

- Leverage industry standards

- Leverage COTS

- A much larger unified market producing a win/win opportunity for owner/operators and suppliers

Global Collaboration and Coordination

- MIMOSA/OpenO&M
- POSC Caesar
- CIEAM - Asia Pacific / Australia Region
- FIATECH
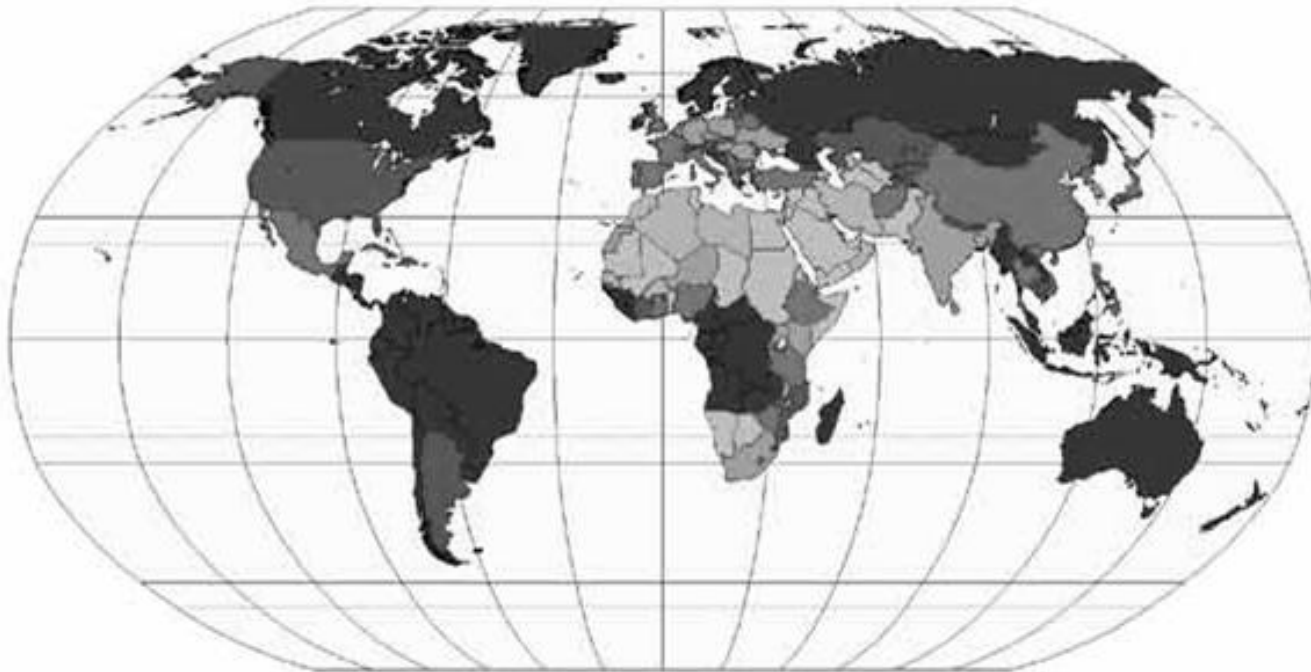
OpenO&M Initiative and POSC Caesar
Major 2009 Q4 Collaboration Events

- CEAM World Congress - September 28-October 1 - Athens, Greece
- ISA EXPO 2009
  - ✓ October 6-8; Houston, Texas
  - ✓ Embedded 1/2 Day Management-level OpenO&M Executive Summit
    - (IBM, Microsoft and Rockwell Automation)
  - ✓ Enterprise Integration Conference & Interoperability Demonstration
    - Automation/Controls (Rockwell Automation and Yokogawa)
    - Engineering (INTERGRAPH, INOVx)
    - Enterprise Systems (IBM and Microsoft)
    - O&M Solutions - Mtelligence
    - Standards and Solutions Teams (OpenO&M, POSC Caesar, CIEAM)
- NPRA Technology Q&A - October 11-15 - Dallas/Fort Worth, Texas
- POSC Caesar Meeting
  - ✓ October 19-21; Kuala Lumpur, Malaysia
  - ✓ Hosted By PETRONAS
- ISO TC184 SC4 Plenary - Nov 8-12- Rotterdam, Netherlands
- Intelligent Manufacturing Systems - Nov 9-11- Geneva, Switzerland
- API Refining and Equipment Standards Meeting - Nov 9-11 – Dallas, TX

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SAP Commitment to Open Standards
and MIMOSA OpenO&M Organization

- ⊕ *As the largest provider of Enterprise Applications across the Process Industries, SAP remains committed to extending the value of these solutions for our customers through interoperability.*

- ⊕ *This support for open standards is further demonstrated by our continued membership in organizations such as MIMOSA.*

- ⊕ *SAP will continue to work with its partners and OpenO&M members to find the most appropriate means to demonstrate interoperability.*

- ⊕ *SAP continues to collaborate with customers in other interoperability initiatives such as the Integrated Operations High North consortium and POSC–Caesar.*

Key Joint Projects

- **Asset Globally Unique ID**
  - ✓ Norwegian Continental Shelf
  - ✓ Americas
  - ✓ Malaysia ?

- **Key Physical Asset Parameters**
  - ✓ Global project
  - ✓ Critical Infrastructure Management
  - ✓ Initial focus on common rotating equipment and valves

- **OpenO&M Event Oriented Message Bus "Intergalactic Systems Bus"**
  - ✓ Use case driven - Specification for Open On-Ramps and Off-Ramps
  - ✓ With IBM, Microsoft and SAP support

- **OpenO&M and ISO 15926 Topology Mapping**
  - ✓ Practical bootstrapping for current projects
  - ✓ Basis for reverse engineering into ISO 15926

- **Creation of standing R&D/Demonstration environment including**
  - ✓ Prime IT Suppliers – IBM, Microsoft, SAP
  - ✓ Key Automation and Controls Suppliers
  - ✓ Key Engineering/Procurement/Construction Suppliers

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