OIlE Australia Working Group

Post Break Session
How The OIIE Delivers Business Value

• 1st Session was focused on Business Value provided by OIIE, discussing WHAT it is and WHY it is of business value
• 2nd Session will discuss HOW the OIIE is implemented to deliver this business value
The OpenO&M Initiative, led by MIMOSA, extended the architecture to fully address life-cycle asset management in conjunction with Construction Industry Institute (CII). Collectively, this provides the basis for the Open Industrial Interoperability Ecosystem (OIIE) and ISO 18101 (ISO OGI TS).

ISA-95/IEC 62264 define an Operations Management Reference Architecture based on the Purdue Reference Architecture.
Full Asset Life-cycle Management

- Product Design
- Process Engineer
- Engineer Design
- Procuere
- Construct
- Operate & Maintain (O&M)
- End of Life
- Continuous Improvement Feedback Loops
- Device/Equip Manufacturing
- Platform Integrator
- Capital Project
- Owner/Operators

Product Model/Product=Component/Systems(Packages)/System of Systems/Plant/Facility/Platform Life-Cycles

Derived from ISO TC 184 Manufacturing Asset Management Integration Task Force Final Report

© MIMOSA 2020
OIIE Intra-Enterprise Systems Connectivity and Services Architecture

Enterprise Business Systems

- OIIE Administration
- Planning
- Engineering Design
- Construction Management
- Operations Management
- Operations Risk Management
- Maintenance Management

IEC 62264 Messaging Service Model /OpenO&M Information Service Bus Model

Standard, Cloud Friendly Enterprise Solutions Architecture For Digital Business Ecosystems

Connectivity Legend

- IIoT Connections
- (Constrained)
- Trusted IT/OT connections
- ISBM Web Services
- (Constrained)

Inter-Enterprise Connections

Automation Control Bus

- Automation and Control
- HSE and Operation Monitoring
- Prognostic & Health Management

IIOT Device

Device

Shared Information and Semantic Context

- Enterprise Reference Data Libraries
  IIoT Device Metadata

- Industry Reference Data Libraries
  IIoT Device Metadata
  (ISO 15926, OTD, CDD...)

© MIMOSA 2020
OIIE Inter-Enterprise Systems Connectivity and Services Architecture

**EPC Firms**
- Engineering, Procurement and Construction

**IT Networks**

**OEMs**
- Manufacturers
- Enterprise Business Systems

**Owner/Operators**
- Enterprise Business Systems

**Automation and Control**
- Manufactured Asset Data (Make/Model Information, Serial #)

**Operations & Maintenance Data**
- Monitoring, Diagnostics Prognostics

**Functional and Technical Requirements**
- PFD, P&ID, Tags, Docs & Requirements
- Model and Instance Information

**Business Requirements**
OIIE/OGI Standardized Use Case Architecture
Standardized Methodology to Define and Re-use OIIE Components

User Stories
• High-level
• Pictographic
• Depict 1 or more Use Cases, Scenarios, and/or Events
• Actors, Systems, Exchanges, Data

Use Cases
• Background
• Scope
• Preconditions
• Successful End Condition

Scenarios
• Actors
• Triggers
• Process Workflows
• Scenarios

Events
• Individual Message Exchange
• Specific Data Content
• Required data processing
• Expected Response Event
• Implemented by CCOM BODS and possibly others
OIIE Standard Use Case List

Derived from OpenO&M Standard Use Case List – Circa 2007

OIIE Use Case 1 – Information Handover from EPC to O/O
OIIE Use Case 2 – Engineering Updates
OIIE Use Case 3 – Field Changes to Plant/Facility Engineering
OIIE Use Case 4 – Online Product Data Library Management
OIIE Use Case 5 – Asset Installation/Removal Updates
OIIE Use Case 6 – Preventive Maintenance Triggering
OIIE Use Case 7 – Condition-Based Maintenance Triggering
OIIE Use Case 8 – Early Warning Notifications
OIIE Use Case 9 – Incident Management/Accountability
OIIE Use Case 10 – Information Provisioning of O&M Systems
OIIE Use Case 11 – Enterprise Reference Data Library Management
OIIE Use Case 12 – RFI and RFI Response for Models Meeting Requirements (Greenfield & Brownfield)
OIIE Use Case 13 – Lockout-Tagout
OIIE Use Case 14 – Condition-Based Maintenance Data Acquisition
OIIE Use Case 15 – Capital Project Asset Installation

Current OIIE Use Cases Focus on Life-cycle Asset Management and OIIE Administration
May be expanded into more of Operations Management in conjunction with FEnEx CRC
OLIE Australia Working Group

Industry Associations, SDO and NGO Alignment
OpenO&M Initiative – Formed 2004

Enterprise Business Systems
Enterprise Resource Planning (ERP)

Operations

OpenO&M™

Maintenance

Physical Asset Control
Real-time Systems

Level R4
Level R3
Level R2
Level R1
Level R0
Owner/Operators Objective
Shared Industry Foundation Architecture

From:
OpenO&M Owner/Operator Leadership Team
(BP, Chevron, Dow, Dupont, Nova Chemical, Saudi Aramco, Suncor)
Circa 2008

Request for Standard Architecture for Interoperability
Interoperability for Physical Asset Management-Associations and Activities

**Industry Level**

- MIMOSA CCOM, ISDD OSA-CBM
- ISA ISA-95, ISA-99
- MESA B2MML
- OAGi BOD
- OPC DA, UA
- OpenO&M ISBM
- OpenO&M OJIE

**MIMOSA Member/OIIE Pilot Sponsor Requirements**

- CII AWP, Proteus
- API
- ASME
- The Asset Institute
- Institute of Asset Mgt

**International Standard Level**

- ISO TC184/SC4 ISO 15926, 8000
- ISO TC 251 ISO 55000
- ISO TC 184/SC 5 ISO 18435
- ISO TC 67 ISO 14224
- ISO TC 65 IEC 62264, CDD,
- ISO TC 108 SC 5 ISO 13374
- IEC TC 3/ISO TC 10 ISO/IEC 81346
- ISO/IEC JWG 21
- ISO TC 184/WG 6 ISO 18101
- Interoperability for Asset Intensive Industries

**OIIE Oil and Gas Interoperability Pilot**

- NIST
- NERA

**MIMOSA**

- CCOM, ISDD
- OSA-CBM
- CC4M
- ISBM
- ISDD
- OSA-CBM

**Interoperability for Asset Intensive Industries**

- ISO TC 184/SC 5 ISO 18435
- ISO TC 67 ISO 14224
- ISO TC 65 IEC 62264, CDD,
- ISO TC 108 SC 5 ISO 13374
- IEC TC 3/ISO TC 10 ISO/IEC 81346
- ISO/IEC JWG 21
- ISO TC 184/WG 6 ISO 18101
- Interoperability for Asset Intensive Industries
ISO TS 18101-1
April 21, 2020
OIIE Australia Working Group

Alan T. Johnston
Convenor ISO TC 184/WG 6
President MIMOSA
“This document was prepared by Technical Committee ISO/TC 184, Automation systems and integration.

This document provides an overview and outlines the fundamental principles of the ISO 18101 series. Future parts of the ISO 18101 series will be developed including sets of industry developed use cases, once the use cases have been documented using the Open Industrial Interoperability Ecosystem (OIIE) use case architecture and validated using the OIIE Oil and Gas Interoperability (OGI) Pilot, with the results captured in Technical Reports. These use cases will incrementally define industry prioritized elements of the secondary business process, which is the scope of the ISO 18101 series.”
ISO TS 18101-1 SCOPE

This document provides requirements, specifications and guidance for an architecture of a supplier-neutral industrial digital ecosystem. It includes a standardized connectivity and services architecture, and a standardized use case architecture with methods to specify atomically re-usable scenarios and events, which can be used to specify the characteristics of standardized industry use cases.

NOTE 1 Examples of standard industry use cases included in the secondary business process are included in Annex A along with standardized use case architecture.

This document gives:
— guidance for an architecture applicable to the oil and gas, petrochemical, power generation, public utilities and other asset-intensive industries;
— requirements for interoperability among systems of systems, systems (including hardware and software) and components included in the secondary business process of a plant, platform or facility at any given time;
— guidance on how these interoperability requirements are to be achieved and sustained in support of operations in the same plant, platform or facility;
— specifications enabling the specialization of a digital ecosystem concept for the requirements of the secondary business process in included industries;
— guidance to industry participants, including owner/operators and their product and services suppliers, to support their secondary business process requirements using products, which interoperate based on the specifications included in this document.

NOTE 2 This document is focused on interoperability requirements for systems which play roles in the secondary business process, including those in domains identified in Figure 7.
Secondary Business Process

Derived from ISO TC 184
Manufacturing Asset Management Integration Task Force Final Report
Inter-Enterprise OII E Digital Ecosystem

- **EPC**
  - Engineering, Procurement, and Construction Systems

- **IT Networks**

- **OEM Manufacturing**
  - Enterprise Business Systems
  - Automation and Control Systems
  - Manufactured Asset Data (Make/Model Information, Serial #)

- **Owner/Operator**
  - Enterprise Business Systems
  - Automation and Control Systems
  - Operations & Maintenance Data (Monitoring, Diagnostics, Prognostics)
OIIE Use Case Architecture - 1

- **User Stories**
  - High-level
  - Pictographic
  - Depict 1 or more Use Cases, Scenarios, and/or Events
  - Actors, Systems, Exchanges, Data

- **Use Cases**
  - Background
  - Scope
  - Preconditions
  - Successful End Condition

- **Scenarios**
  - Actors
  - Triggers
  - Process Workflows
  - Scenarios

- **Events**
  - Information Service Bus Configuration
  - (OIIE) Events

- **User Stories**
  - Individual Message Exchange
  - Specific Data Content
  - Required Data Processing
  - Expected Response Event
  - Reference implementation using CCOM BODS
**Objective:** Move From Systems Integration to Systems Interoperability and Digitalization - Asset Lifecycle Focus

**Inter-Enterprise View**

**WG 6 Status:**
- **ISO TS 18101-1 Published June 2019**
  - Asset Intensive Industries includes supply chains for CAPEX and OPEX Use Cases
  - Includes ISO, IEC and Industry SDO inputs, digital twins for capital projects
  - NWIP for Part 2 Terminology
  - OIIE OGI Pilot Phase 3.2 In Progress
    - Per ISO TS 18101-1 Pilot Develops and Validates content for future parts of ISO 180101
    - Phase 3.2 formalizing set of OIIE Use Cases

**Participating National Committees:** (11)
- Canada, China, France, Germany, Italy, Japan, Korea, Netherlands, Norway, United Kingdom, United States (Plus Experts from Australia)
ISO 18101 is developed at the Technical Committee level rather than the Sub Committee level because it includes experts and standards from many Sub Committees, other Committees and IEC. ISO TC 184/WG 6 is almost a JWG.

- Direct input into ISO for ISO 18101 requires a “P” Membership in TC 184

- This is critical to help ensure both contents and ballots support OIIE Australia Working Group Requirements
OIIE Australia Working Group

OIIE Oil and Gas Interoperability (OGI) Pilot
MIMOSA Information Network (MIN)

June 21, 2000
MIN-Viewer
OSA-CBM Presentation
Alan T. Johnston
MIN Project Director

MIN-Viewer Segment Navigation 1

User Interface Modeled On The Microsoft Windows Explorer

MIMOSA Background:
15 OIE Use Cases have been identified spanning the Asset Lifecycle. Details are developed and validated in the OIE OGI Pilot. We intend to submit the set above (likely including others) in forthcoming TRs, to be included in ISO 18101-3.
• **Includes sponsorship by National Energy Resources Australia**
  • Start capturing Australian Industry Priorities to be included in Phases 3.3 and beyond

• **Scope**
  • Capture requirements for improved Inter-bus and Inter-enterprise features
    • Associated with OpenO&M ISBM 2.1 Specification Update (OpenO&M (ISA, OAGi and NIST)
    • Driven by OIIE Use Cases (starting with RFI/RFI Response)
    • Needed to better support Australian Energy Cluster requirements
  • Documentation for OIIE Use Cases developed and validated in Phase 3.1
  • Preparation for next steps with NIST, NERA, CII, THTH and IOGP
Open Forum for Q&A
Call To Action

• Opportunity for Australian Leadership
  – Freedom to innovate in a vendor-neutral digital ecosystem
  – Help shape the OIIIE to meet Australia business requirements
  – Address global markets

• What is expected
  – Australia Requirements to be captured in formal OIIIE Use Case(s)
  – Digital Collaboration between SMEs, O/Os and Academics using OIIIE
  – Active Participation in OIIIE OGI Pilot with NERA Sponsorship
  – Preparation for FEnEx CRC

• Interim Leadership Team – Don Sands – Acting Chair
• Schedule follow-up Organizational Meeting