

The Open Industrial Interoperability Ecosystem (OIIE), the OIIE-Oil and Gas Interoperability (OGI) Pilot, and ISO 18101

For: THTH Fall Seminar

October 29, 2019

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Presentation Topics

- Significant Progress in 2019
 - ISO 18101-1 – Published by ISO
 - **1st ISO Standard Specifying a Supplier-neutral Industrial Digital Ecosystem and Process to Build/Sustain it**
 - Foreward: OIIE OGI Pilot to validate OIIE Use Cases before they are included to define next parts of standard
 - Scope: Asset Intensive Industries
 - WG 6 Scope Changed to “Asset intensive industry interoperability”
 - ISO TC 184 Report on Digital Twin Architecture
- OIIE Oil and Gas Interoperability (OGI) Pilot
 - R&D Testbed for OIIE and ISO 18101
 - Pilot Phase 3.1 Completed – Recording of demonstration with O/O Summary from Ken Dunn of BP
 - Phase 3.2 Starting next Month with NERA Sponsorship
- Ongoing Cooperation
 - ISA
 - OAGi
 - NIST
 - IOGP (coming)
- **Future cooperation between THTH Association and MIMOSA**



Relevant ISO Technical Committees & Activities

Industry Specific

Practices and Content
(ISD versus ISDD)

Cross-Industry Digitalization and Interoperability

Sensors Through Enterprise, Digital Twins, IT/IM Architecture
(Machine Interpretable)

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

ISO 14224
Petroleum, petrochemical and natural gas industries — Collection and exchange of reliability and maintenance data for equipment

ISO TC 108
Mechanical vibration, shock and condition monitoring

ISO 13374- Condition monitoring and diagnostics of machines — Data processing, communication and presentation

ISO TC 184
Automation systems and integration
WG 6
ISO 18101-Asset intensive industry interoperability

SC 4
Industrial Data

ISO 15926-Process Data
ISO 8000–Data Quality

SC 5
Interoperability, integration, and architectures for enterprise systems and automation applications

ISO 18435-O&M Integration

Show Websites

**Automation systems and
integration — Oil and gas
interoperability —**

Part 1:

Overview and fundamental principles

*Systèmes d'automatisation et intégration — Interopérabilité entre les
industries du pétrole et du gaz —*

Partie 1: Vue d'ensemble et principes fondamentaux



ISO TS 18101-1 Foreword

Paragraph 6

“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.”

**Automation systems and
integration — Oil and gas
interoperability —**

Part 1:
Overview and fundamental principles

*Systèmes d'automatisation et intégration — Interopérabilité entre les
industries du pétrole et du gaz —*

Partie 1: Vue d'ensemble et principes fondamentaux



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;

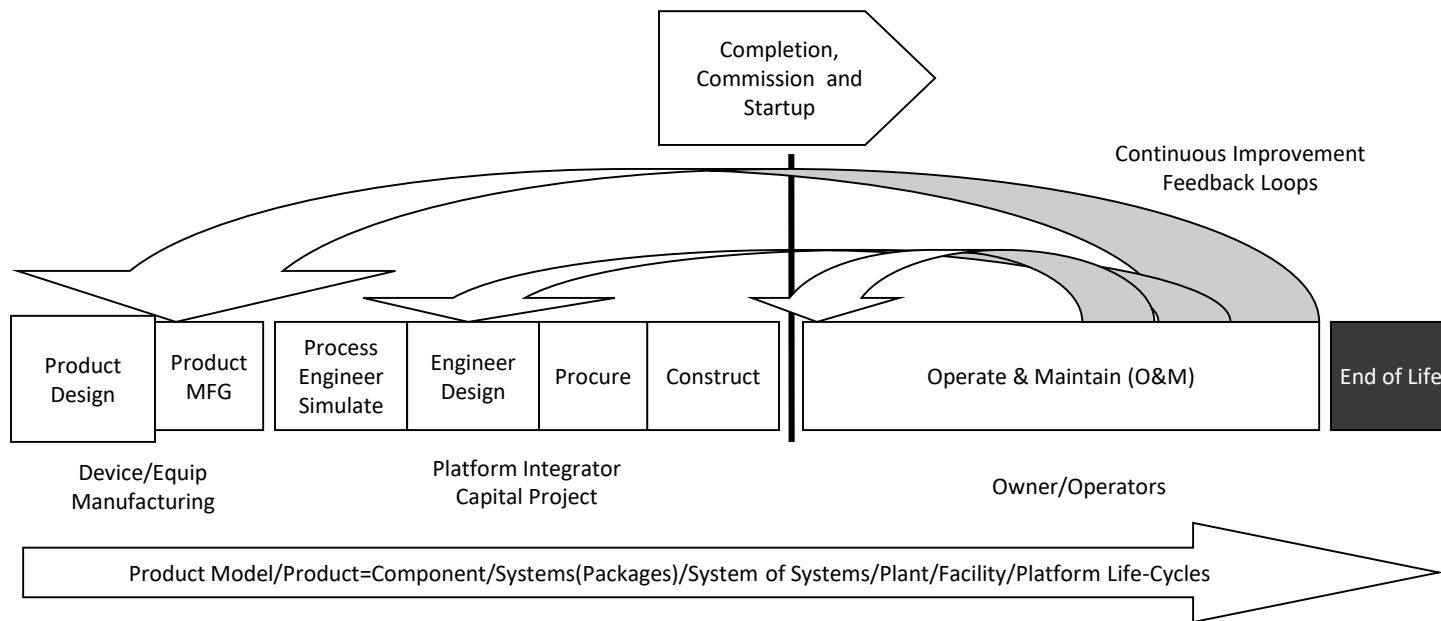
— guidance on how these interoperability requirements are to be achieved and sustained in support of operations in the same plant, platform or facility;

— 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.

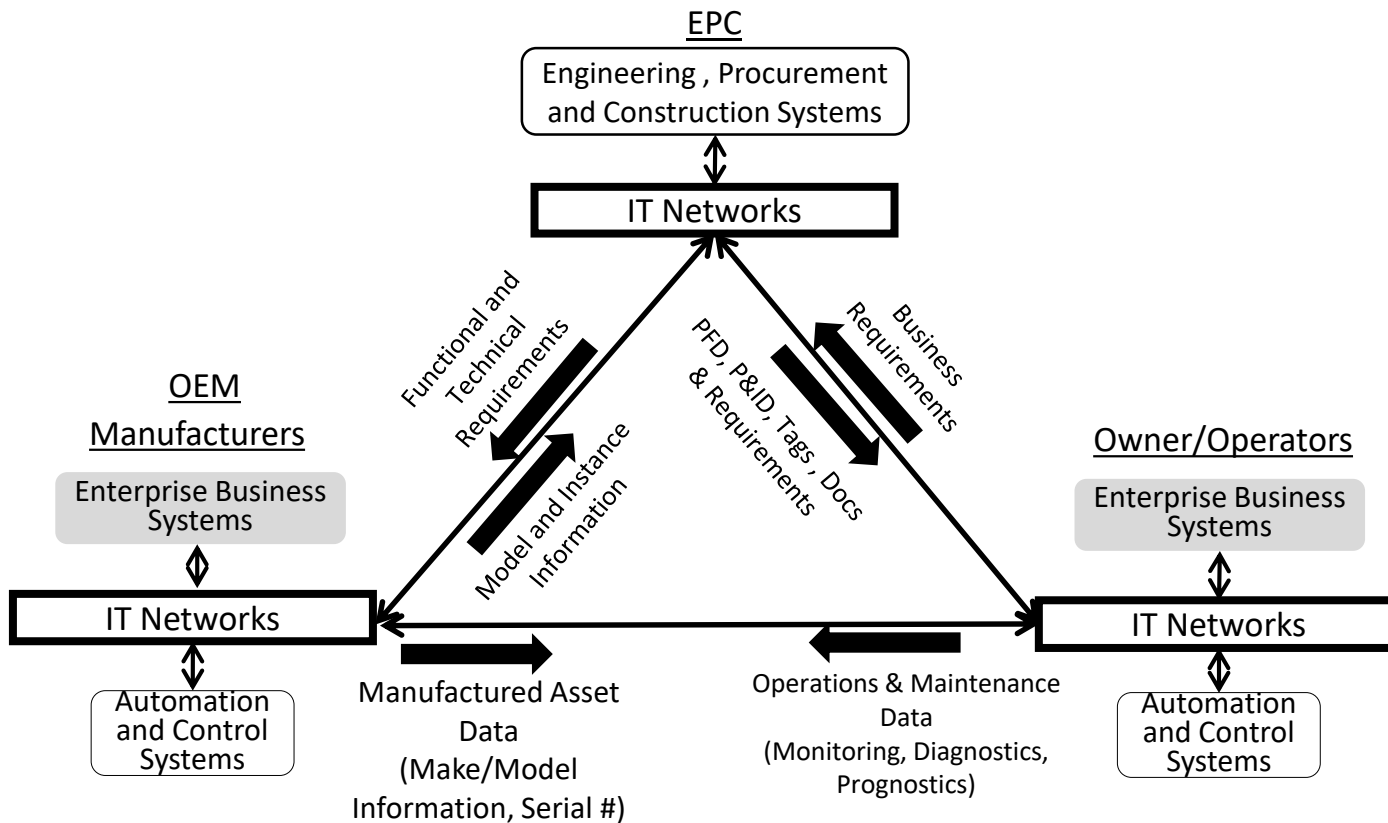
NOTE 2 This document is focused on interoperability requirements for systems which play roles in the secondary business process, including those in domains identified in [Figure 7](#).

Secondary Business Process

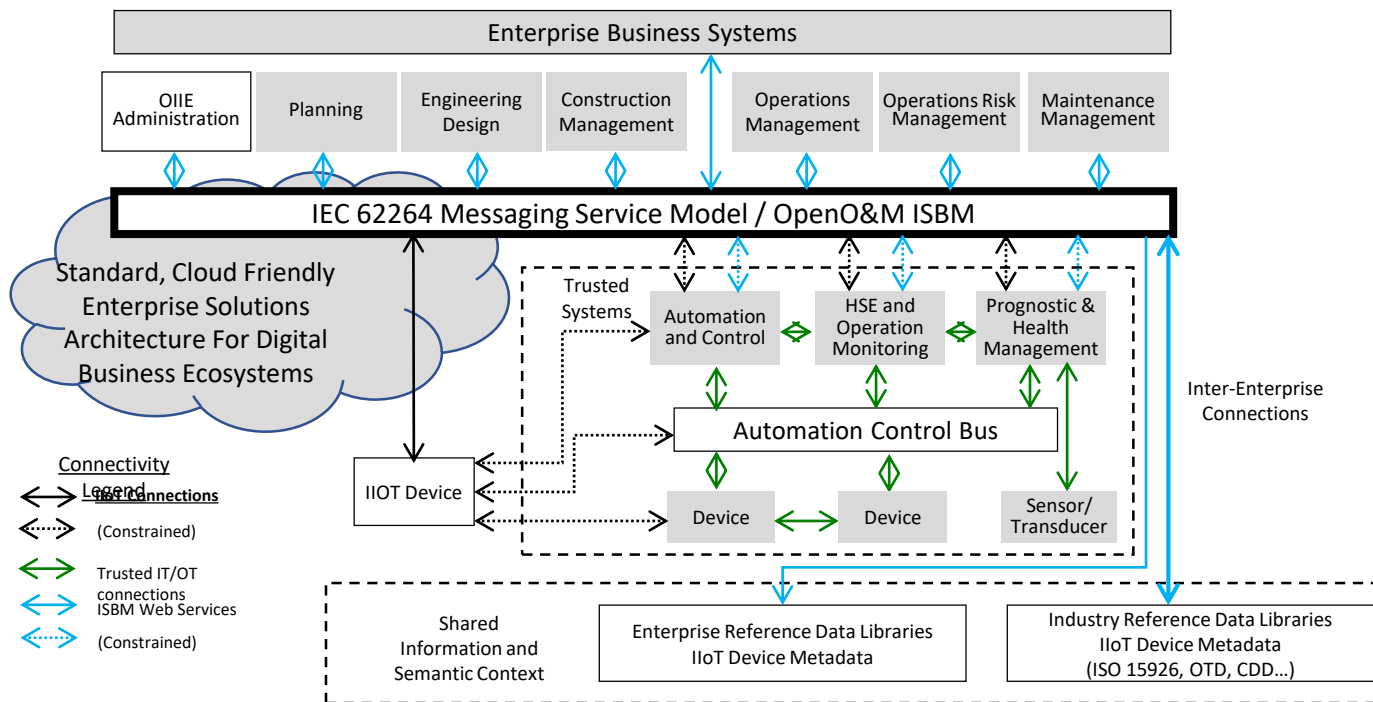


Derived from ISO TC 184
 Manufacturing Asset Management Integration Task Force Final Report

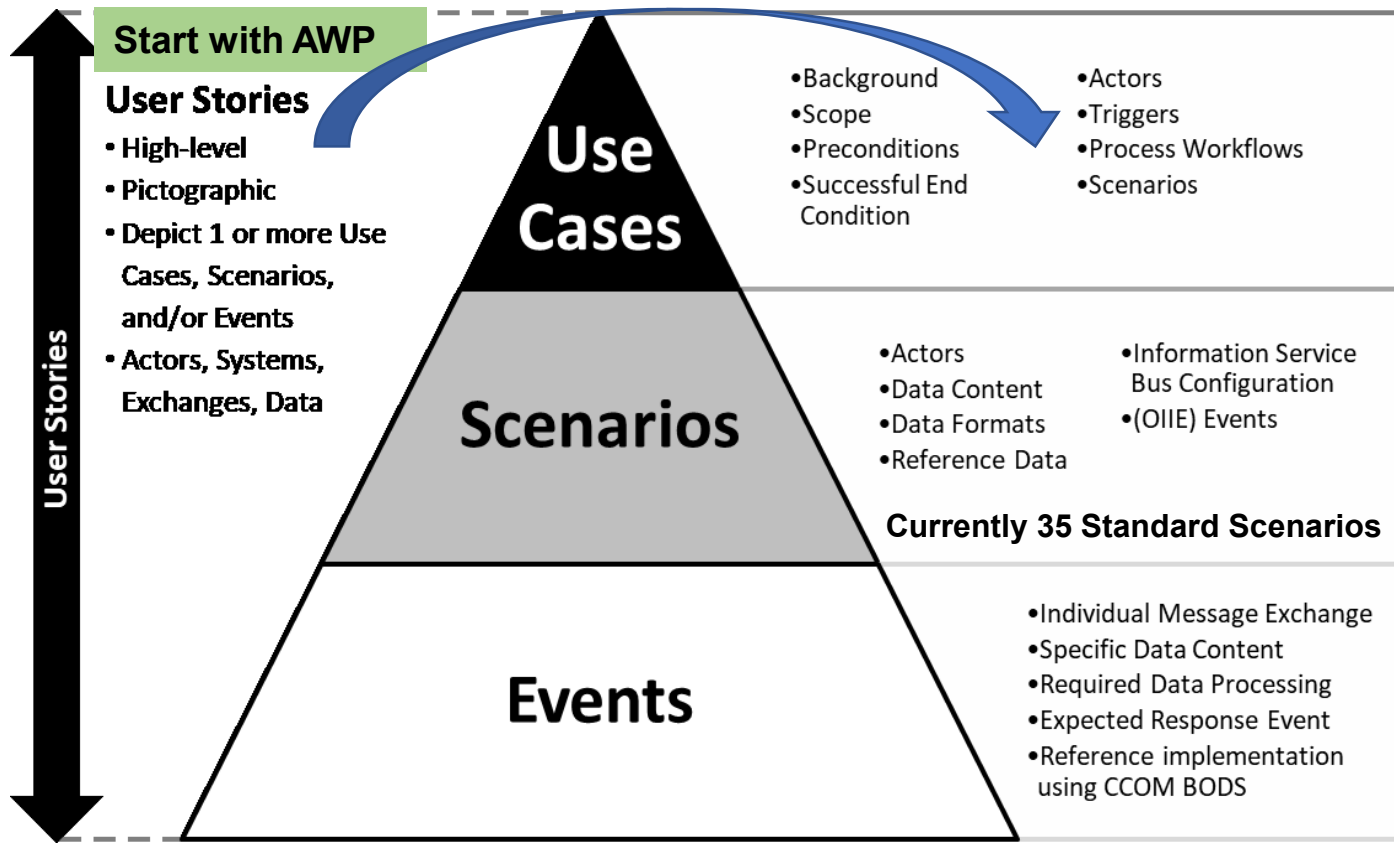
Inter-Enterprise OIIE Digital Ecosystem



Intra-Enterprise OIIE Digital Ecosystem

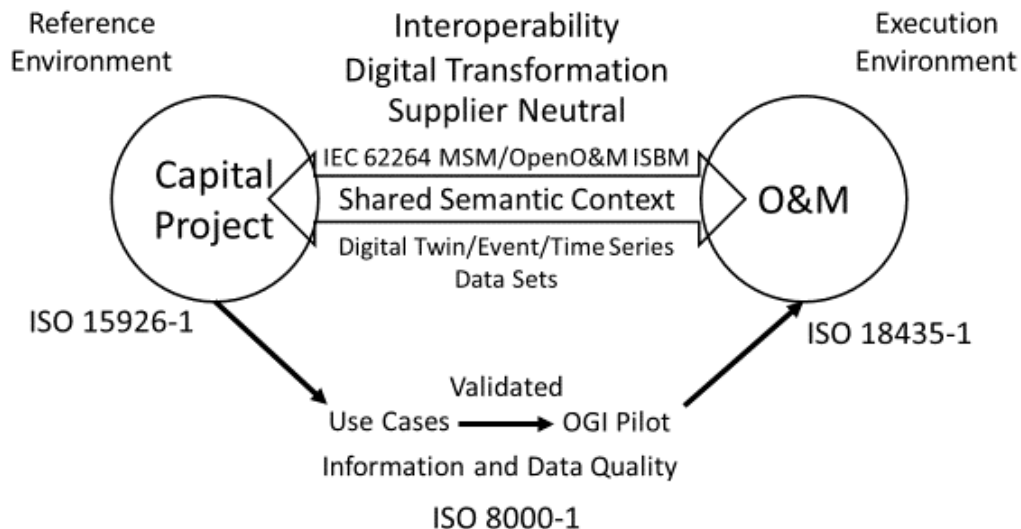


OIIE Use Case Architecture - 1



WG6 – Oil and Gas Interoperability (OGI) TS – ISO 18101 Standardization Concepts and Features

OGI TS Objective: Move From Systems Integration to Systems Interoperability and Digitalization



Status: ISO TS 18101-1

- Approved 13-0 – October 2018
- Published by ISO June 2019 – ISO Store
- **1st ISO standard to explicitly identify and define the basis for a supplier-neutral industrial digital ecosystem, previously identified as a requirement by the EU**
- ISO TC 184 Digital Twin Report : Industrial Digital Ecosystem and Process Industries Digital Twins – July 2019

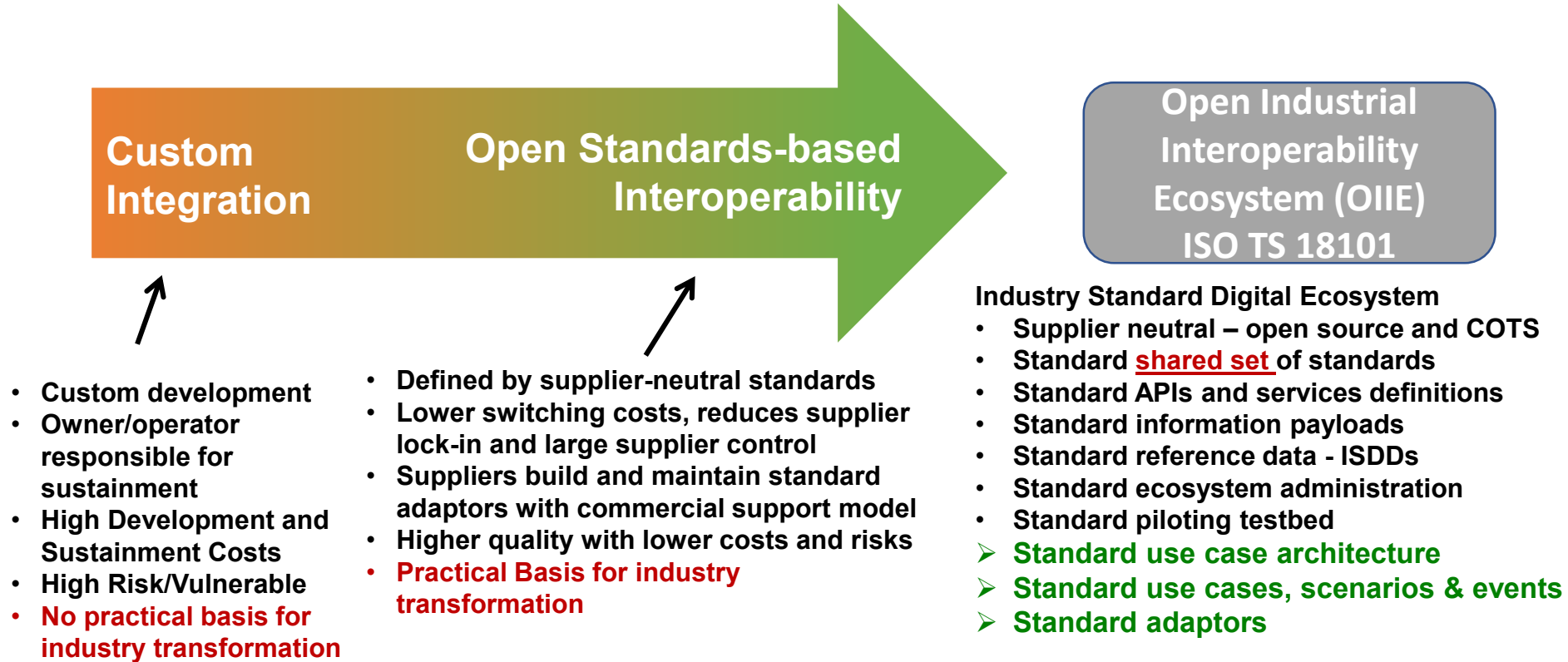
Participating National Committees:

Canada, China, France, Germany, Italy, Japan, Netherlands, Norway, Sweden, United Kingdom, United States (Plus Experts from Australia)

Industry Level Cooperation and OIIE Use Cases

Industrial Digital Transformation

A Pragmatic Solution: Standards-based Interoperability



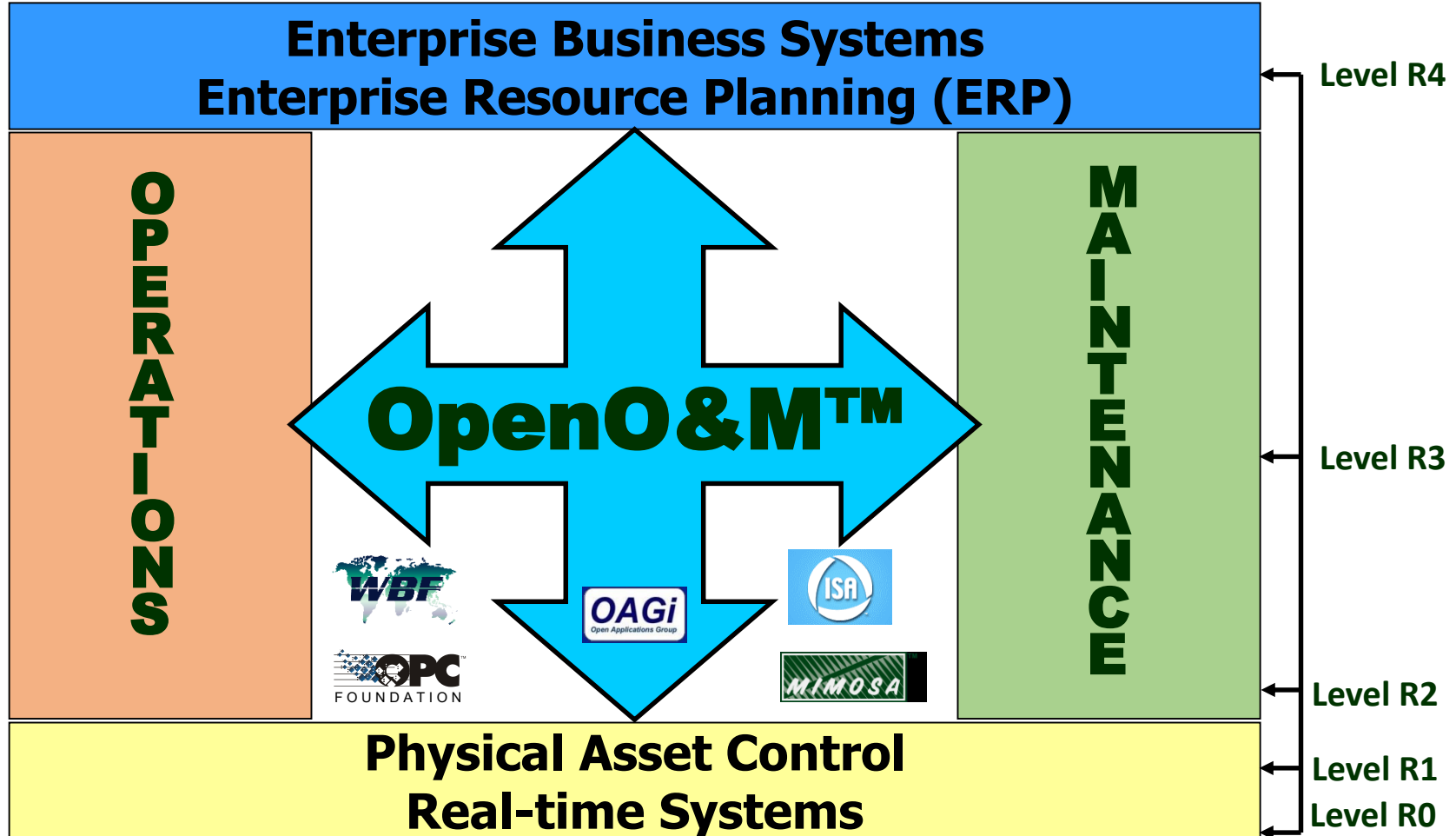
OIIE Path to Sustainable Interoperability

- Simplify
- Standardize (Industry Digital Transformation requires industries to share standards)
- Digitalize
 - Follow and leverage PERA / ISA95
 - Industry Standard Datasheet Definitions linked to Industry Standard Datasheets
 - ISA
 - API
 - PIP
 - PFD and P&ID Information
 - Procurement
 - Construction Work Orders
 - Condition Monitoring and IIOT – In Cooperation with NIST
 - Maintenance
- Interoperate: (Systems of Systems, not just file exchange or integration)
- Specialize: (In conjunction with industry specific associations and individual enterprises)

Industrial Digital Transformation: Interrelated Standardization Workstreams

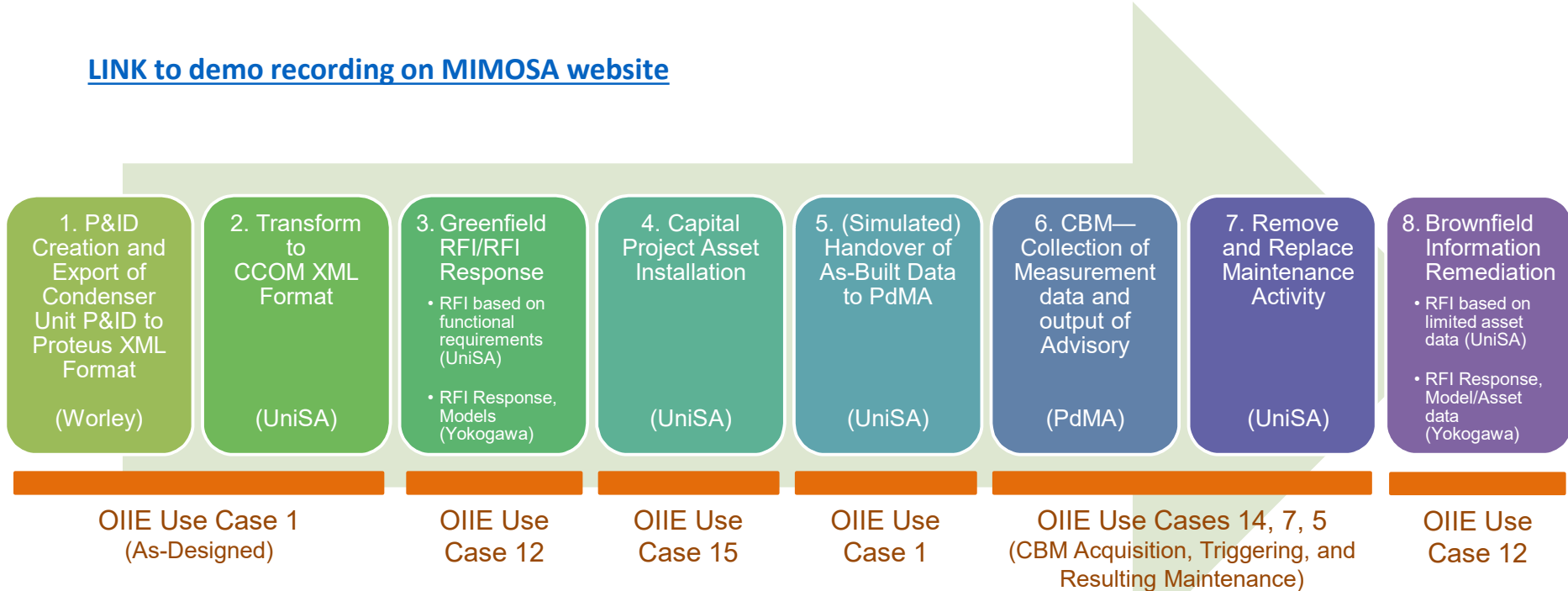
- **International Standards Organization (ISO):** (Standards addressing many topics including Practices, IT and IM)
- **OpenO&M Initiative** – Group of Standards Developing Organizations (website)
 - Formed by Multilateral MOU - ISA, MESA/B2MML, MIMOSA, OAGI, OPC (plus bi-lateral MOUs with some)
 - Industry standards developing organizations cooperating to enable interoperability
 - MIMOSA owns and manages OpenO&M branded IP
 - NIST Smart Manufacturing and Integration teams (R&D, summits & white papers)
- **MIMOSA** (Website, Teams and GitHub)
 - MOUs with ISA, USPI, THTH
 - CII and NERA MOUs under development: Mostly focused on OIIE Use Case Development

OpenO&M Initiative – Formed 2004



OIIE OGI Pilot 3.1 Demonstration

[LINK to demo recording on MIMOSA website](#)



OIIE OGI Pilot Phase 3.2

- Starting in November
- Will now include sponsorship by National Energy Resources Australia
 - Mission is to improve efficiencies in Australian Energy Sector
 - Australia does not have globally dominant IT suppliers and wants to be free to innovate
- Scope
 - Add basic Inter-bus and Inter-enterprise features to OIIE
 - Multiple OIIE Instances interoperating with each other forming supplier-neutral digital ecosystems
 - Driven by Use Cases (starting with RFI/RFI Response)
 - Associated with OpenO&M ISBM 1.2 Specification Update
 - OIIE Entry Point for ILAP (with Team Norway)
 - SPIR Entry Point
 - Preparation for next steps with NERA, CII and IOGP

MOU and Path Forward

- In May both associations identified the desire for an MOU framing the opportunity for mutually beneficial cooperation
 - THTH would build on top of existing OIIE Specifications
 - Share maximum practical amount of IT and IM Standards and Methods
 - Specialize for Pulp and Paper, following standard architecture and methods
 - Pulp and Paper specializations would be THTH IP, managed in a cooperative manner to extend OIIE on a scalable, repeatable and sustainable manner
- We have now executed such an MOU (Show PDF)
- OIIE OGI Pilot Phase 3.2 Starting next Month
- MIMOSA Open Meeting – Dec 4 – Dow Center – Houston, TX
- ISO TC 184/WG 6 Meeting – Dec 5 – Dow Center – Houston, TX