The Open Industrial Interoperability Ecosystem (OIIE) and ISO 18101

Standards-based Interoperability for Digital Transformation and Asset Lifecycle Management

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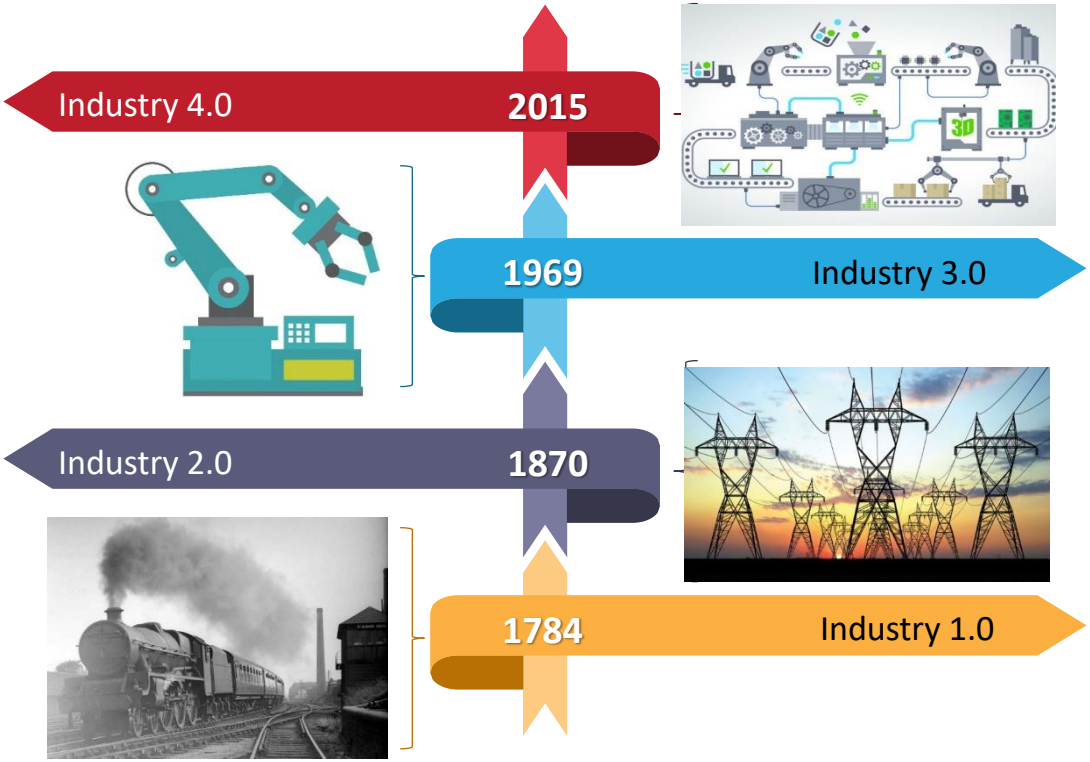
Industrial Revolution Phases and Common Principals

Gaining Business Efficiency from Modularity, Interoperability and Standardization



In Industry 4.0

- Supply chains integrated across many industries
- Sharing industrial internet and AI
- Modular, interoperating & standardized industrial digital ecosystems

All industrial revolution phases have included modularity, interoperability & standardization

- Standard gauge railroads, screw thread
- Physical/Mechanical standards
- Electrical/Utility and Telephony standards
- Intermodal Transport

To achieve interoperability, we use practices and standards designed for that purpose.

- Open Industrial Interoperability Ecosystem (OIIE)
- ISO 18101: Interoperability for Asset Intensive Industries

Industrial Digital Transformation – 2022 and Beyond

A Pragmatic Solution: Standards-based Interoperability and the OIIE

OIIE R&D Program
Industry Requirements Driven OIIE Use Cases
OIIE OGI Pilot Program

Open Industrial Interoperability Ecosystem (OIIE)
ISO 18101

Supports/Federates

- **Digital Twins**
- **Digital Services**
- Systems of Systems
- Interoperability
- AI, Ontology, OTDs
- ID Management
- IIOT and Analytics
- Risk Mgt: Ops & Cyber

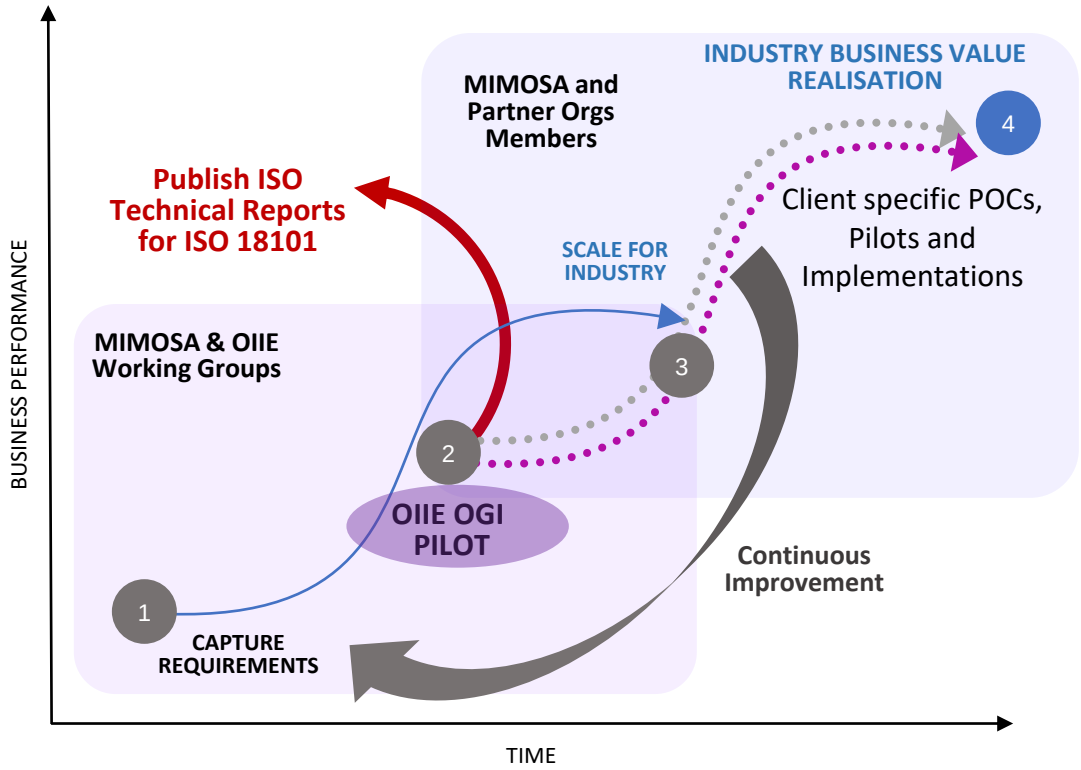
Model, Monitor and Manage

MIMOSA has helped lead the development of the Model Driven Architecture for Physical Asset Management Paradigm for 20+ yrs.

Industry Standard Digital Ecosystem Components

- **Standard OIIE Use Cases, Scenarios & Events**
- **Standard OIIE Digital Services Definitions**
- **Standard OIIE APIs (OpenO&M ISBM)**
- Standard OIIE Registers and Services Directories
- Standard Data Models (MIMOSA CCOM, PROTEUS…)
- Standard Message Models
- Standard Reference Data
- Standard OIIE Adaptors

The OIIE R&D Program Drives Industry Digital Transformation and Business Value Realization Sharing Costs, Risks and Standards



4 Industry Business Value Realization

- Participant/Client Specific Solutions
- Client Ecosystem and Interdependencies
- Industry participants assemble their own interoperating OIIE systems of systems using intranets and extranets

3 Scale for Industry

- Industry participants build supported implementations of OIIE elements for industry use in OIIE systems of systems

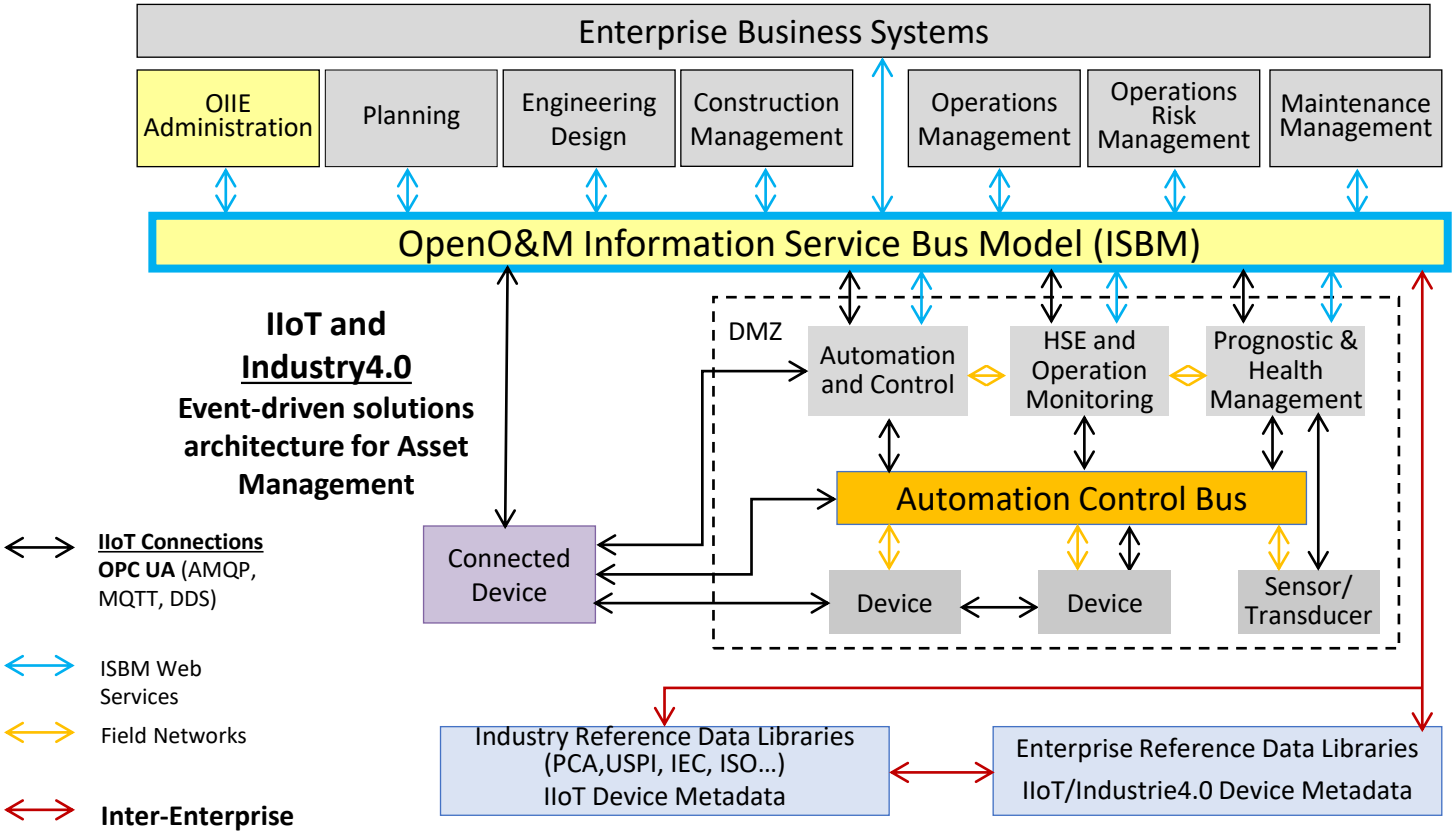
2 OIIE OGI Pilot

- Prototype OIIE use cases & software
- Validate use cases and software in industry pilot
- Publish version managed standards and specifications (use cases, scenarios, events…)

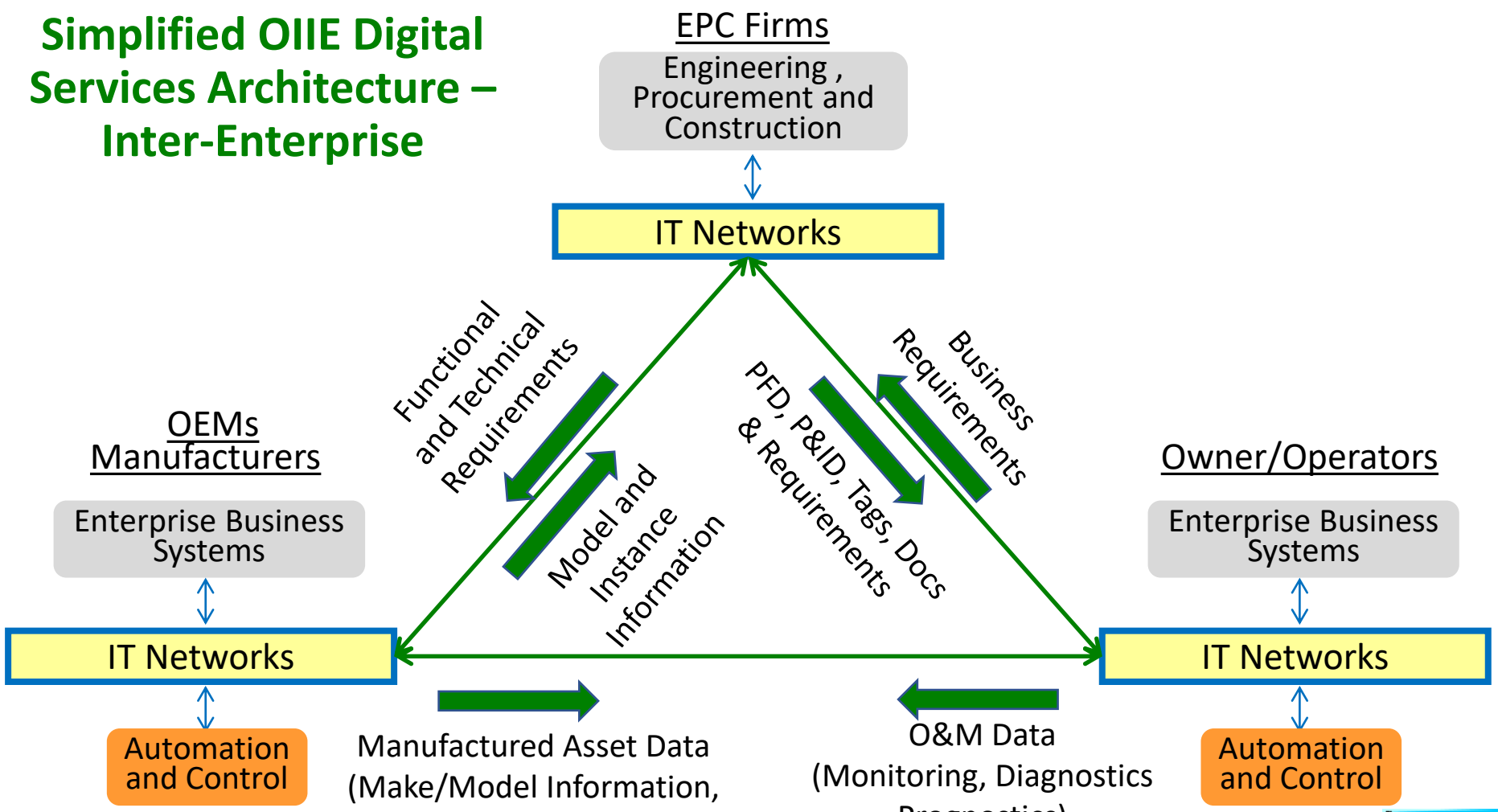
1 Capture Industry Requirements

- Process of capturing industry user stories and prioritizing them for the OIIE OGI Pilot

Simplified OIIE Digital Services Architecture – Intra-Enterprise

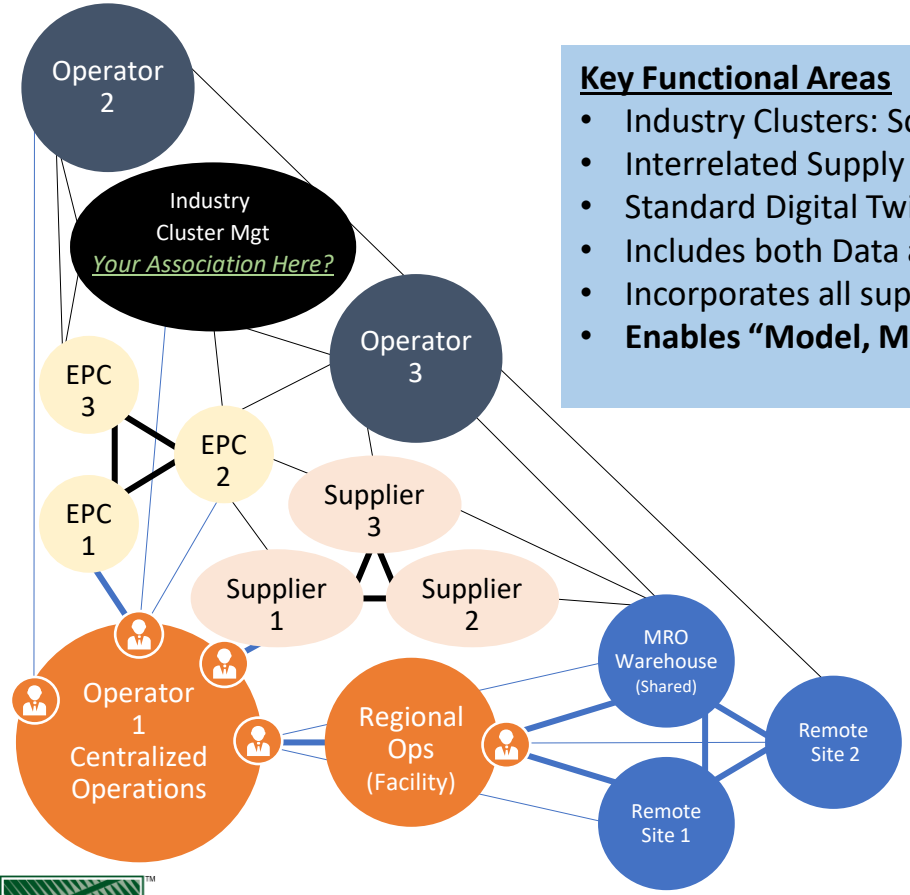


Simplified OIIE Digital Services Architecture – Inter-Enterprise



ISO 18101 and OIIE Interoperability Framework

Asset-centric Connected Digital Ecosystems – Industry Clusters



Key Functional Areas

- Industry Clusters: Scalable "Virtual Hubs" without hub and spoke architecture liabilities
- Interrelated Supply Chains – CAPEX and OPEX
- Standard Digital Twins (synchronized across the lifecycle)
- Includes both Data and Required Documents
- Incorporates all supplier classes (Hardware, Software, Services, Digital Services)
- **Enables "Model, Monitor and Manage" paradigm for Asset Lifecycle Management**

OIIE/OGI Standardized Use Case Architecture

Standardized Methodology to Define and Re-use OIIE Components

User Stories

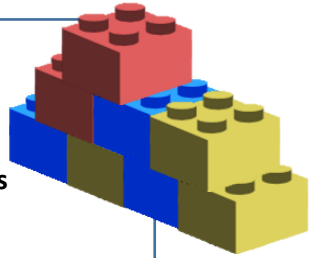
User Stories

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

Use Cases

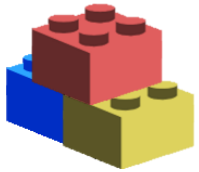
- Background
- Scope
- Preconditions
- Successful End Condition

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



Scenarios

- Actors
- Data Content
- Data Formats
- Reference Data
- Information Service Bus Configuration
- (OIIE) Events



Events

- Individual Message Exchange
- Specific Data Content
- Required data processing
- Expected Response Event
- Implemented by CCOM BODS and possibly others

This standard use case architecture and the associated methodology results in standardized Digital Services Specifications that are repeatable, scalable and maintainable.

Standard OIIE Use Cases

OIIE Use Case 1: Information handovers to O&M

OIIE Use Case 2: Recurring Engineering Updates to O & M

OIIE Use Case 3: Field Changes to Plant/Facility engineering

OIIE Use Case 4: Enterprise Product Data Library Management (tied to ISDDs)

OIIE Use Case 5: Asset Installation/Removal Updates

OIIE Use Case 6: Preventive Maintenance Triggering

Already Piloted and Demonstrated in 3.x Series

Currently Being Piloted

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: Automated Provisioning of O & M systems

OIIE Use Case 11: Enterprise RDL Management

OIIE Use Case 12: RFI and RFI Response (Models Meeting Requirements and Model Information, Green and Brown Field)

OIIE Use Case 13: Lockout/Tagout

OIIE Use Case 14: CBM Data Acquisition

OIIE Use Case 15: Capital Project Asset Install

OIIE Use Case 16: Purchasing (Subset of Procurement Process)

OIIE Use Case 17: Risk Model Development and Continuous Improvement

OIIE Use Case 18: Risk model Linkages

Thank You!

For further information contact MIMOSA.org.