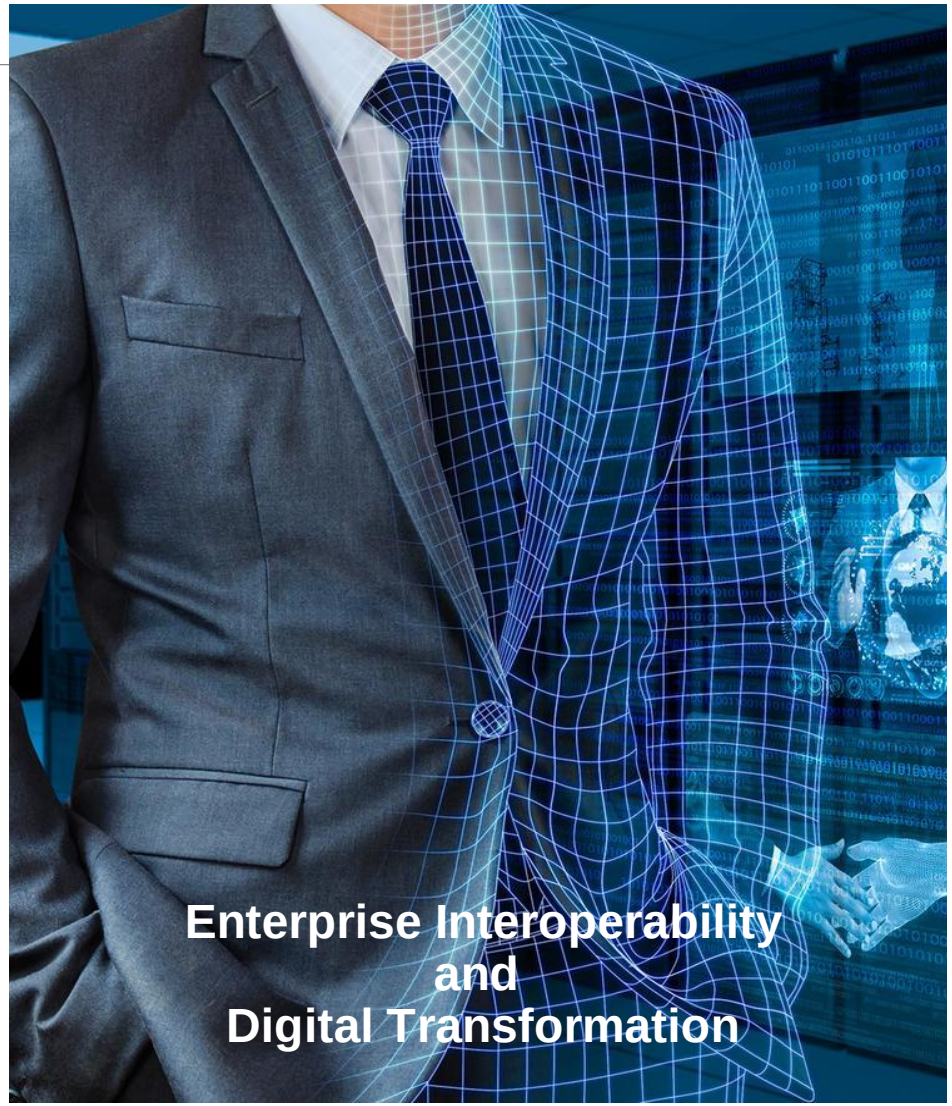
Using the AIN to Enable Digital Interoperability

Leveraging industry standards to build Digital Business Ecosystems

Mark Pyatt, SAP O&G Operational Integrity
November, 2017

Agenda

- Understanding the AIN
- How is BP Using the AIN?
- Understanding Digitalization and Interoperability Using the OIIE
- Questions / Next Steps



O&G Operators aim for the following…

Maximize asset productivity

- Overall equipment effectiveness
- Return on assets
- Unplanned outages

Drive safe operations

- Annual OSHA related incidents
- Recordable accident frequency rate

Reduce costs

- Annual service and maintenance cost
- Planned maintenance budget vs. actual cost

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... but face different challenges in Asset Management

Incompleteness

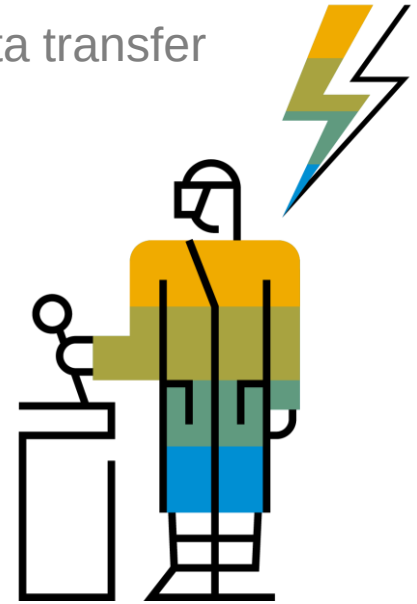
Old Vastness Uncertainty

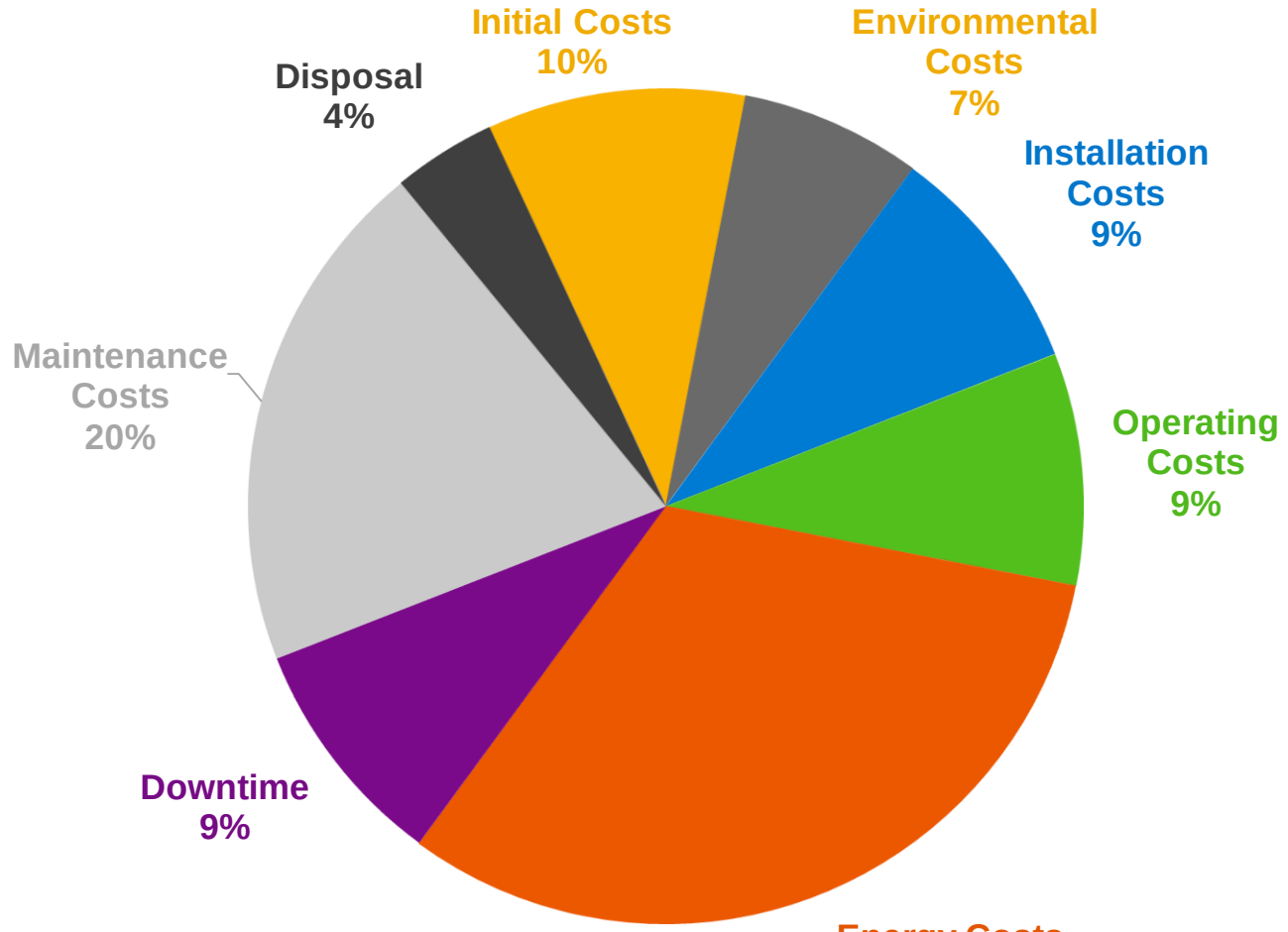
documentation Inconsistency

Data Quality Incorrectness

siloed sources

Manual data transfer





*www.pumpsandsystems.com

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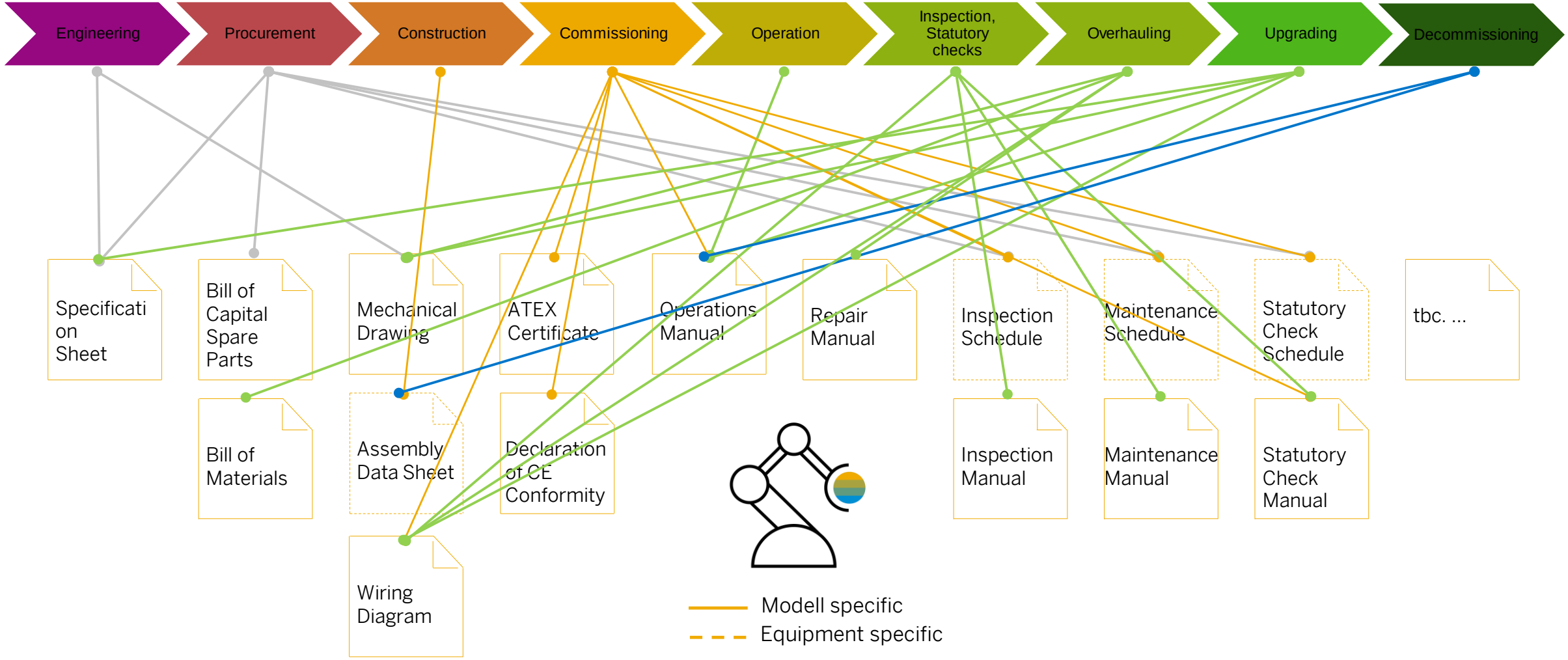
Asset specific documentation is complex and difficult to manage

Digital manufacturing information for all stakeholders



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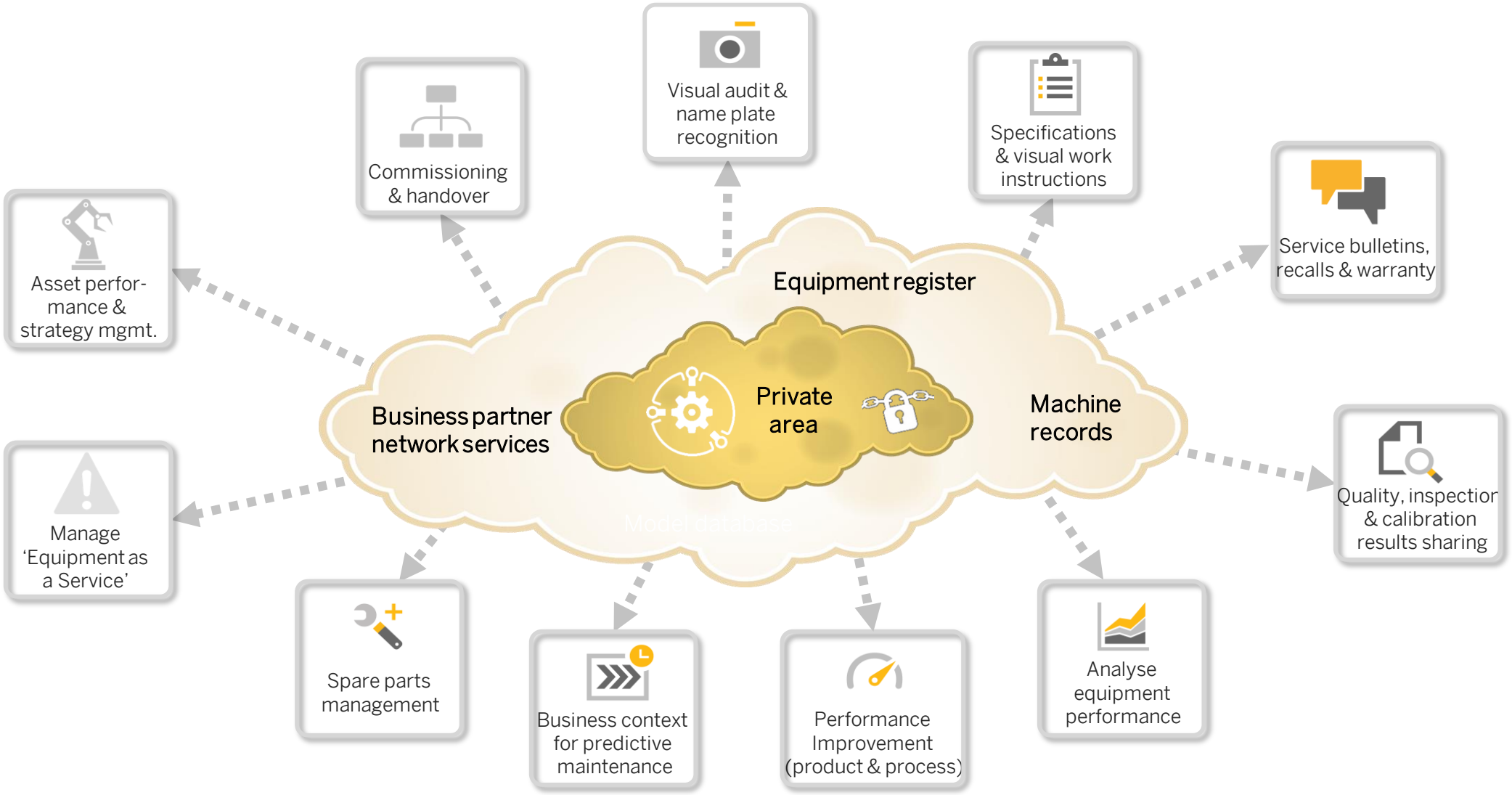
SAP AIN Enables You to ‘Rethink Technology Architecture’



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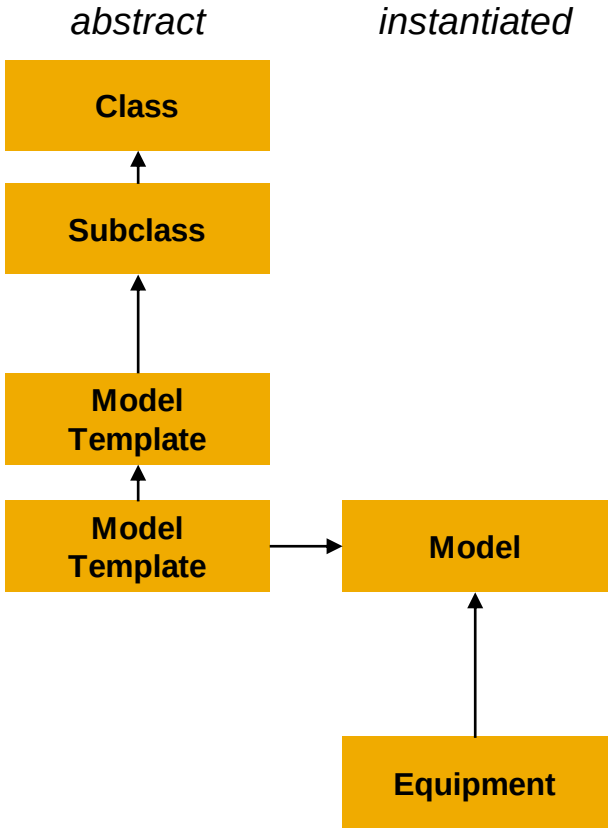
Standardize Asset Information Models; Create a Digital Twin

Business Semantic used to organize and share data between different parties



Predefined Content – provided and kept up to date by **SAP** as the AIN application provider. Based on common best practices (e.g. ISO 14224, API 610 data sheets). This is the **class** and **characteristics template.**

CLASS: PUMP
SUBCLASS: CENTRIFIGUAL
RATED POWER (BHP)
EFFICIENCY %

Model Family & Model Information
provided by the individual **manufacturer** or **OEM**

FAMILY: 384 - PUMP ASSEMBLY, SEAWATER
MODEL: 384XL – PUMP ASSEMBLY, SEAWATER, EXTRA LARGE
Manufacturer: ACME Instruments
RATED POWER: 1500RPM – 2500RPM

Equipment/Asset Information – provided by **Owner/Operator** or by the EPC (on behalf of the OEM).

EQUIP: PU815 – JETTY PUMP ASSEMBLY
Site Data: Dusty Environment,
Liquid: Pumping water
Service: Continuous

AIN Supports SAP and Non-SAP Information Models

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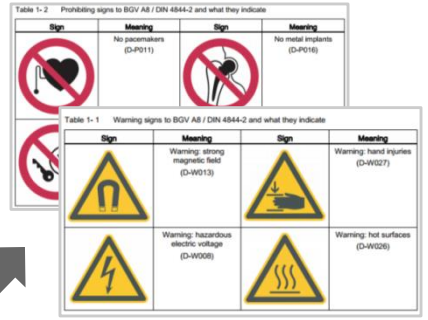
Multi-tenancy capabilities support many data sources and formats found within your ecosystem

Specifications	Value
MOTOR TYPE	DC
NUMBER OF PHASES	3P
POWER RATING	570KW
NUMBER OF POLES	2P
VOLTAGE RATING	690 V
ROTATIONAL SPEED	
FREQUENCY	
FRAME NUMBER	

Maintenance strategy/ intervals and tasks



Manufacturer #1

Revisions/service bulletins

SAP Share

Asset owner #1
Chemicals

Asset owner #1
Mining

Asset owner #1
Oil & Gas

Equipment Subdivision	
Electric motor	Lubrication system
Stator	Reservoir
Rotor	Pump
Excitation	Motor
Radial bearing	Filter
Thrust bearing	Cooler
Coupling	Valves
Control and monitoring	Piping
Control	Oil
Actuating device	Cooling system
Monitoring	Heat exchanger
Valves	Filter
Internal power supply	Valves
Miscellaneous	Piping
hood	Pump
	Motor
	Fan

Table 8-4 Rolling-contact bearing faults

↓ Bearing overheats	↓ Bearing "whistles"	↓ Bearing "knocks"	Possible causes of fault	Remedial measures
X			High coupling pressure	Align the machine more accurately.
X			Belt tension too high	Reduce the drive belt tension.
X			Bearing contaminated	Clean the bearing or replace it. Che
X			High ambient temperature	Use a suitable high-temperature gr
X	X		Insufficient lubrication	Grease the bearings as instructed

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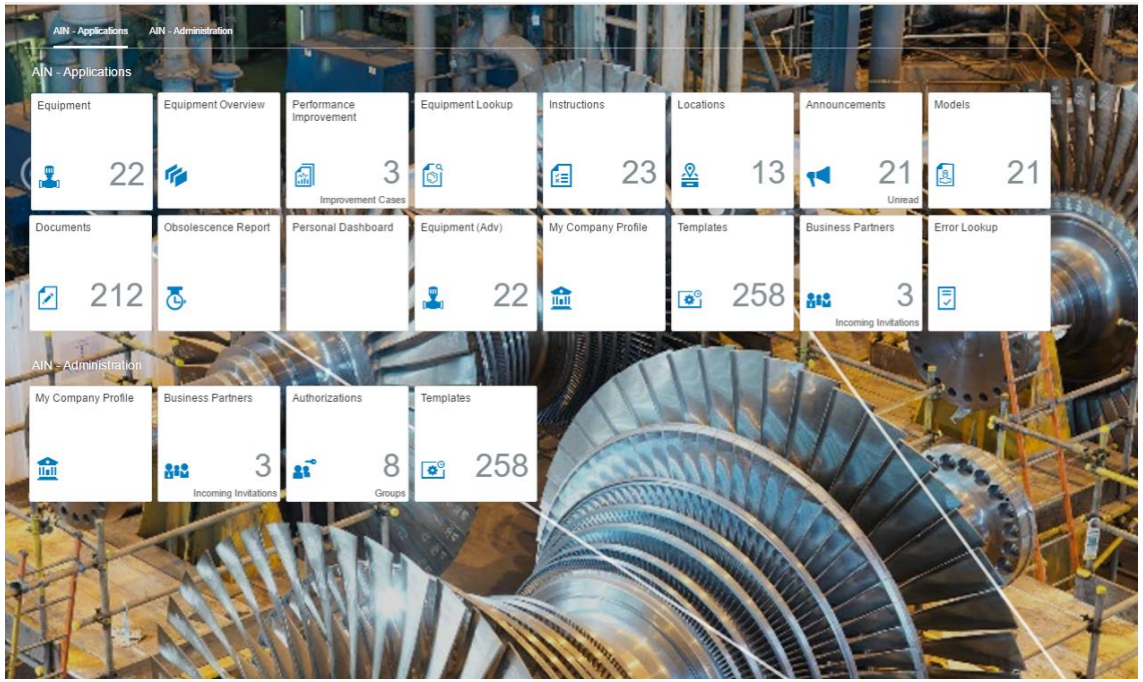
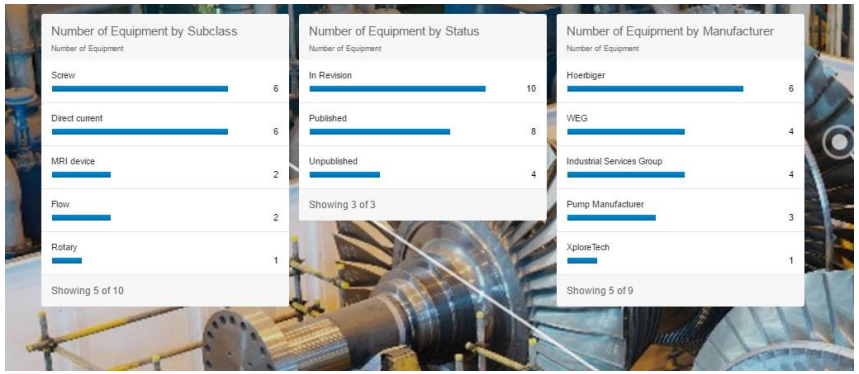
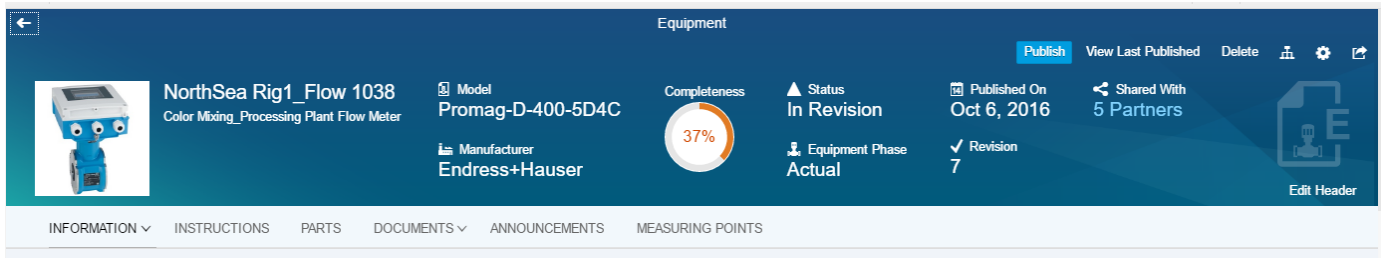
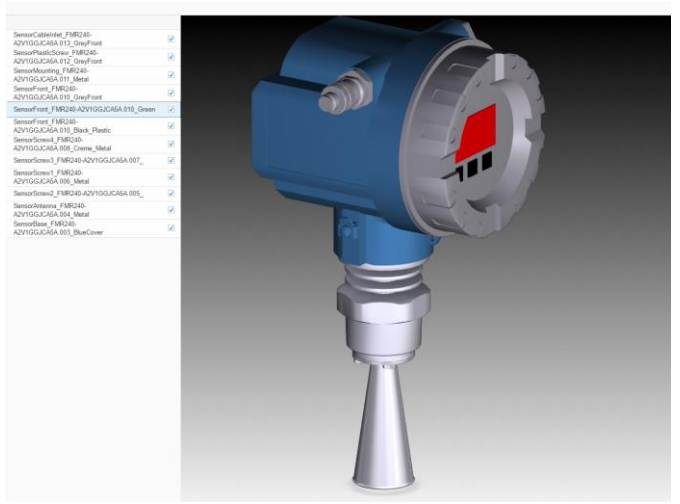
SAP Asset Intelligence Network UI is flexible, adaptable

Real-time updates for equipment, specifications, catalog and part numbers for SAP PM









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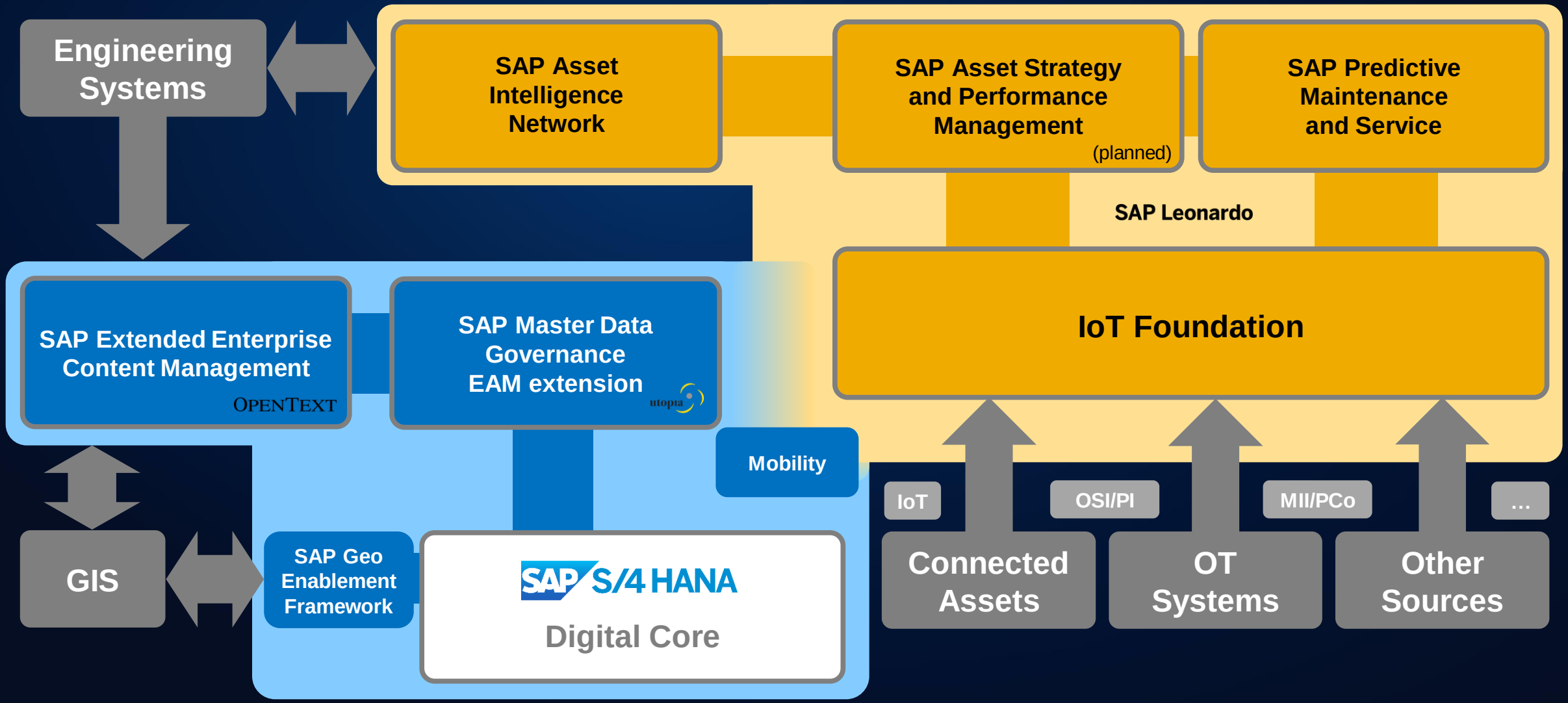
Logical Architecture for Asset Management System and Product View



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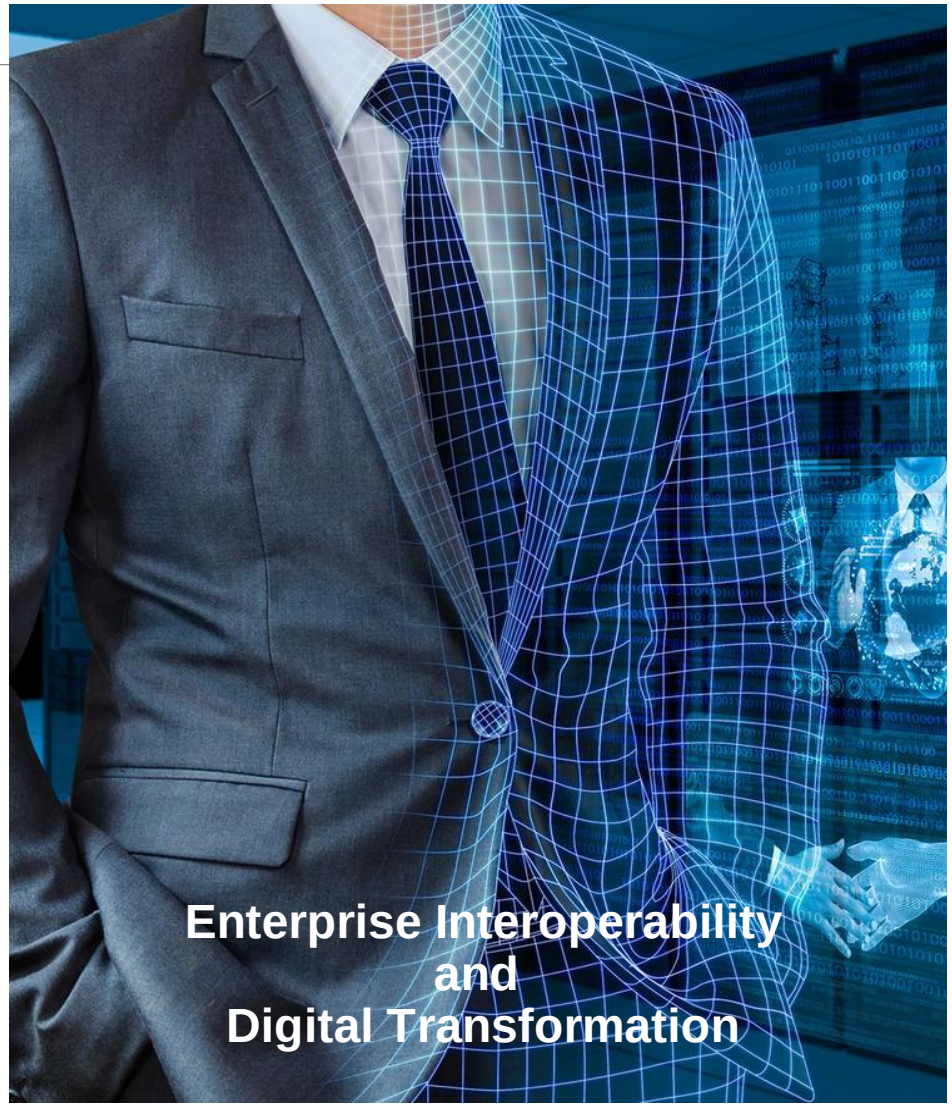

What's the status on adoption of the Asset Intelligence Network?

SAP Pilot Participants (2016):

Shell Oil / Endress Hauser

BASF / Sigma-Aldrich

Rio Tinto / Metso

Others…

2017 POCs (not a complete list):

Siemens	**Conglomerates**
Pfizer	**BioPharmaceuticals**
Bayer Group	**BioPharma / Chemicals**
ThyssenKrupp	**Conglomerates**
….	

OIIE* Pilot Participants:

BP / Yokogawa, TechnipFMC

Future Pilots (MIMOSA / Fiatech Members):

Caterpillar

Chevron

DOW Chemical

Southern Company

U.S. Armed Forces

….

40+ Companies on the list

** **OIIE** = Open Industrial Interoperability Ecosystem*

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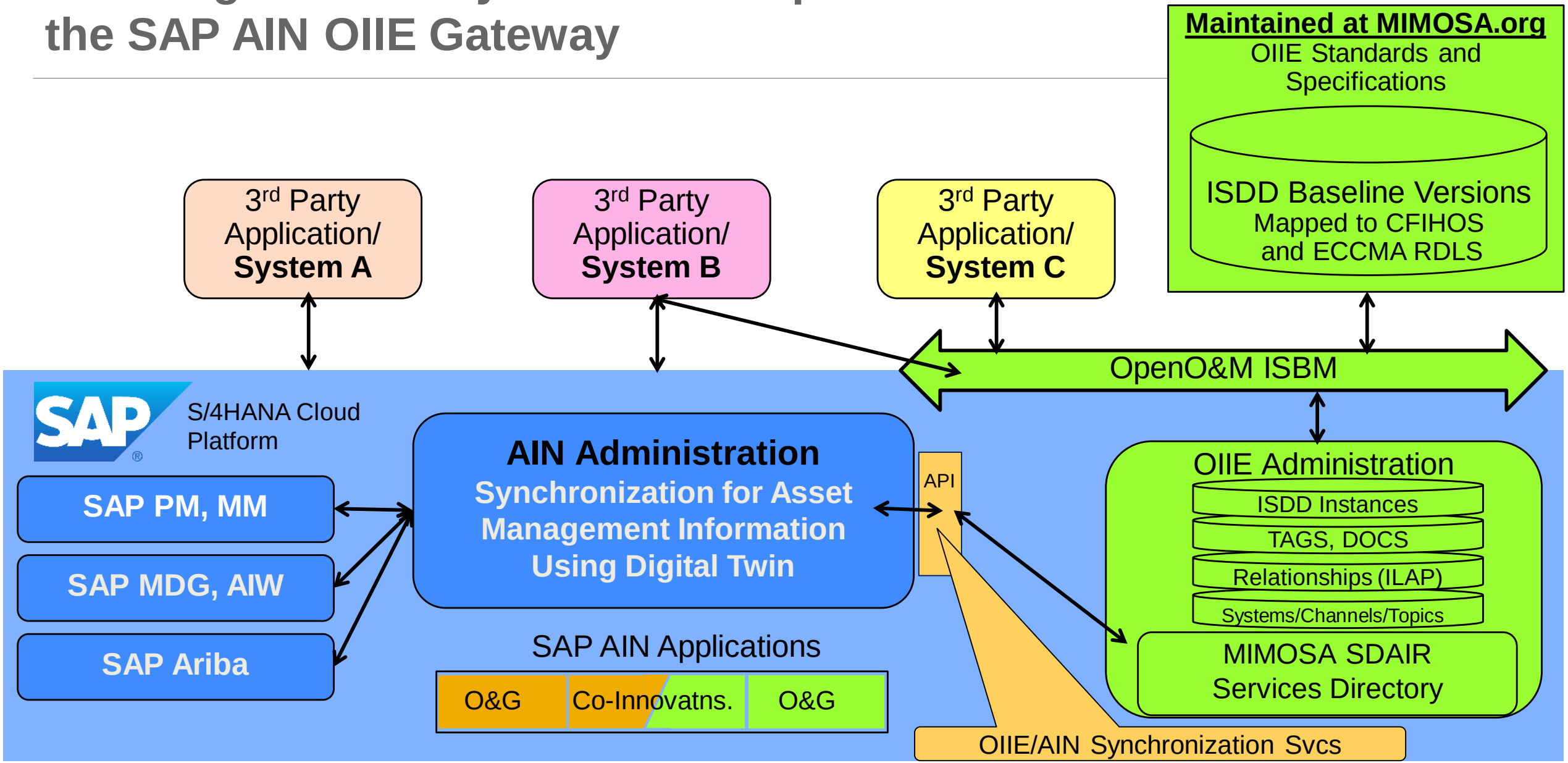
Enabling asset lifecycle business processes via the SAP AIN OIIE Gateway



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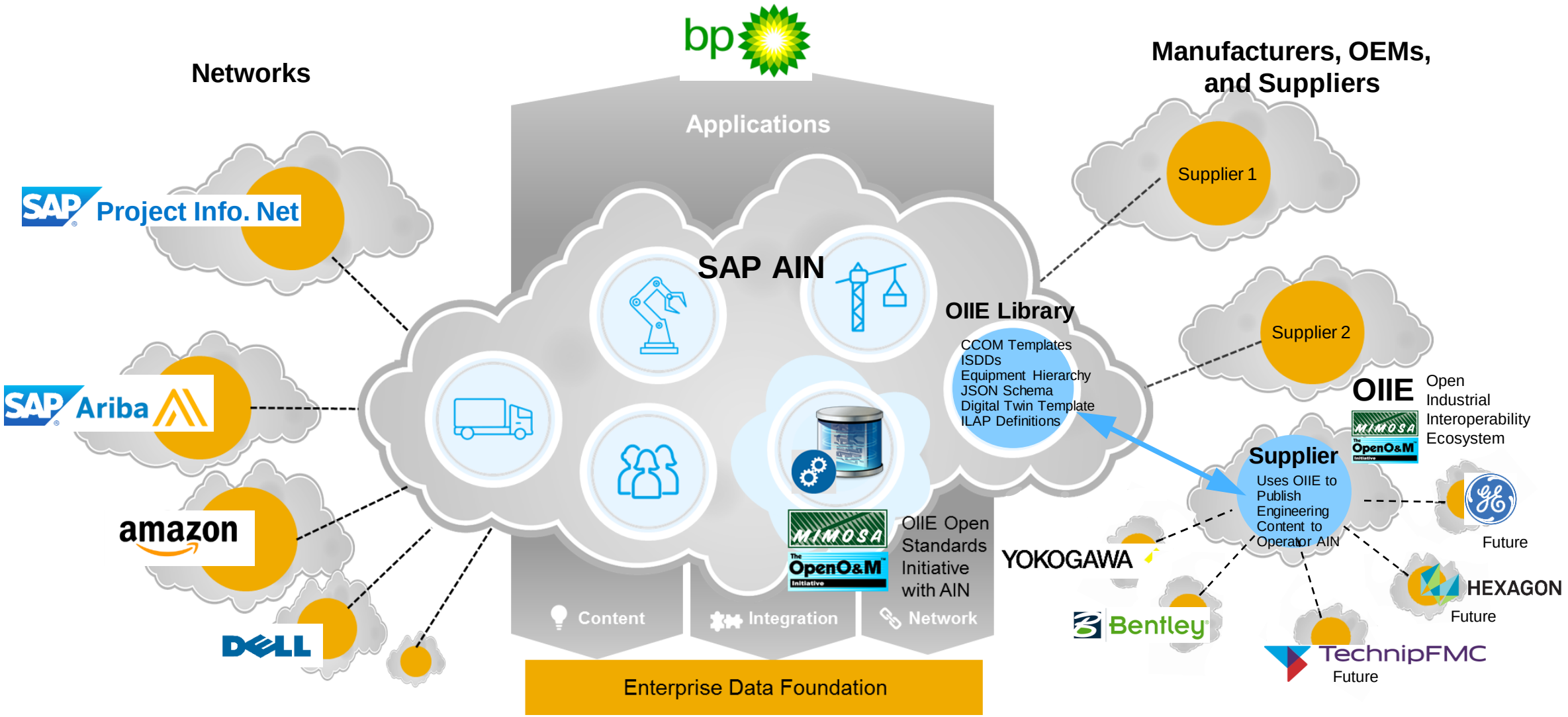
Starting: OIIE Proof-of-Concept with Yokogawa, TechnipFMC



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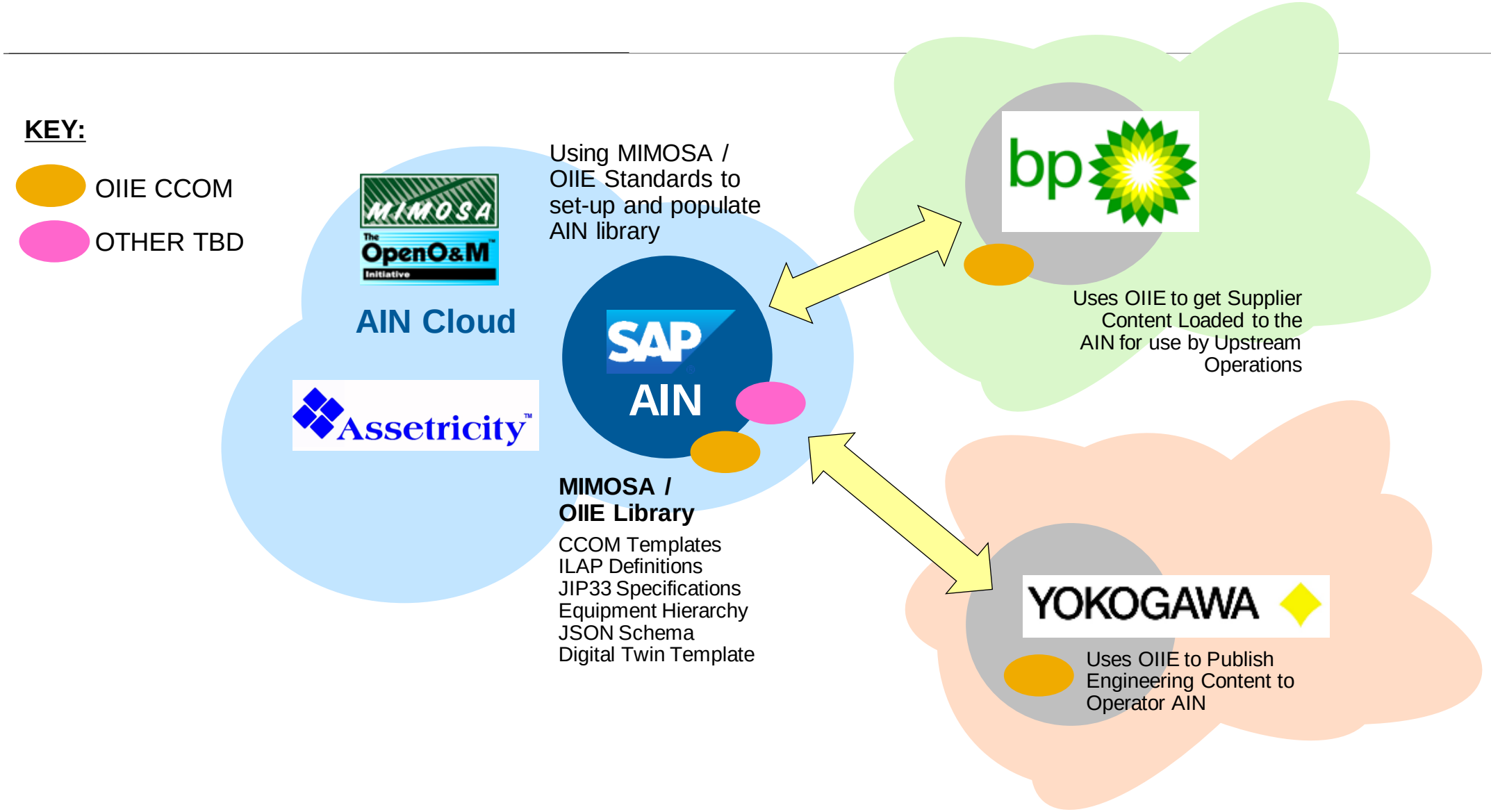
Enabling: OIIE Proof-of-Concept to Test / Initiate Transactions



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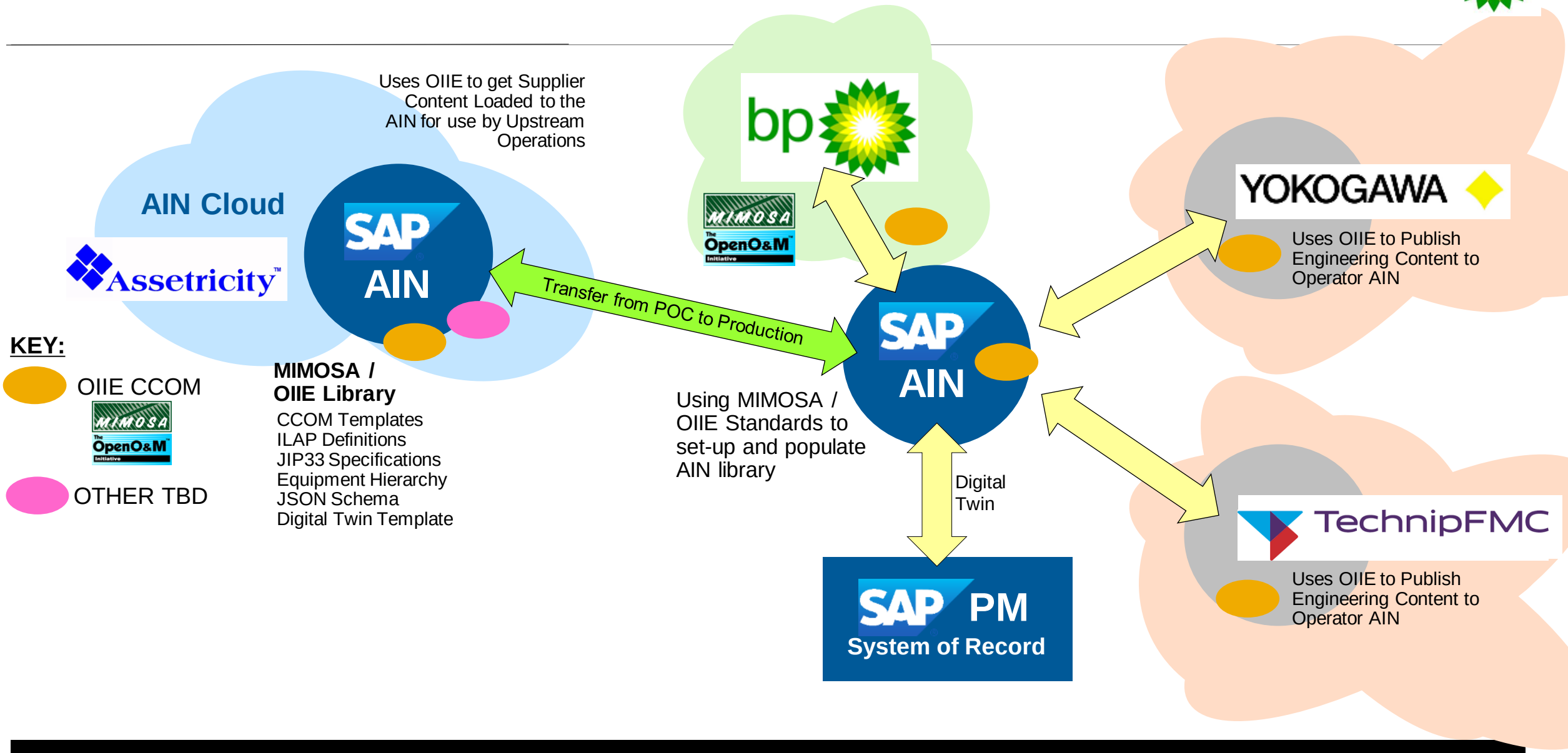
Enabling: OIIE Production Using the AIN for Interoperability



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Any Questions?

Thank you!

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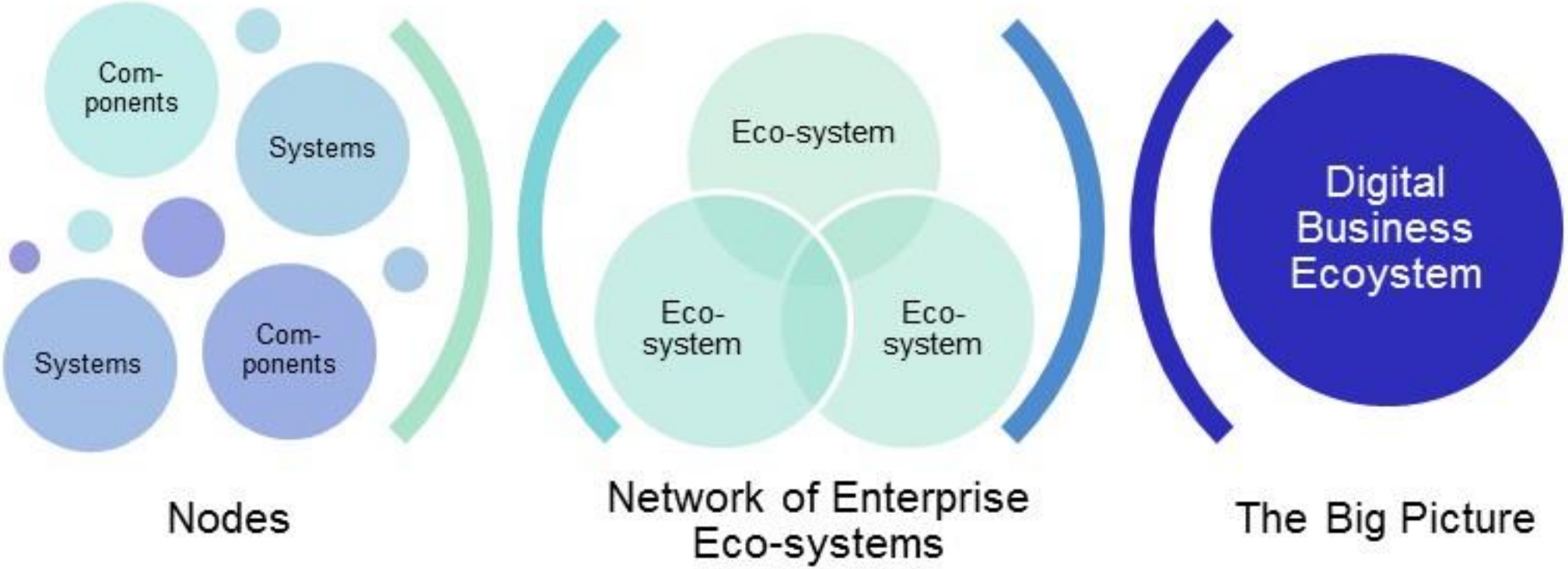
Systems of Systems and Individual Enterprise Ecosystems Must Interoperate In Digital Business Ecosystems



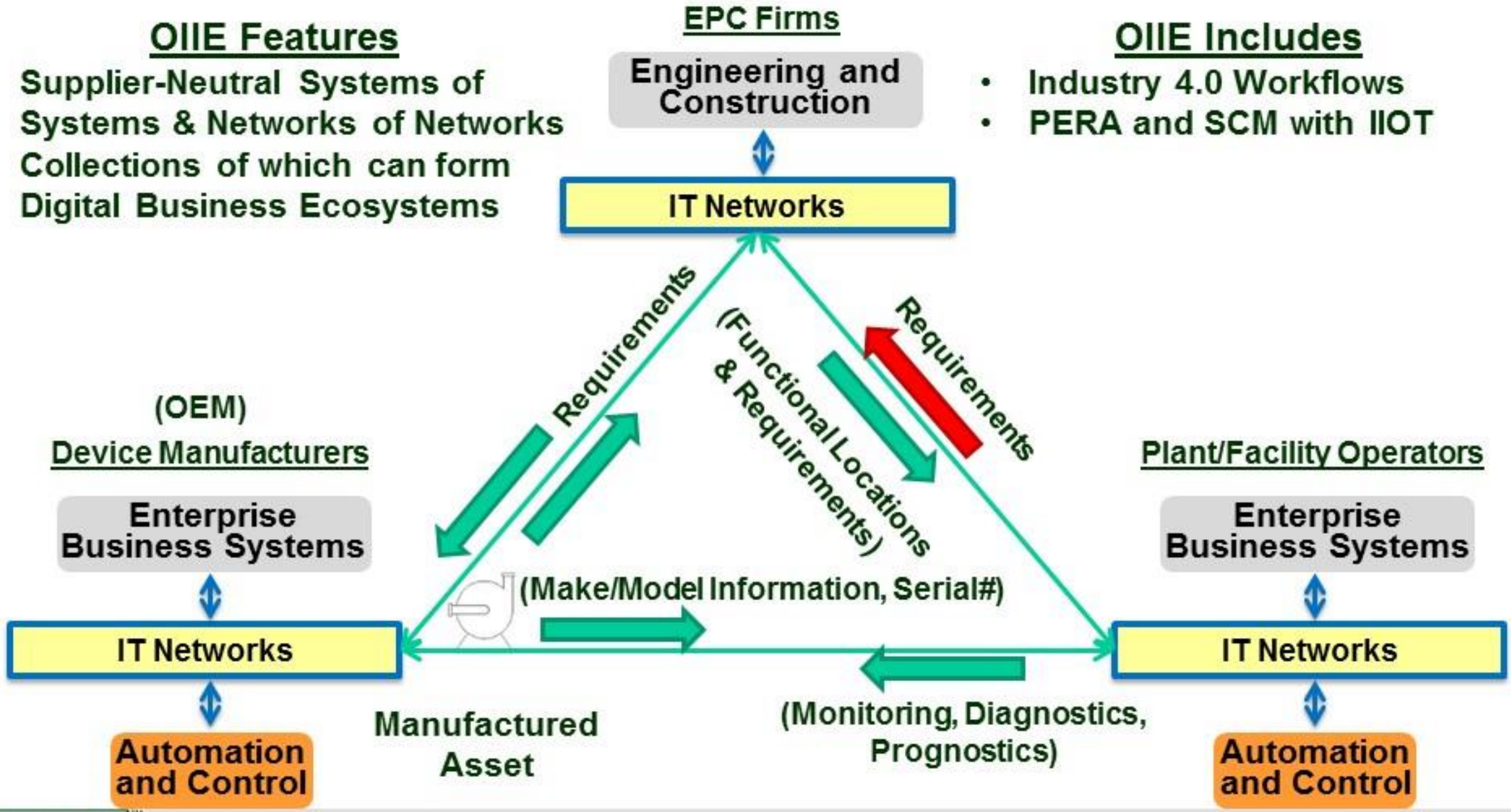
The Open Industrial Interoperability Ecosystem (OIIE) defines the basis for Supplier-Neutral Digital Business Ecosystems composed of Enterprise Ecosystems which share the required standards.

OIIE Features

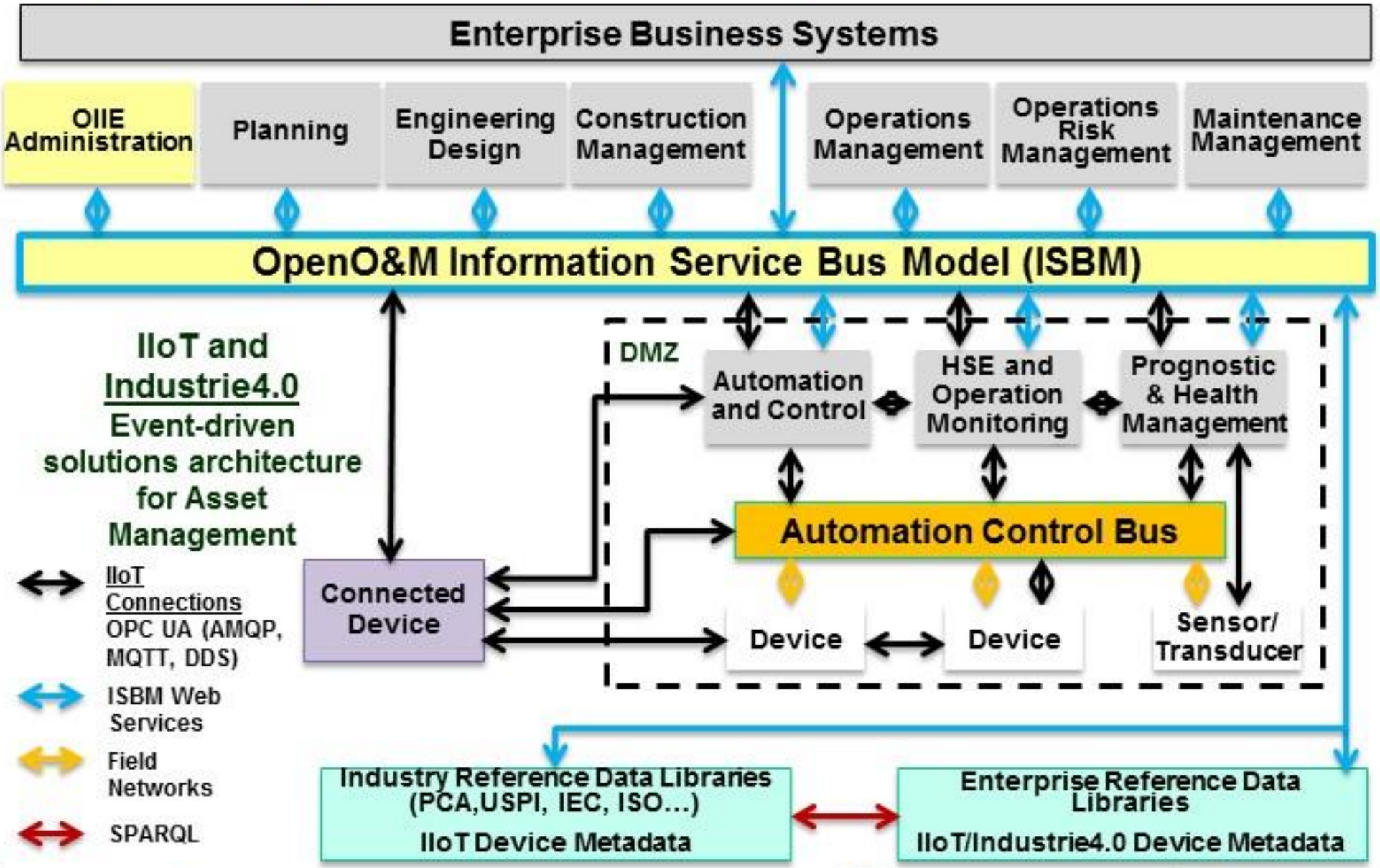
- Supplier-Neutral Systems of Systems & Networks of Networks
- Collections of which can form Digital Business Ecosystems

OIIE Includes

- Industry 4.0 Workflows
- PERA and SCM with IIOT

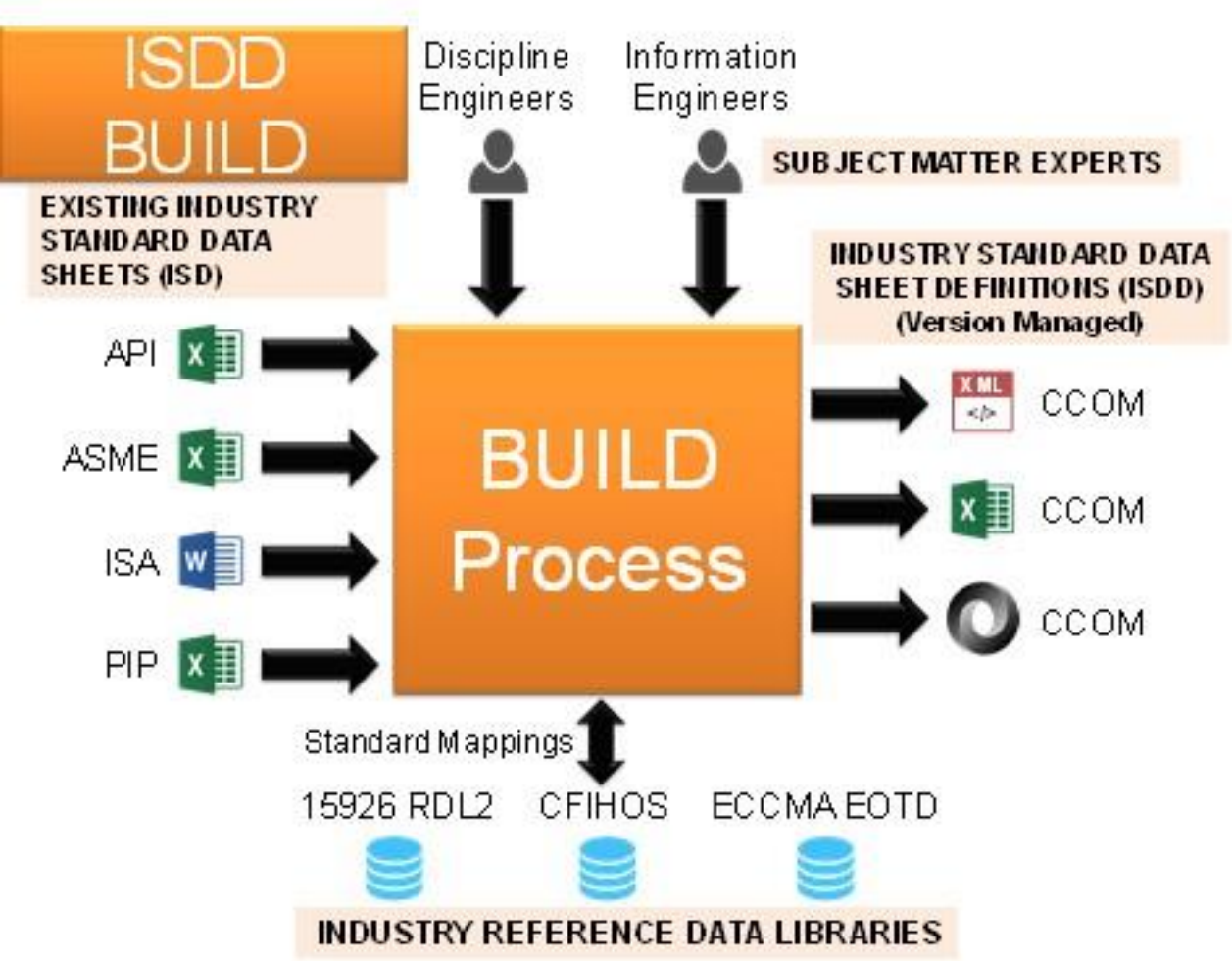


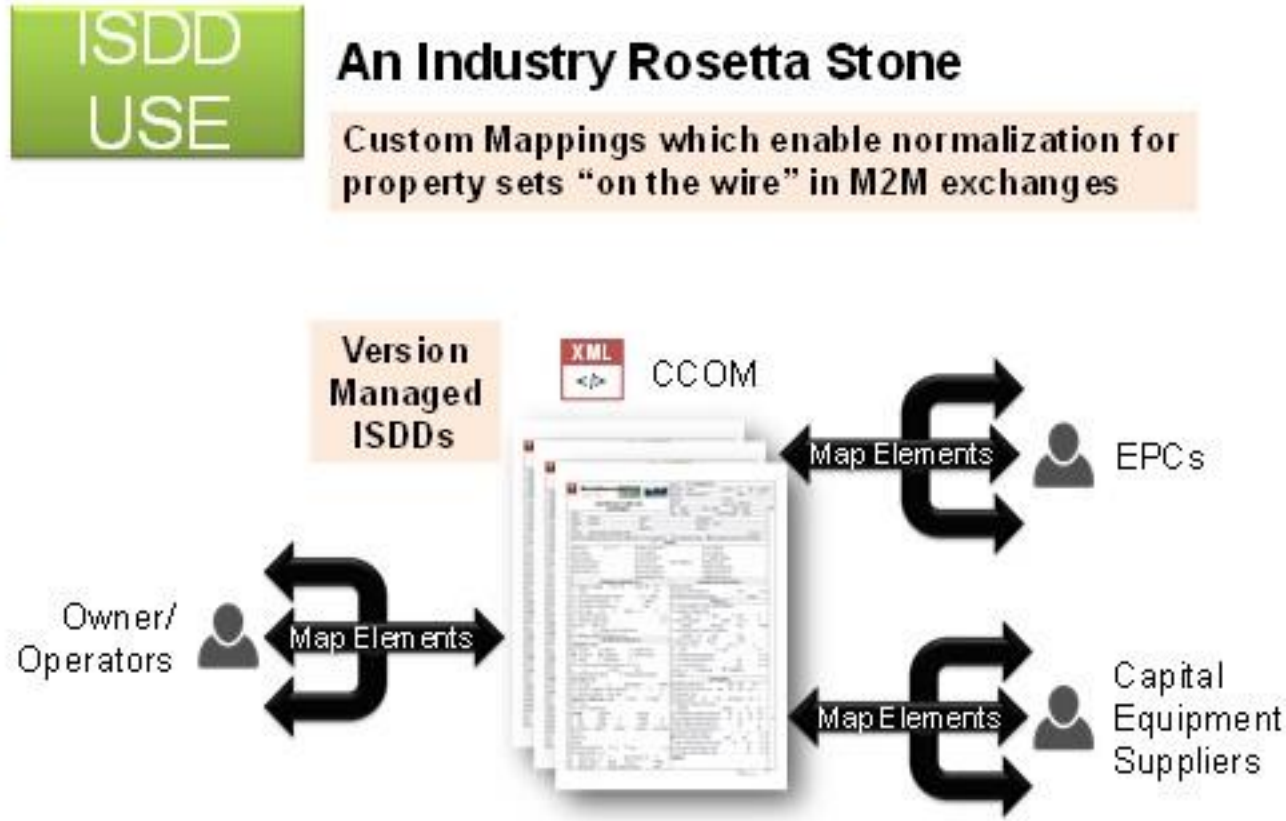
OIIE Simplified Systems Connectivity and Services Architecture



MIMOSA™ PCA POSC Caesar Association Fiatech™ USPI OPC FOUNDATION ECCMA

ISDD Project Build and Use Processes

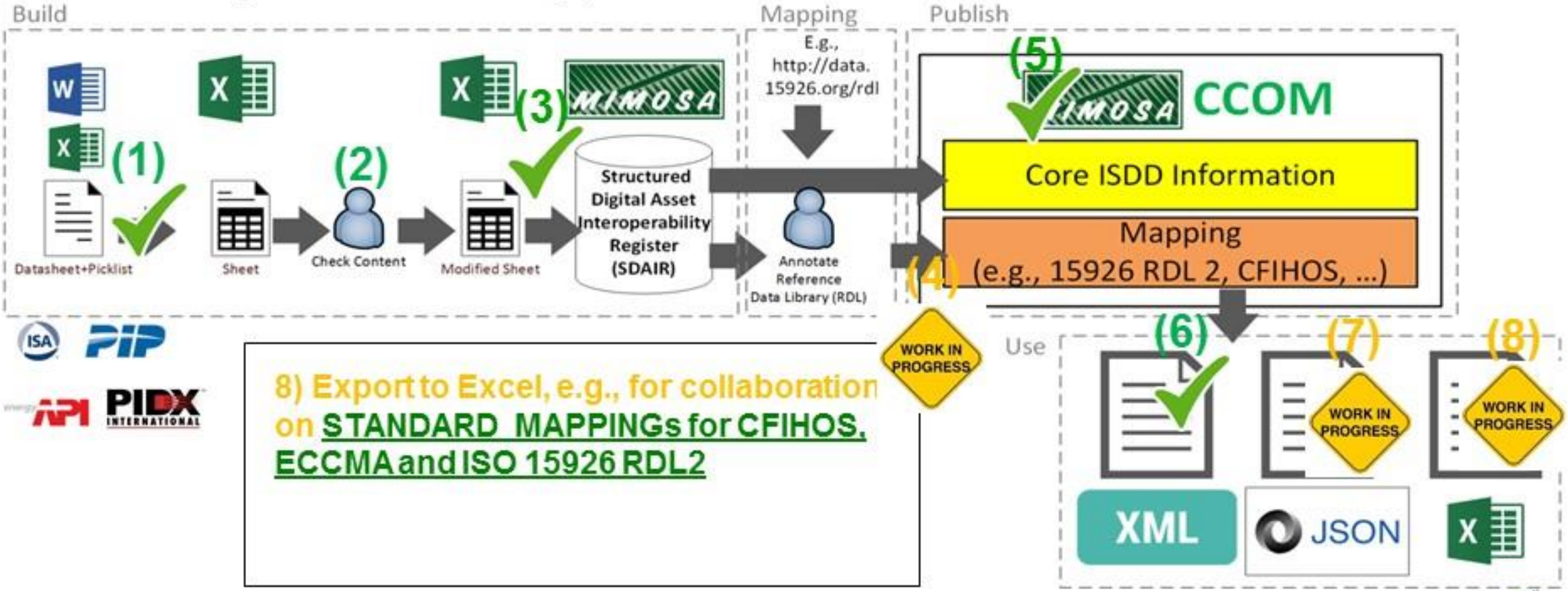




MIMOSA™ POSC Caesar Association Fiatech™ USPI ECCMA

Prototype ISDD Status

- Developed a workflow/pipeline to increase automation

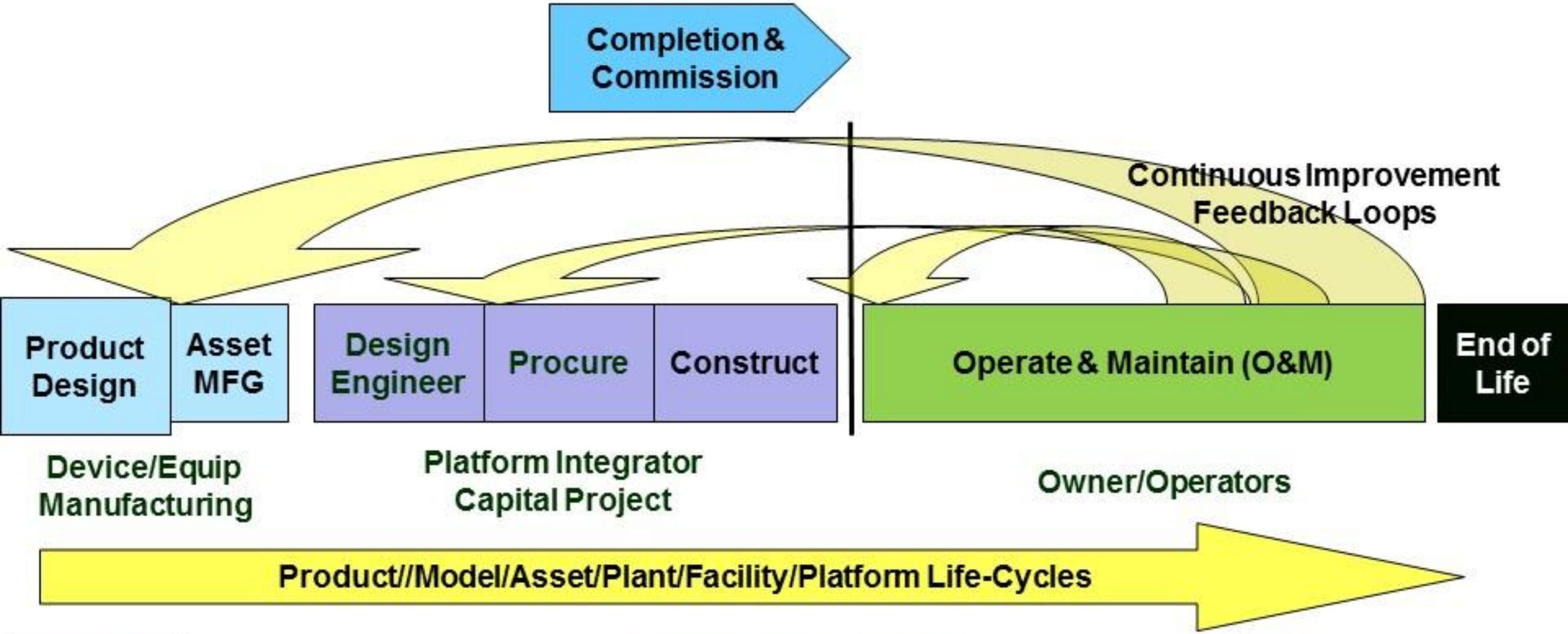
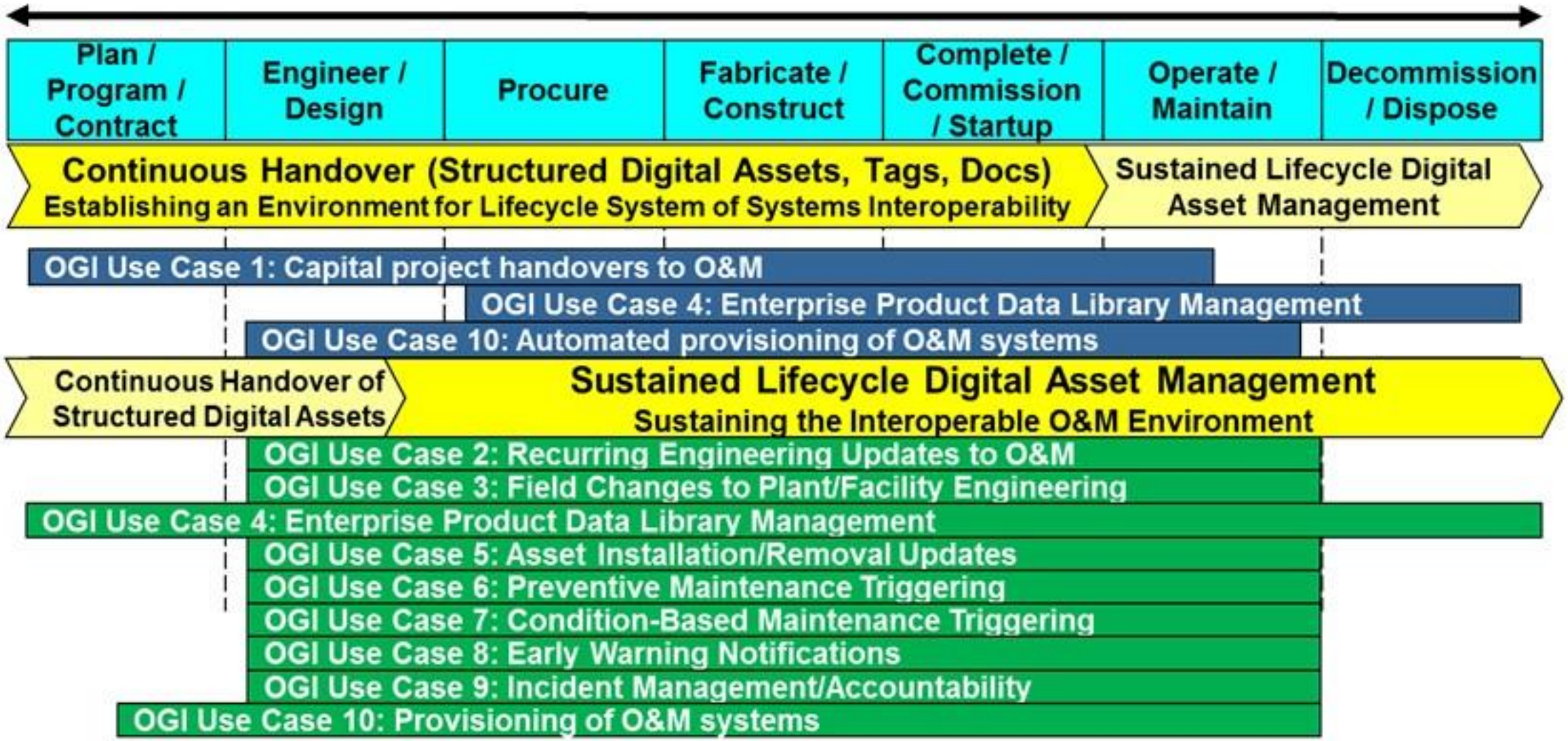


ISA PIP API PIDX INTERNATIONAL

MIMOSA™ POSC Caesar Association Fiatech™ USPI ECCMA

Full Asset Life-cycle Management

Physical and Digital Asset are included in OIIE



Key OIIE Industry Use Cases Cover the Lifecycle of the Asset