THTH activities

MIMOSA Open Meeting Spring 2021

Arto Marttinen

THTH Association, Executive Director

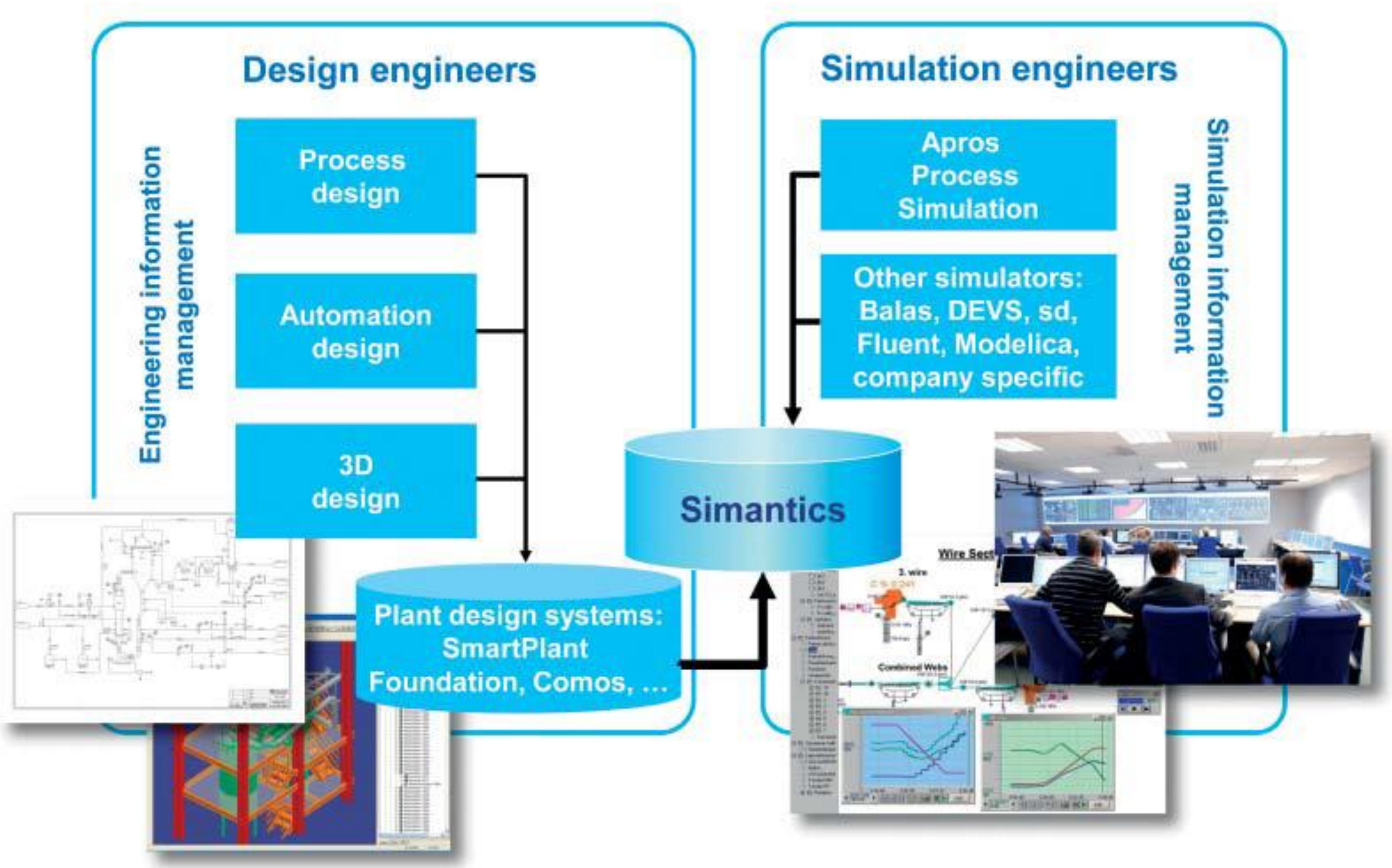
THTH briefly

- Non-profit industry association in Finland
- Currently about 35 member companies (see members and partners)
- Process industry supply-chain collaboration forum to promote digitalisation and digital-twin
- Simantics division
  - develop and maintain open-source code applications for modeling and simulation and for environmental lifecycle assessment and footprint calculations via its
    - SIMANTICS, Eclipse Public License EPL
    - SULCA Sustainability tool for Ecodesign, Footprints & LCA

Simantics
SULCA

- TIE division based on the TIE-project (11/2019 – 10/2021)
  - Targeting to define/pilot digitalization in projects and O&M based on existing standards
  - National and international standardization networks and collaboration (key partners SEIIA/Sweden, PCA/Norway, DEXPI/Germany, MIMOSA/USA, CFIHOS/IOGP, USPI/Netherlands,)

Simantics - description


Design engineers
Engineering information management
Process design
Automation design
3D design
Plant design systems: SmartPlant Foundation, Comos, ...
Simantics
Simulation engineers
Apros Process Simulation
Other simulators: Balas, DEVS, sd, Fluent, Modelica, company specific
Simulation information management
Wire Sect
3. wire
Combined Webs

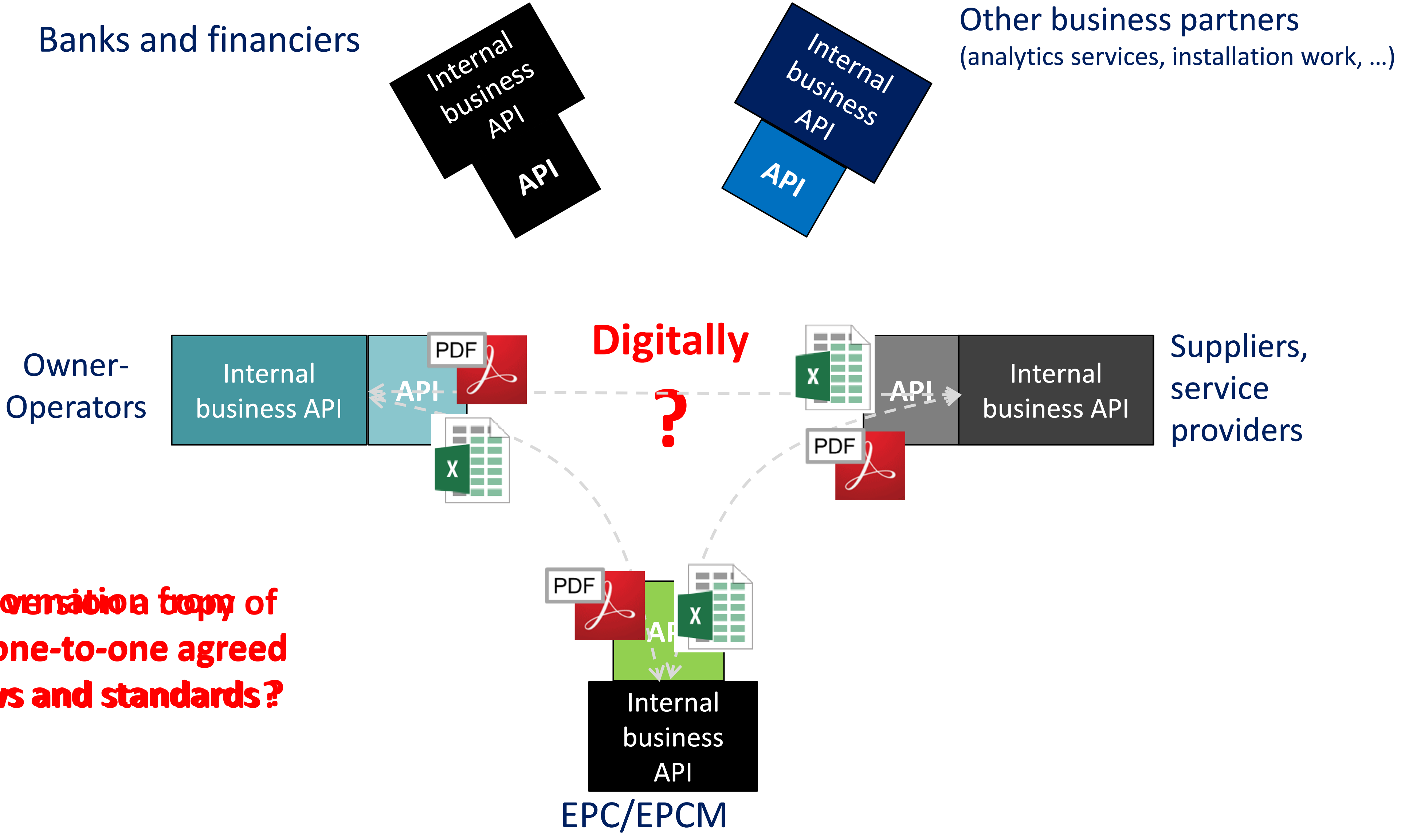
Simantics is an open-source software platform, licensed under Eclipse Public License EPL.

The source code for both semantic database engine Simantics Core and the client Simantics Workbench is available for registered users.

Additional components (e.g. DEXPI viewer) for Simantics division members.

Simantics downloads

Technical Information Exchange (TIE) currently



Banks and financiers

Internal business API

API

Other business partners
(analytics services, installation work, …)

Internal business API

API

Owner-Operators

Internal business API

API

PDF

X

Digitally ?

API

Internal business API

Suppliers, service providers

X

PDF

PDF

API

X

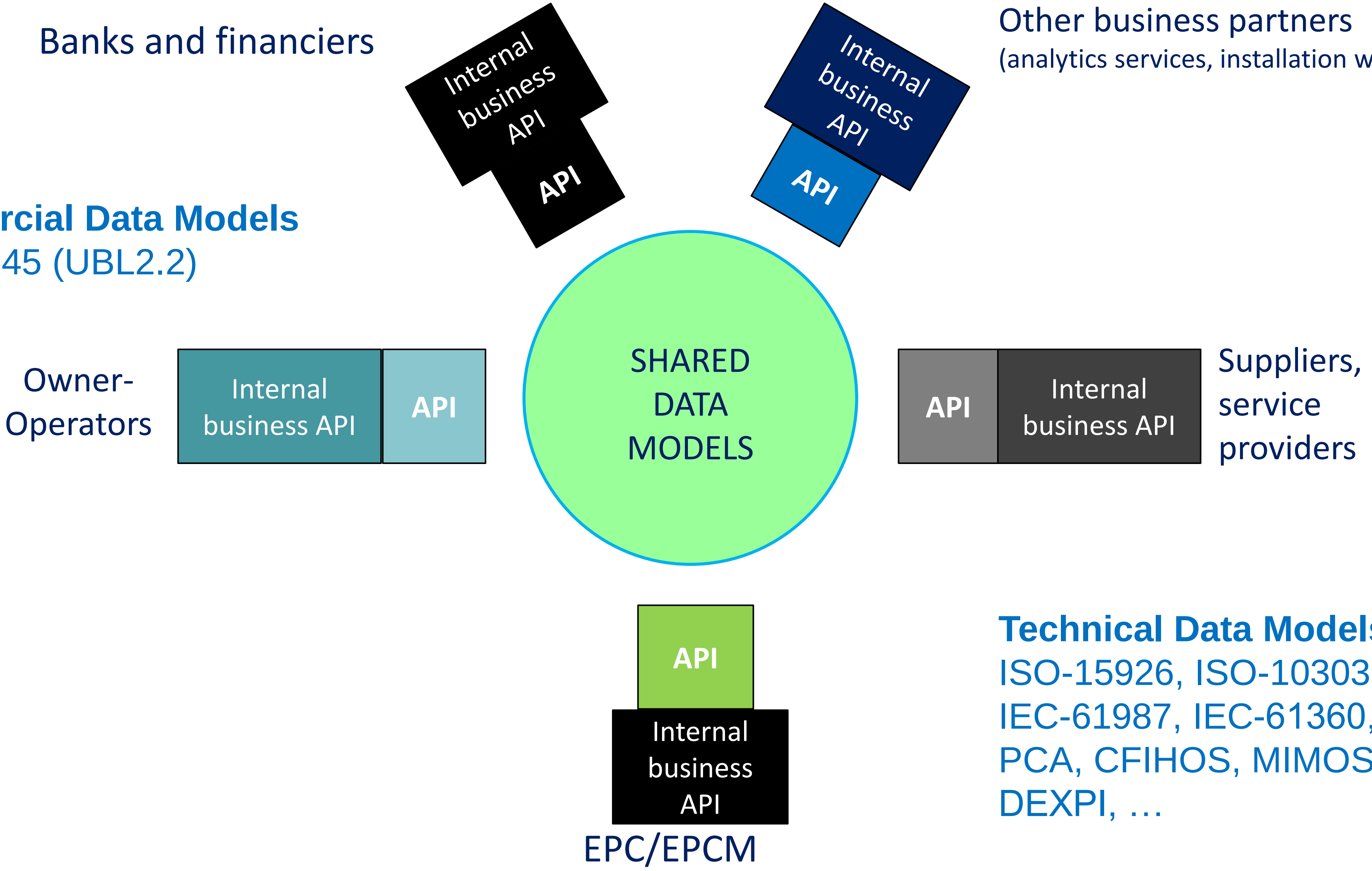
Internal business API

EPC/EPCM

IS digital version a copy of manual, one-to-one agreed workflows and standards?

Transformation from manual, one-to-one agreed workflows and standards?

Shared data models and content standards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API
SHARED DATA MODELS
API
Internal business API
Suppliers, service providers
API
Internal business API
EPC/EPCM

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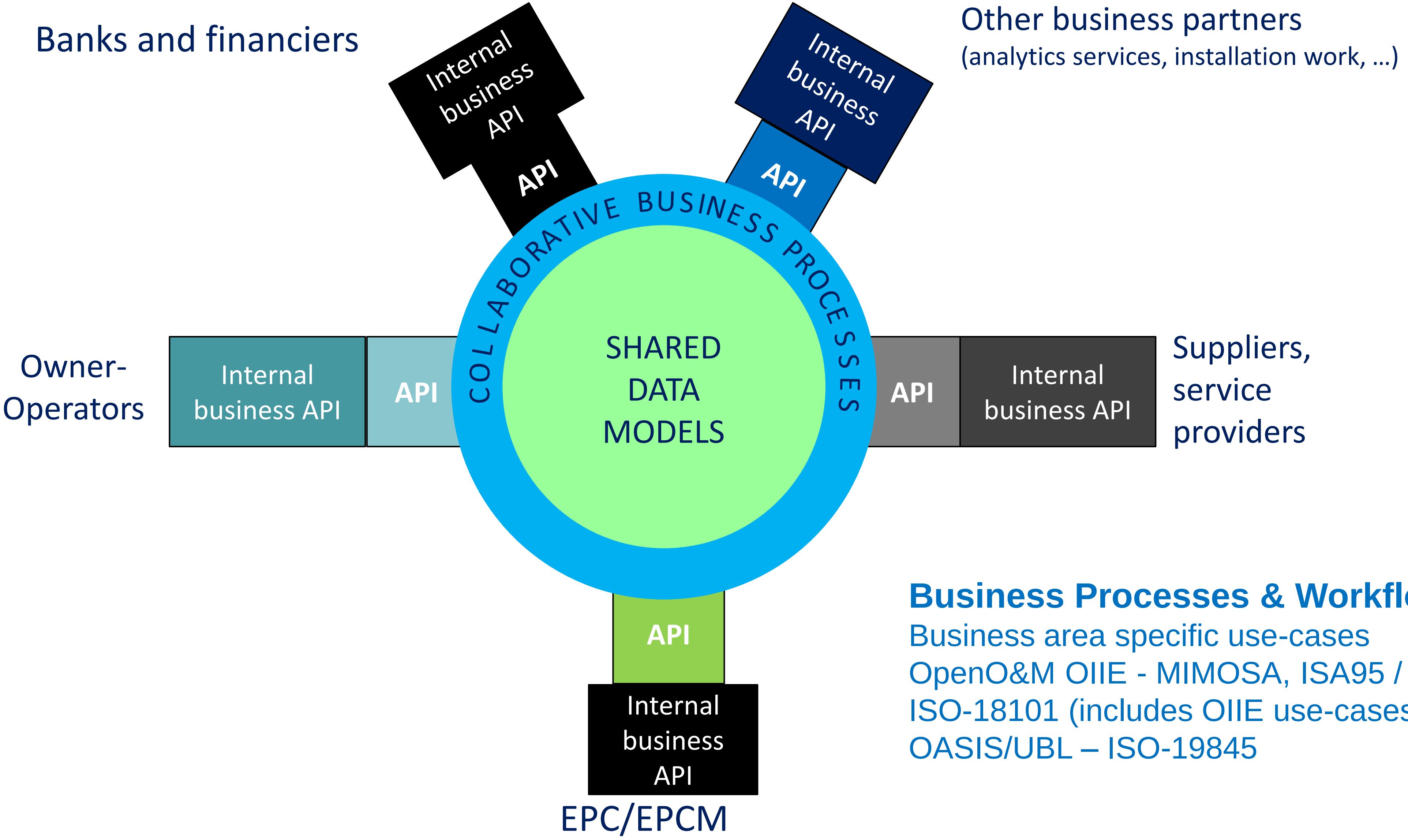
(analytics services, installation work, …)

Commercial Data Models
ISO-19845 (UBL2.2)

Technical Data Models
ISO-15926, ISO-10303, ISO-18346,
IEC-61987, IEC-61360, …
PCA, CFIHOS, MIMOSA, USPI,
DEXPI, …

Shared process standards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Owner-Operators
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API
Internal business API
Suppliers, service providers
API
Internal business API
EPC/EPCM

Business Processes & Workflows

Business area specific use-cases

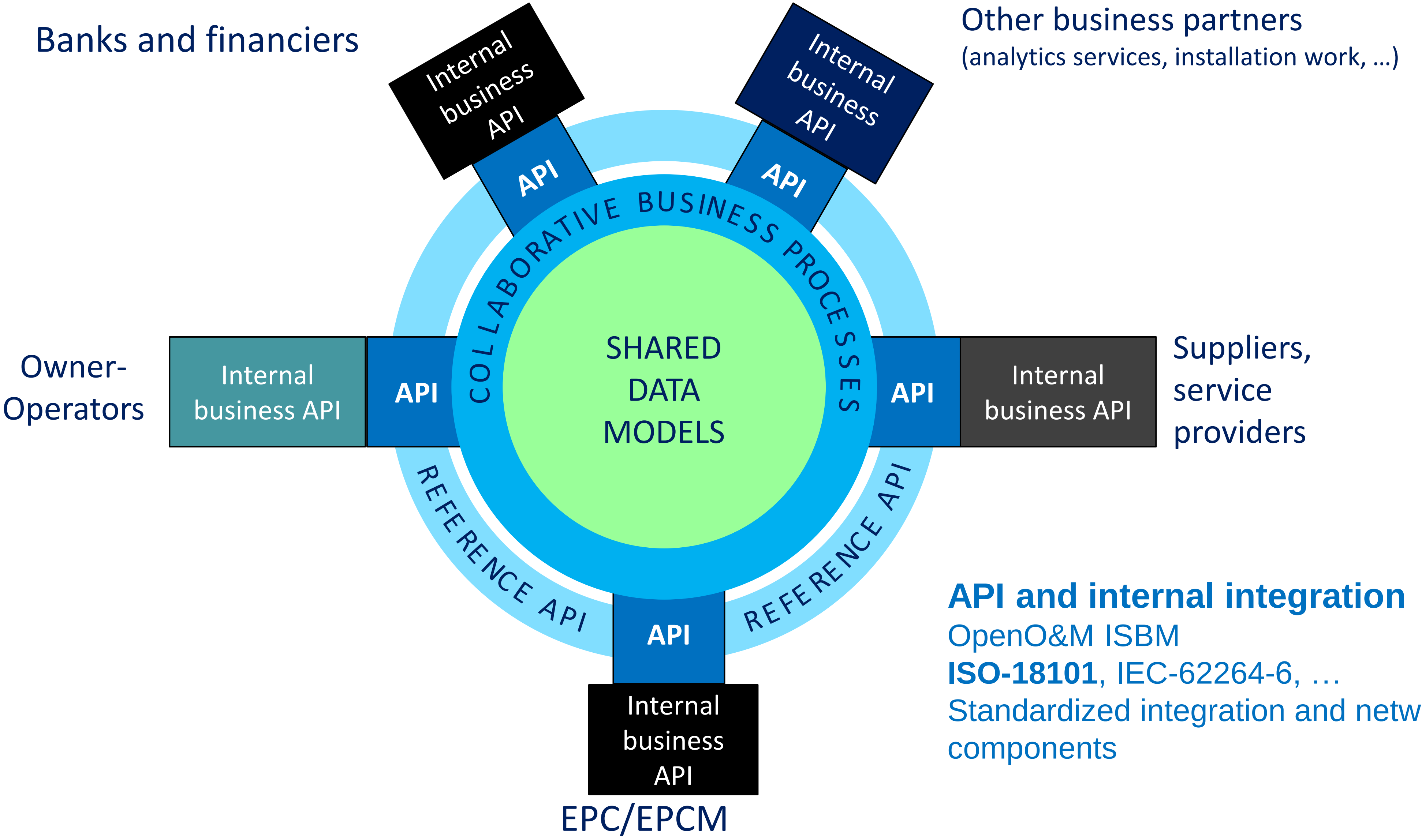
OpenO&M OIIE - MIMOSA, ISA95 / IEC-62264

ISO-18101 (includes OIIE use-cases)

OASIS/UBL – ISO-19845

THTH

Interoperability standards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REFERENCE API
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Internal business API
EPC/EPCM

API and internal integration

OpenO&M ISBM

ISO-18101, IEC-62264-6, …

Standardized integration and network components

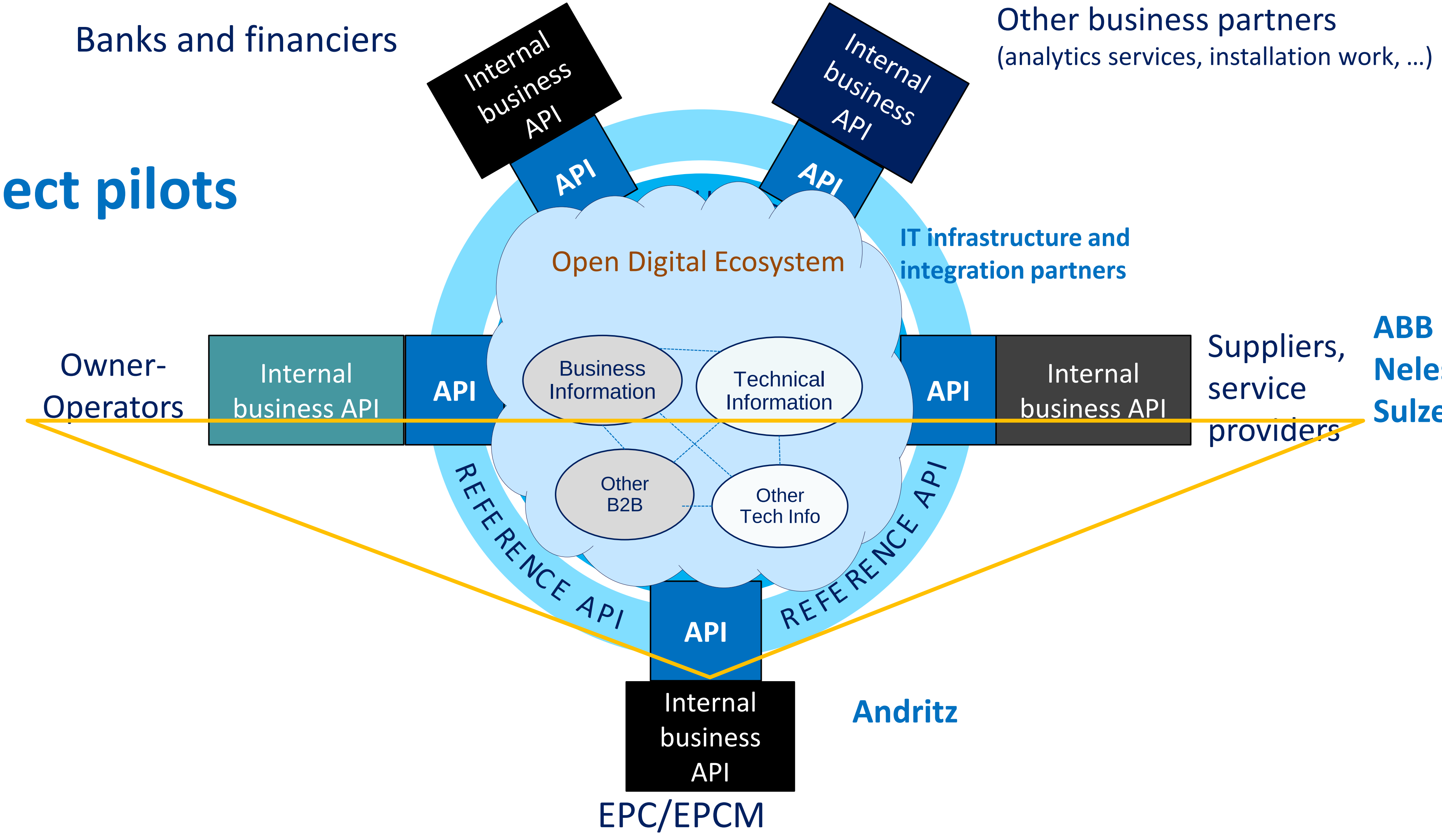
THTH ry 2020

Association of Decentralized Information Management for Industry THTH ry

THTH

Data sharing in digital industry ecosystems

TIE project pilots



Banks and financiers

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API

Other business partners
(analytics services, installation work, …)

Internal business API

API

Open Digital Ecosystem

IT infrastructure and integration partners

Stora-Enso
Metsä Group
UPM

Owner-Operators

Internal business API

API

Business Information

Technical Information

Other B2B

Other Tech Info

API

Internal business API

Suppliers, service providers

ABB
Neles
Sulzer Pumps

REFERENCE API

REFERENCE API

API

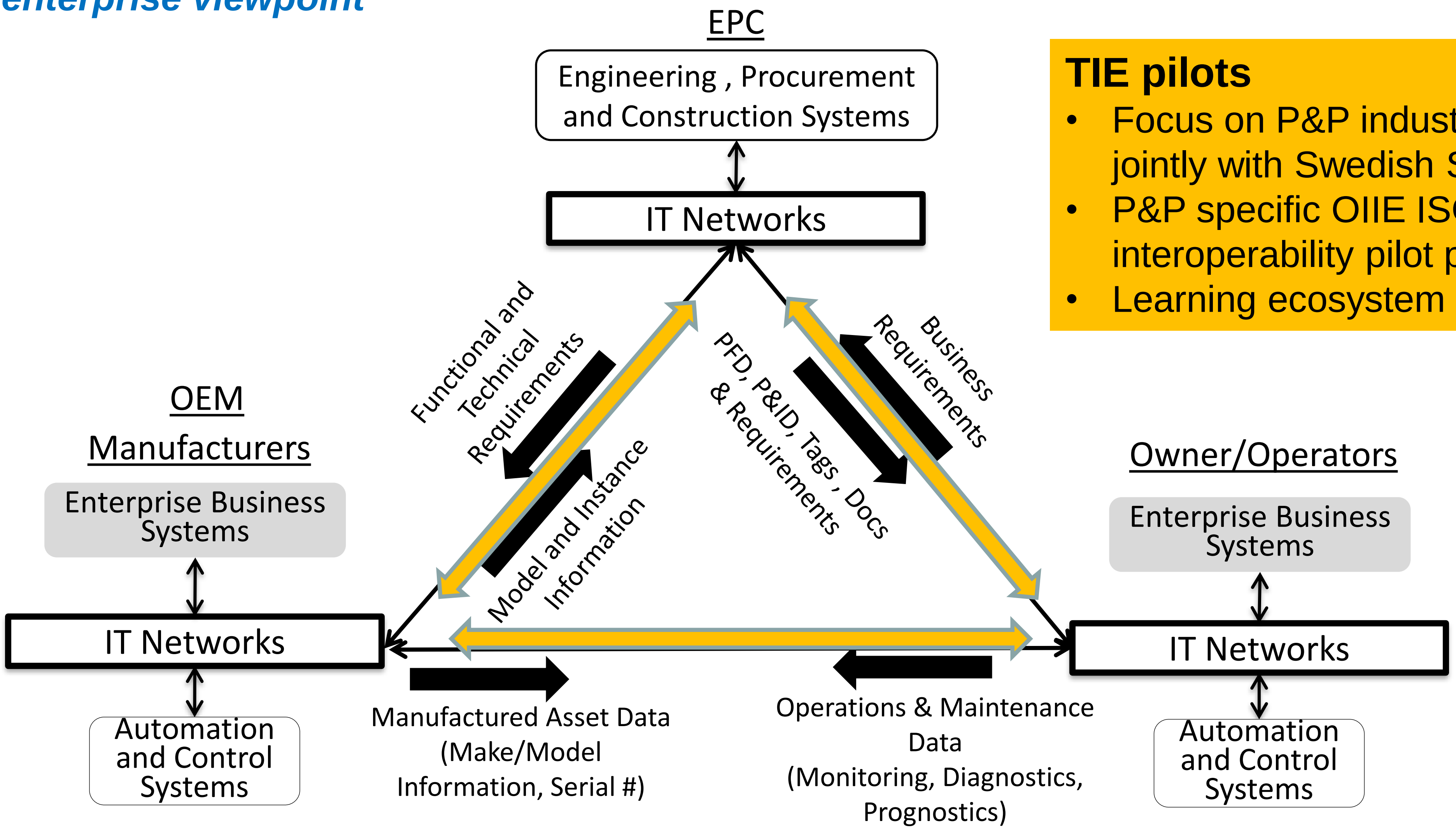
Internal business API

EPC/EPCM

Andritz

ISO-18101 Intra-Enterprise OIIE Digital Ecosystem

Inter-enterprise viewpoint



EPC

Engineering , Procurement
and Construction Systems

IT Networks

Functional and
Technical
Requirements

PFD, P&ID, Tags , Docs
& Requirements

Business
Requirements

OEM
Manufacturers

Enterprise Business
Systems

IT Networks

Automation
and Control
Systems

Model and Instance
Information

Owner/Operators

Enterprise Business
Systems

IT Networks

Automation
and Control
Systems

Manufactured Asset Data
(Make/Model
Information, Serial #)

Operations & Maintenance
Data
(Monitoring, Diagnostics,
Prognostics)

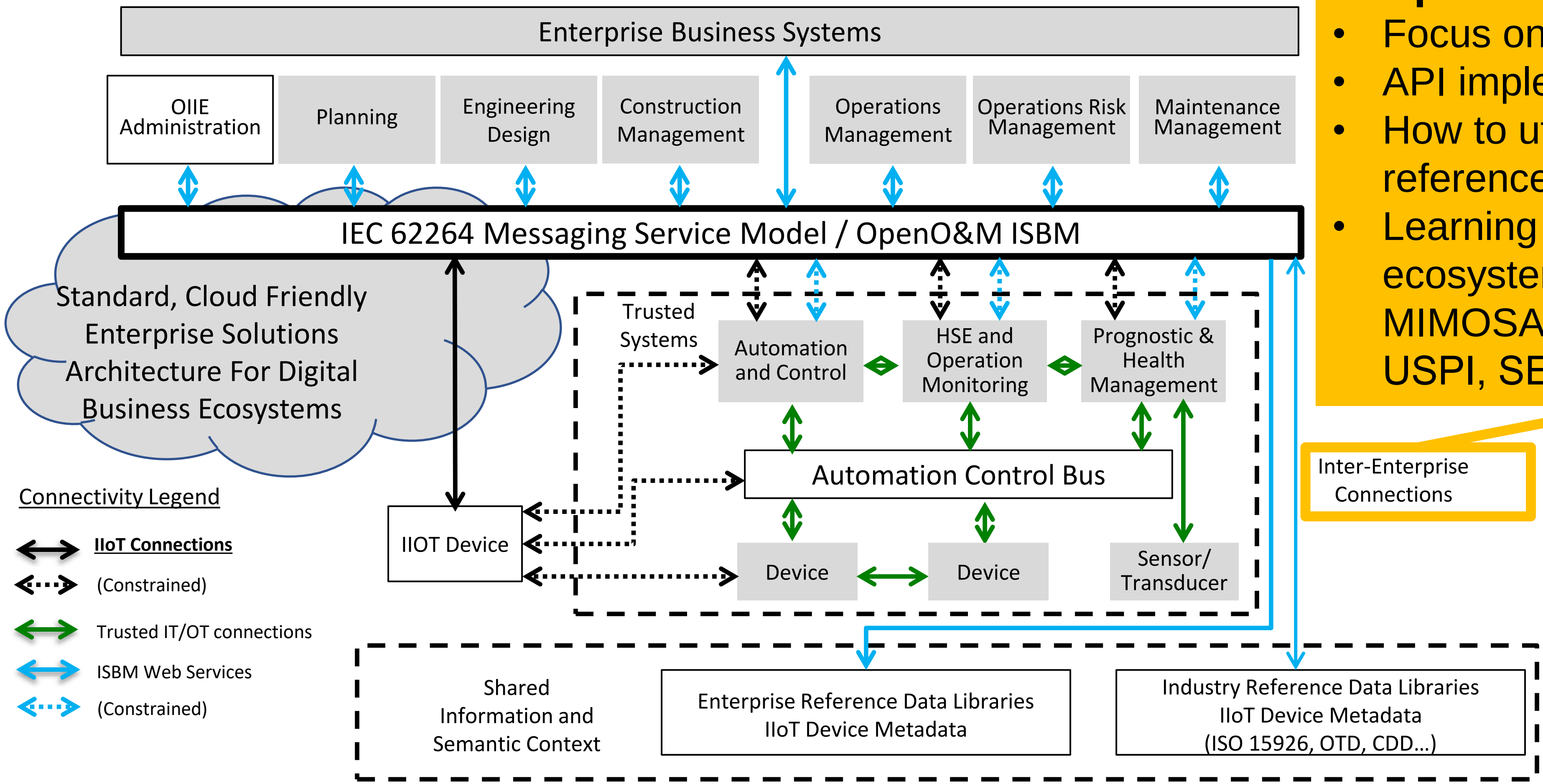
TIE pilots

- Focus on P&P industry use-cases – jointly with Swedish SEIIA
- P&P specific OIIE ISO-18101 interoperability pilot postponed
- Learning ecosystem of enterprises

TC 184

ISO-18101 Intra-Enterprise OIIE Digital Ecosystem

Intra-enterprise viewpoint



Enterprise Business Systems

OIIE Administration

Planning

Engineering Design

Construction Management

Operations Management

Operations Risk Management

Maintenance Management

IEC 62264 Messaging Service Model / OpenO&M ISBM

Standard, Cloud Friendly Enterprise Solutions Architecture For Digital Business Ecosystems

Trusted Systems

Automation and Control

HSE and Operation Monitoring

Prognostic & Health Management

Automation Control Bus

IIOT Device

Device

Device

Sensor/ Transducer

Inter-Enterprise Connections

Connectivity Legend

IIoT Connections

(Constrained)

Trusted IT/OT connections

ISBM Web Services

(Constrained)

Shared Information and Semantic Context

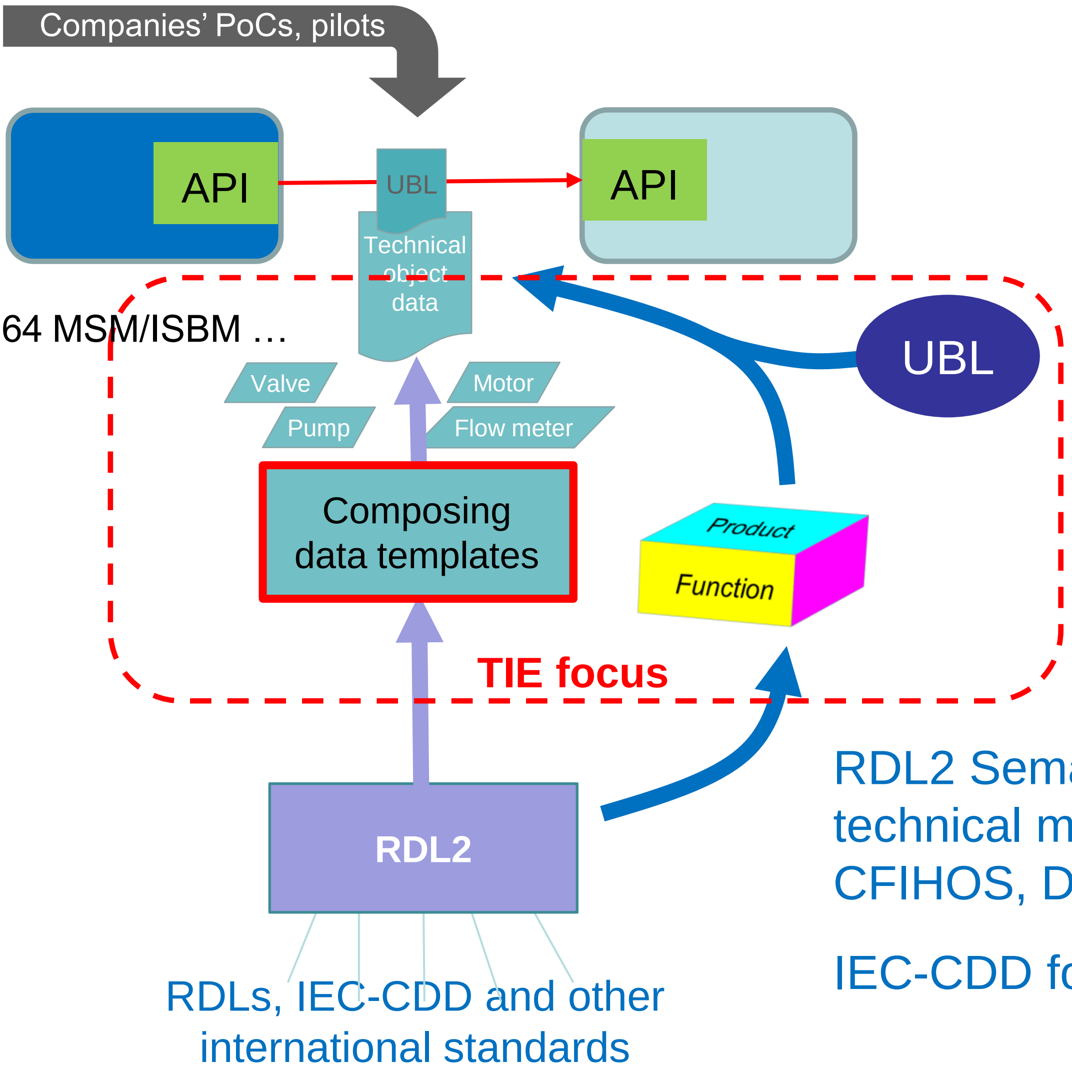
Enterprise Reference Data Libraries
IIoT Device Metadata

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

TIE pilots

- Focus on company interfaces
- API implementations
- How to utilize standard reference data
- Learning standardization ecosystem (ISO/IEC, PCA, MIMOSA, CFIHOS, DEXPI, USPI, SEIIA,…)

TIE pilot infrastructure



Use-cases

Companies' PoCs, pilots

Integration and network infrastructure

API

UBL

API

Technical object data

ISO-18101/IEC-62264 MSM/ISBM …

Data modeling

Valve

Pump

Motor

Flow meter

Composing data templates

UBL

Product

Function

TIE focus

Standardization support

RDL2

RDLs, IEC-CDD and other international standards

Business message schema templates based on use-cases and ISO-19845

National standardization collaboration via SFS (METSTA, SESKO) and PSK

International standardization collaboration via ISO, IEC, MRAIL and MoU partners

RDL2 Semantic search for pump and motor technical models – joint effort with MRAIL/PCA CFIHOS, DEXPI and IOGP JIP33

IEC-CDD for valve and flowmeter technical models

TIE summary – lessons learned so far

- Ecosystem enterprises need a common understanding how to apply standards in a uniform way
  - → Expanding pilots (new use-cases, new standards, utilizing use-cases from other business areas/ecosystems) – via pilots
  - → Expanding ecosystems (new companies connected to the ecosystem) – via pilots
  - → Connecting ecosystems
- International standardization collaboration is essential!
  - →Shared standardization infrastructure accelerates digitalization
  - →ISO-18101 is first ISO/IEC standard to enable interoperable digital ecosystems
  - →THTH seeks to deepen fruitful collaboration with existing MoU partners (MIMOSA, PCA, SEIIA, DEXPI, CFIHOS, USPI)