THTH TIE-project as a part of larger ecosystem initiative

Technical Information Exchange project for process industry project and O&M businesses

Interoperability Summit 15.5.2019 Stockholm

Arto Marttinen, THTH Association, Finland

Agenda

- THTH in brief
- Process industry target in a larger DBE* Core ecosystem framework
- Joint TIE project (Technical Information Exchange) proposal

*DBE stands for Digital Business Ecosystem

Current THTH members

Aalto University	Neste Engineering Solutions Oy
Andritz Oy	PSK Standardisointi ry
ATOR-Consultants Oy	Pöyry Finland Oy
Autodesk GmbH	Semantum Oy
Aveva AB	Sumitomo SHI FW Energia Oy
BlueCielo ECM Solutions Oy	Siemens Turbomachinery Ab
Cadmatic Oy	Stora-Enso Oyj
Fennovoima Oy	SWECO Industry Oy
Fortum Power and Heat Ltd	Syncron Tech Oy
Gasum Oy	Tampere University of Technology
General Electrics (Switzerland) Ltd	Valmet Automation Oy
Intergraph Finland Oy	Wapice Oy
Kymdata Oy	Vertex Systems Oy
LUT University	Wirepas Oy
Masinotek Oy	VTT
Meyer Turku Oy	Yokogawa Electric Corp
MTECH Digital Solutions Oy	

Current board members

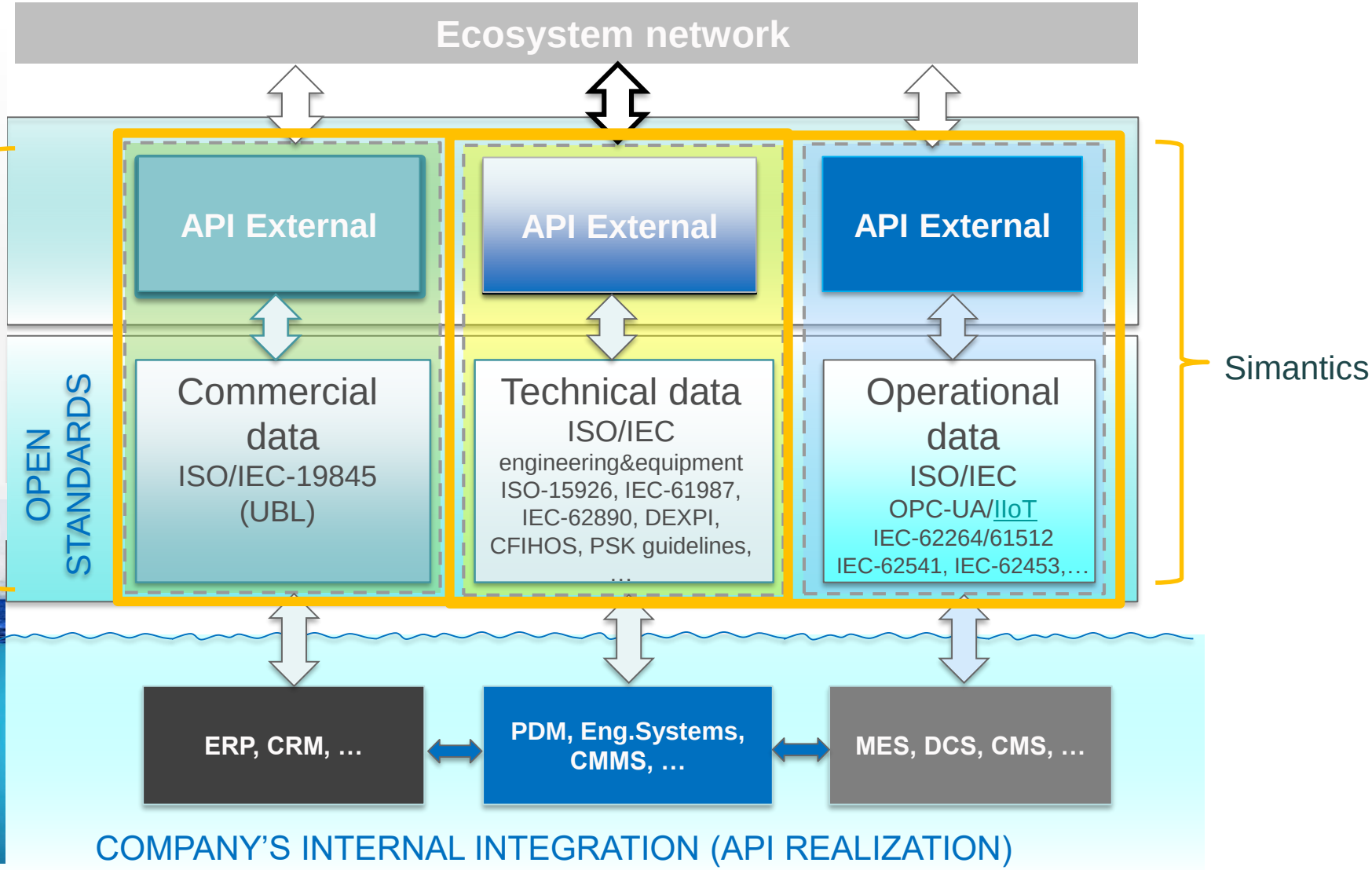
What THTH is?

- THTH is a nonprofit association supporting the development of distributed plant information management during the whole life cycle of industrial assets from investments projects to operation and maintenance
- Started from technical information exchange 2006 (PRINDEX, SEFRAM, ORCHID…)
- THTH initiates and coordinates research and development projects
- Arranges seminars and training
- Targets national and international standardization networks and collaboration
  - PSK, SSG, DEXPI, USPI, CFIHOS, IDS, …
- THTH 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

SULCA

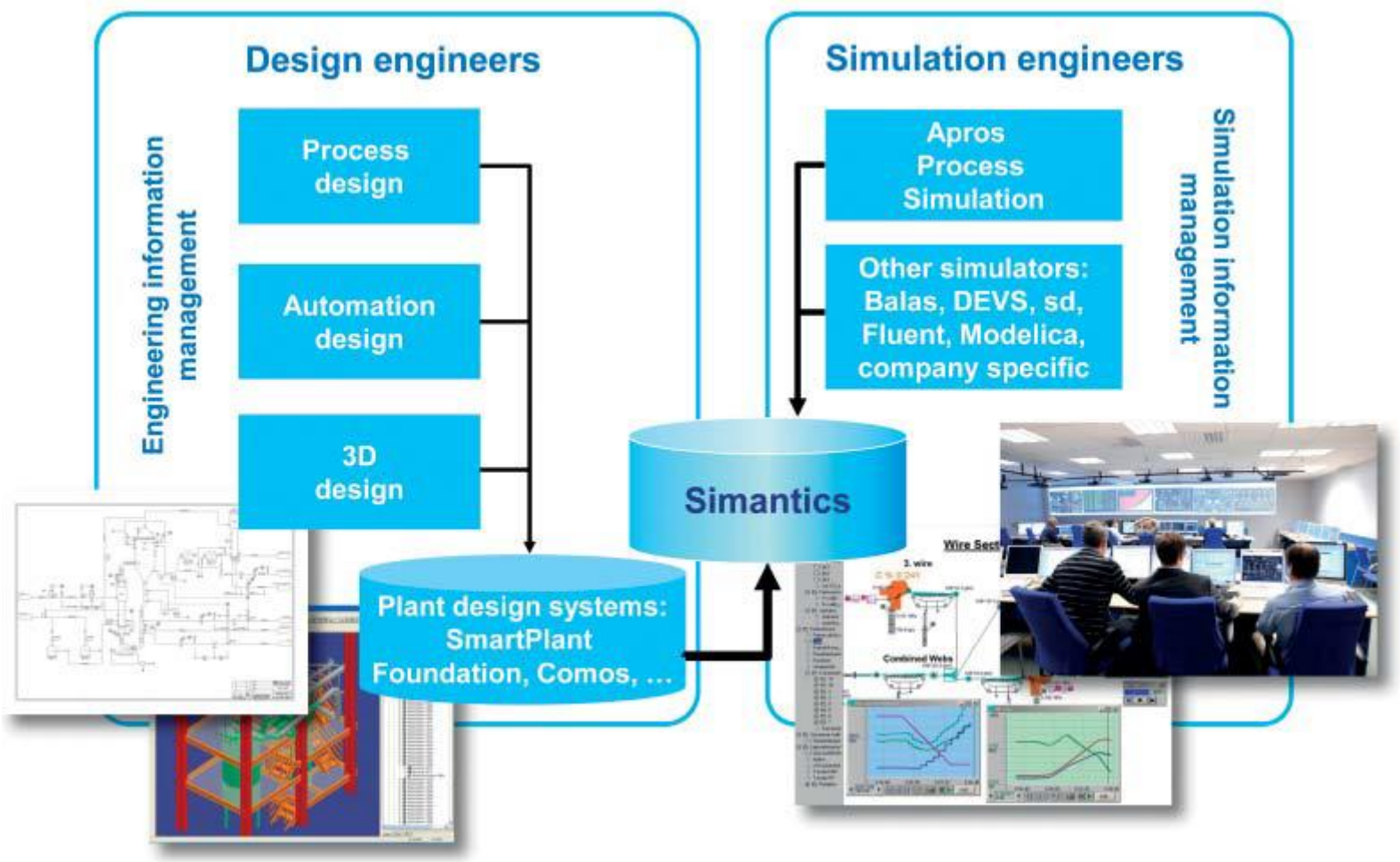
Open networks are based on standards

TIE
as a part of
open industry
effort



Simantics - description

Participants: Fortum/Finland, Sumitomo SHI FW/Finland, Siemens/Sweden, GE/Switzerland, Autodesk/Austria, Yokogawa/Japan, Fennovoima/Finland, Meyer Turku/Finland, Pöyry/Finland, Valmet/Finland…



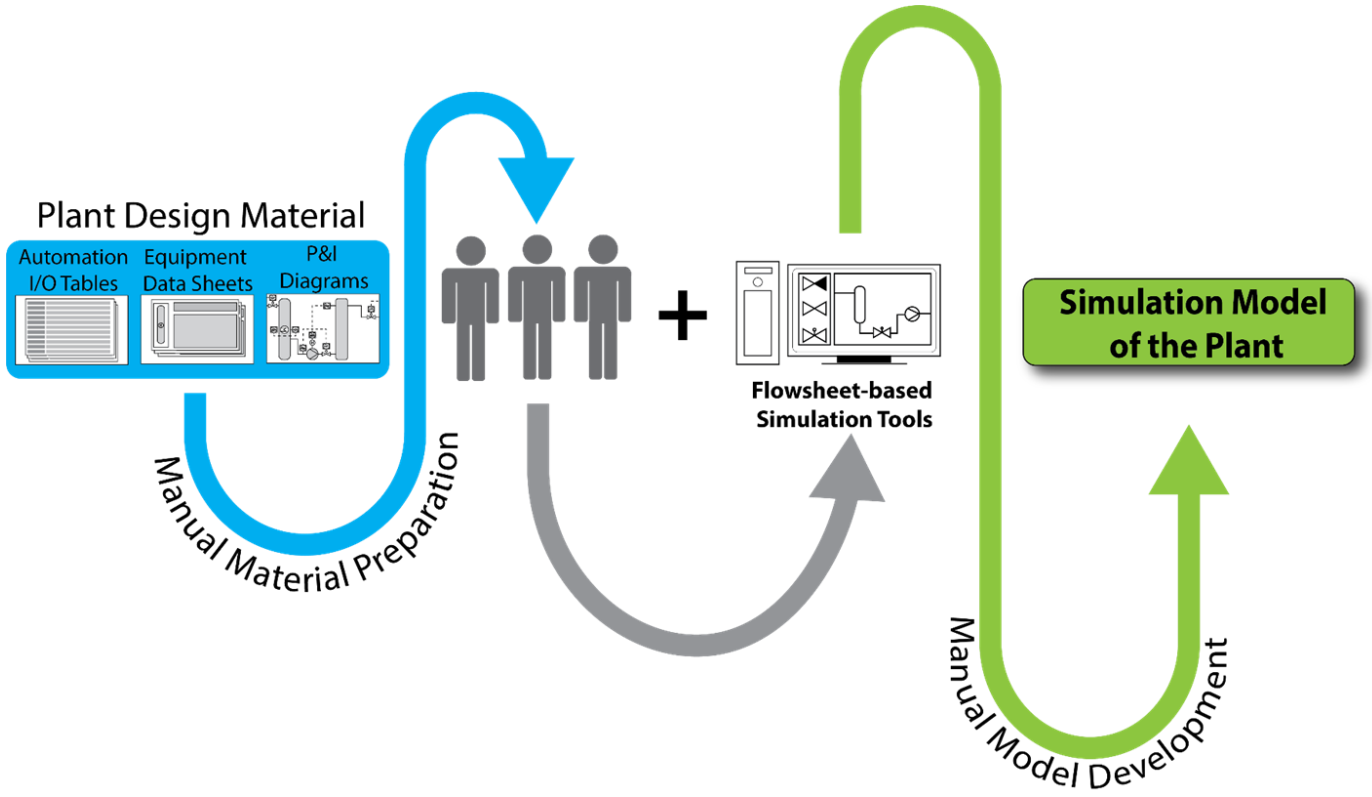
Simantics is an open source software platform, licensed under Eclipse Public License EPL (more information in section Licensing).

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

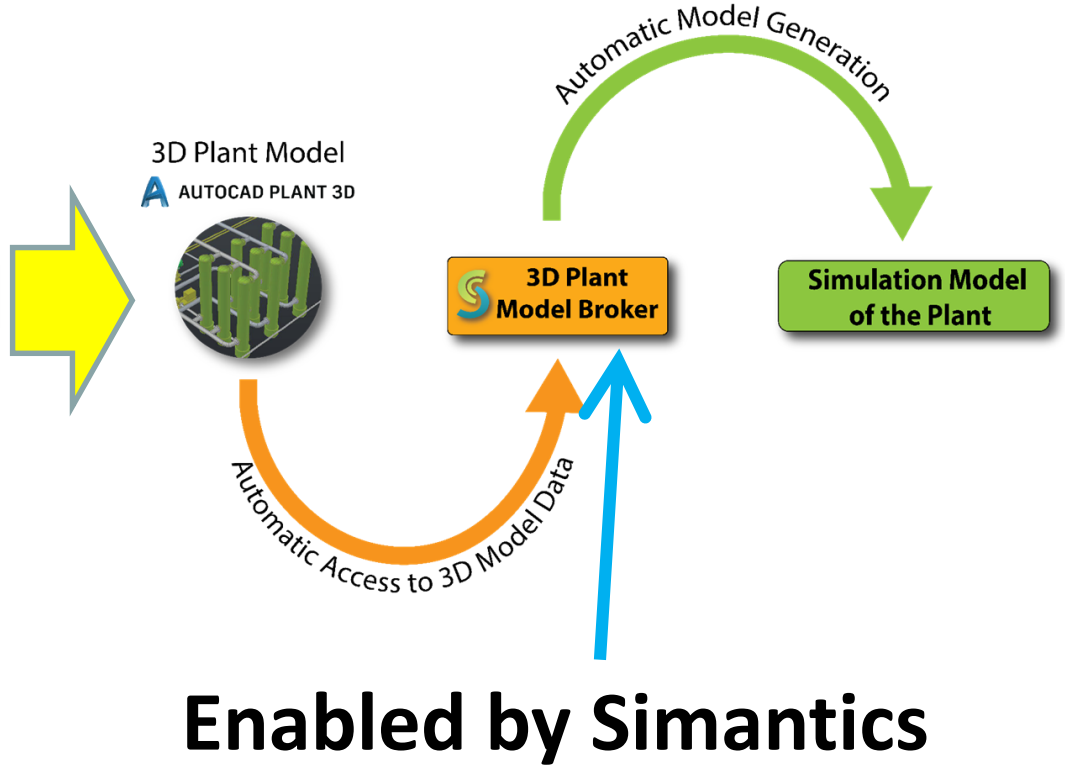
Simantics downloads

Simulation Model development in process industry – Digital Twin

Laborious & expensive manual approach



Automatic Generation from Plant Design Material



Enabled by Simantics

Source: www.semantum.fi

T I E

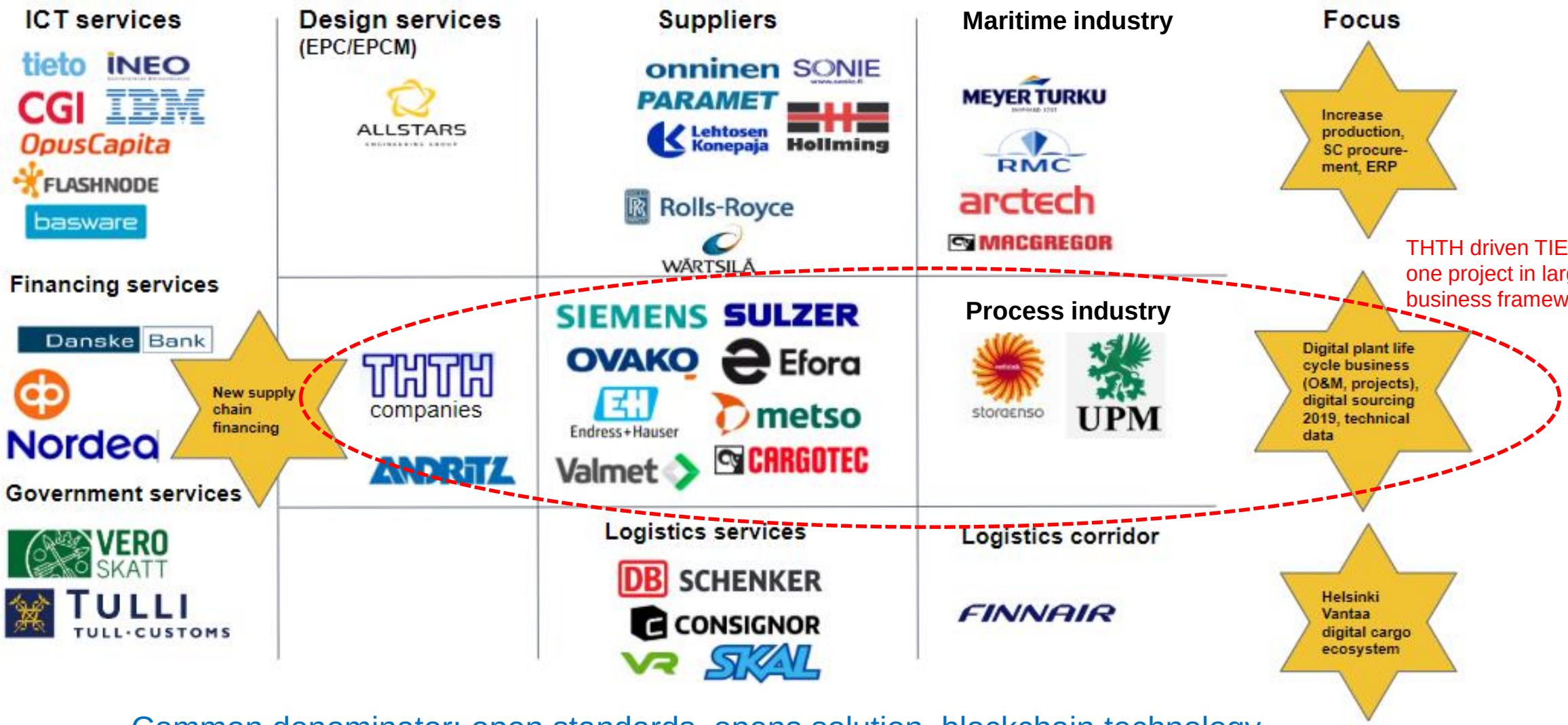
Technical Information Exchange (TIE)

in investment projects and O&M

as a part of DBE Core Ecosystem Orchestration

THTH project proposal for process industry companies

DBE Core Ecosystem development network



Common denominator: open standards, opens solution, blockchain technology

Technical information exchange currently

Banks and financiers

Internal business API

Internal business API

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

End-customers

Internal business API

Internal business API

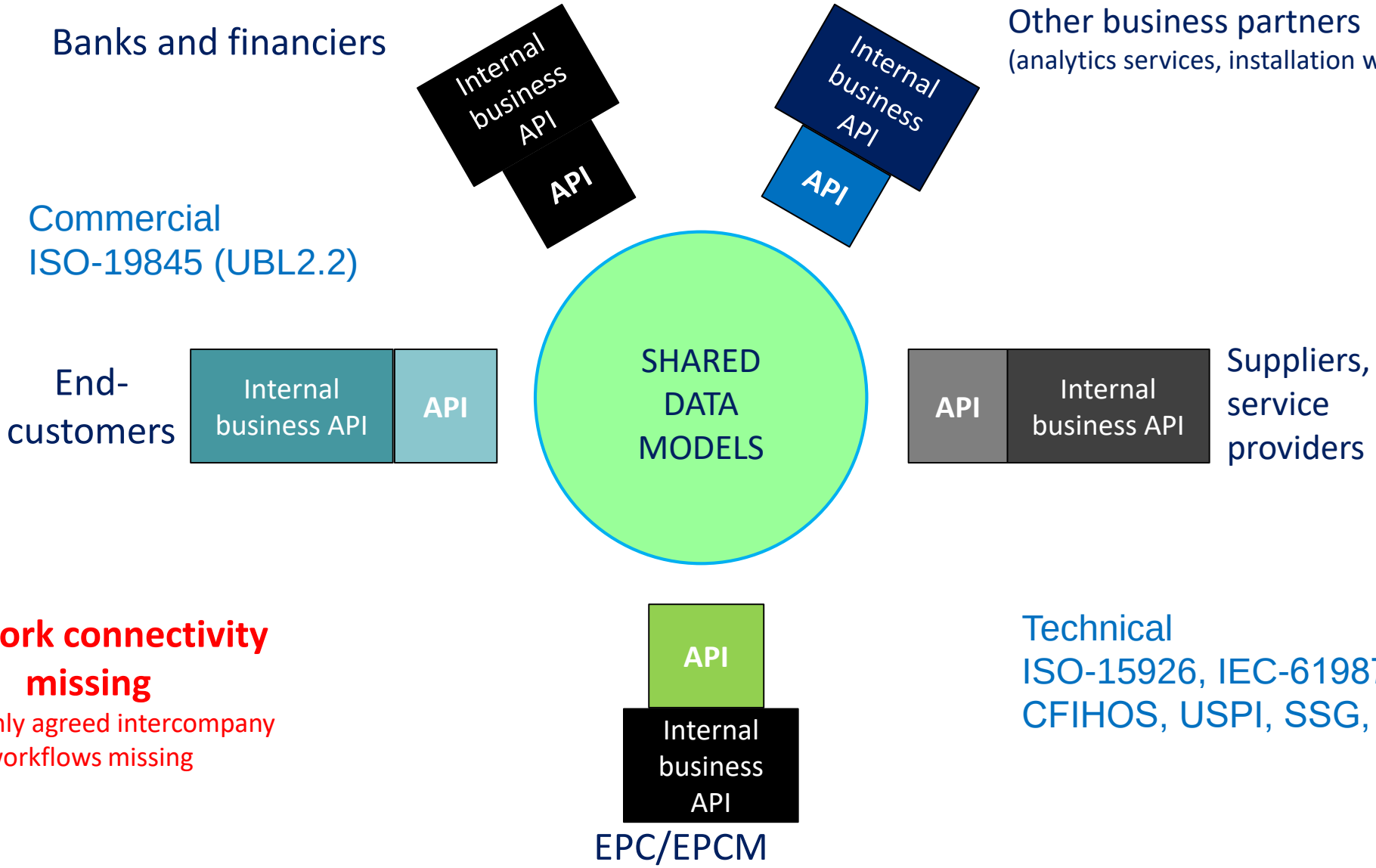
Suppliers, service providers

Internal business API

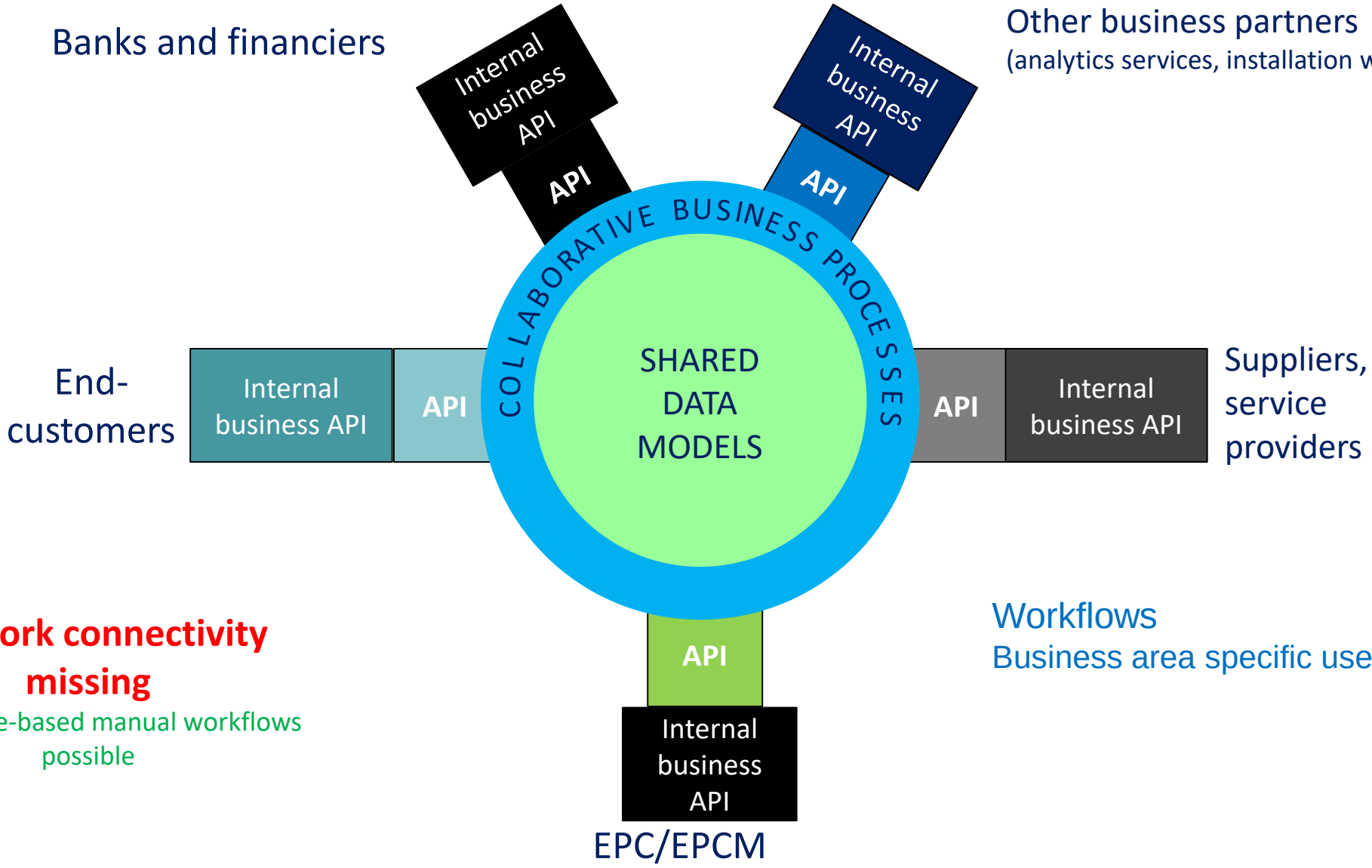
EPC/EPCM

Currently companies are exchanging information manually

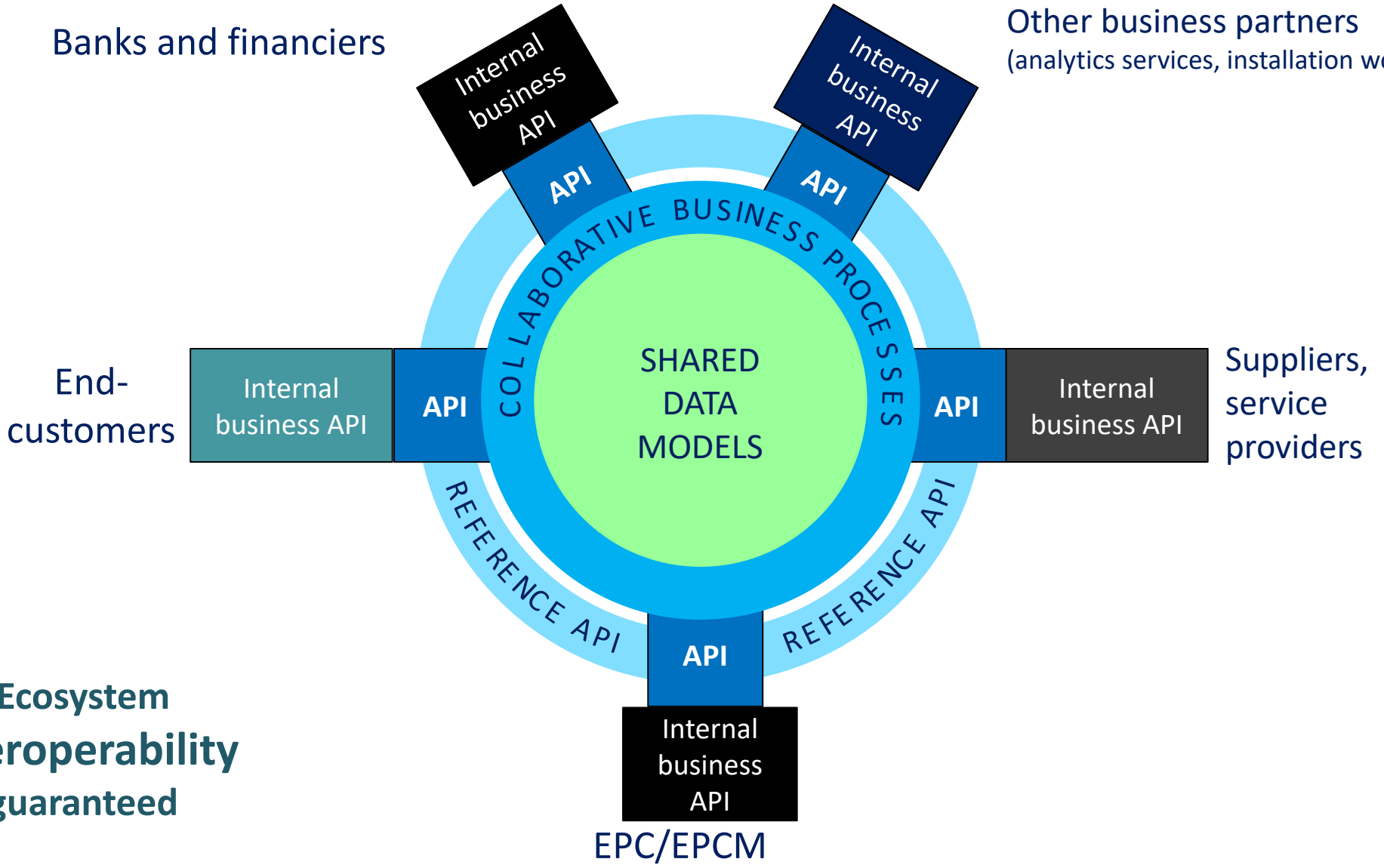
Shared data models form the foundation



Collaborative business processes link parties together



Interoperability using standardized interfaces



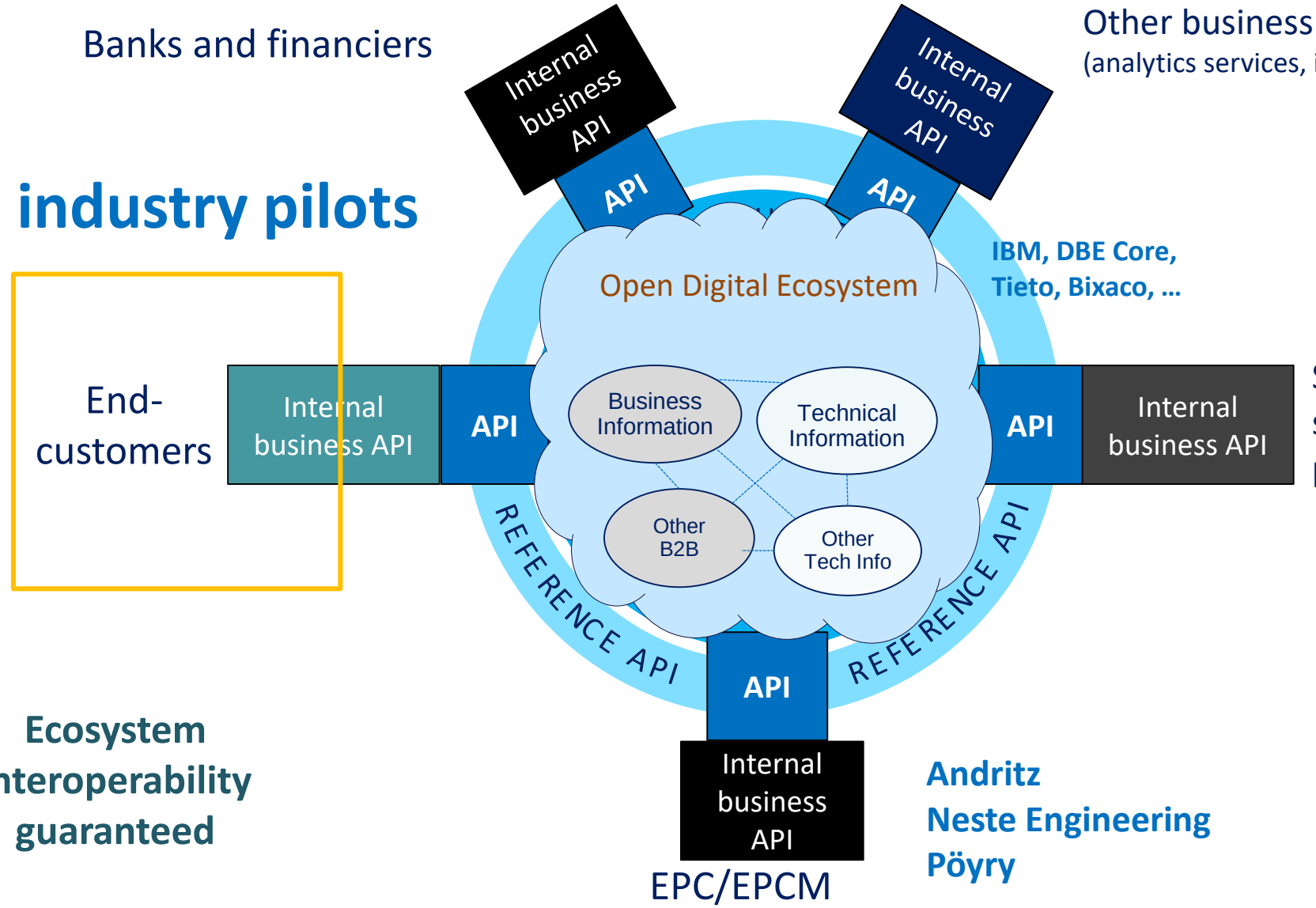
Ecosystem interoperability guaranteed

New data sharing in digital ecosystems

Banks and financiers

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

Process industry pilots



IBM, DBE Core,
Tieto, Bixaco, …

UPM
Stora-Enso
Metsä Group
Fortum

End-customers

Suppliers, service providers

Metso (FC)
Sulzer Pumps
Endress+Hauser
Siemens

Ecosystem interoperability guaranteed

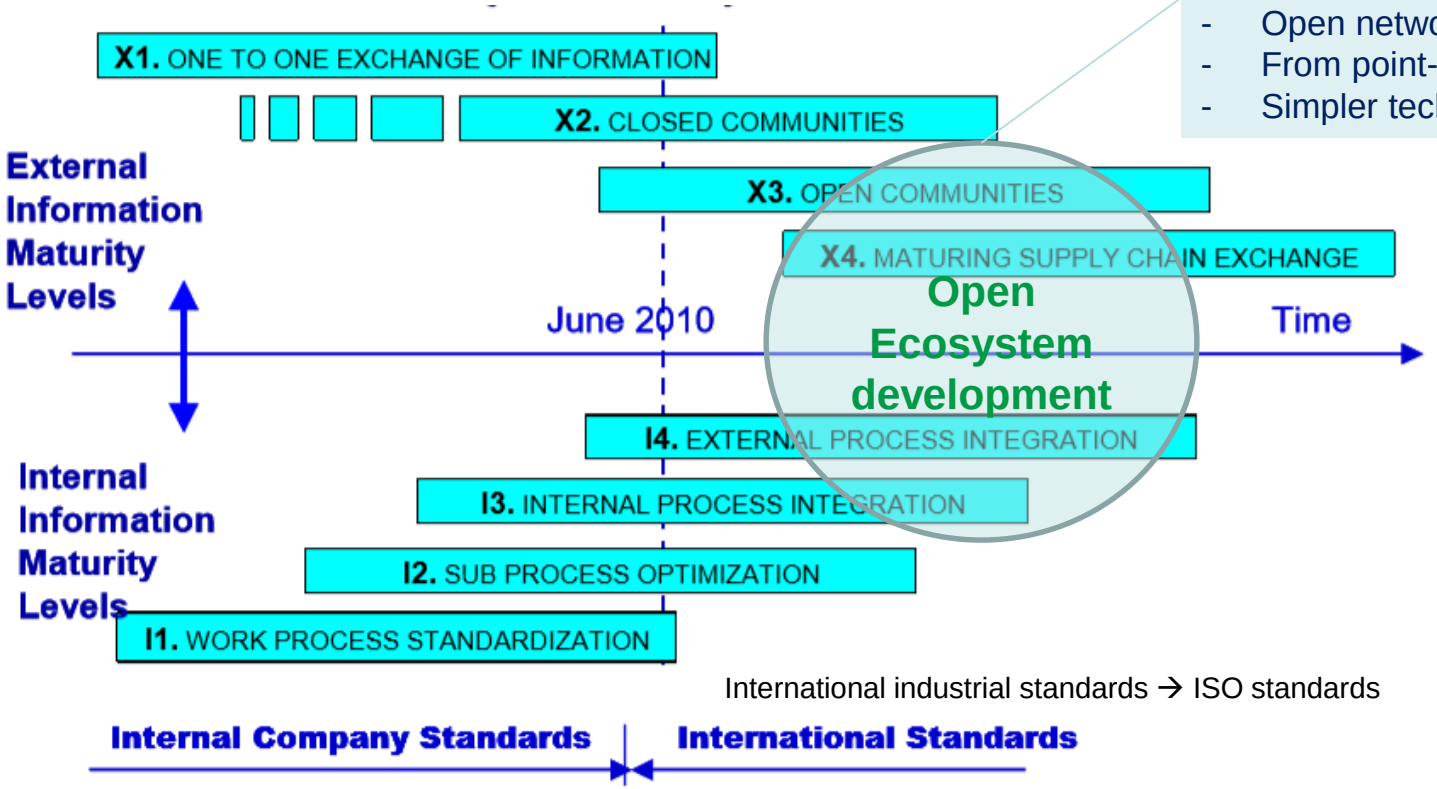
EPC/EPCM

Andritz
Neste Engineering
Pöyry

ORCHID information maturity model

ORCHID - ORCHestrated Industrial Data

Lower all ecosystem obstacles
- Business motivation (to exchange information)
- Information sovereignty (ownership)
- Open networks, open standards, open solutions
- From point-to-point model to ecosystem model
- Simpler technological solutions (blockchain)



Common agreement (orchestration)

Network infrastructure development

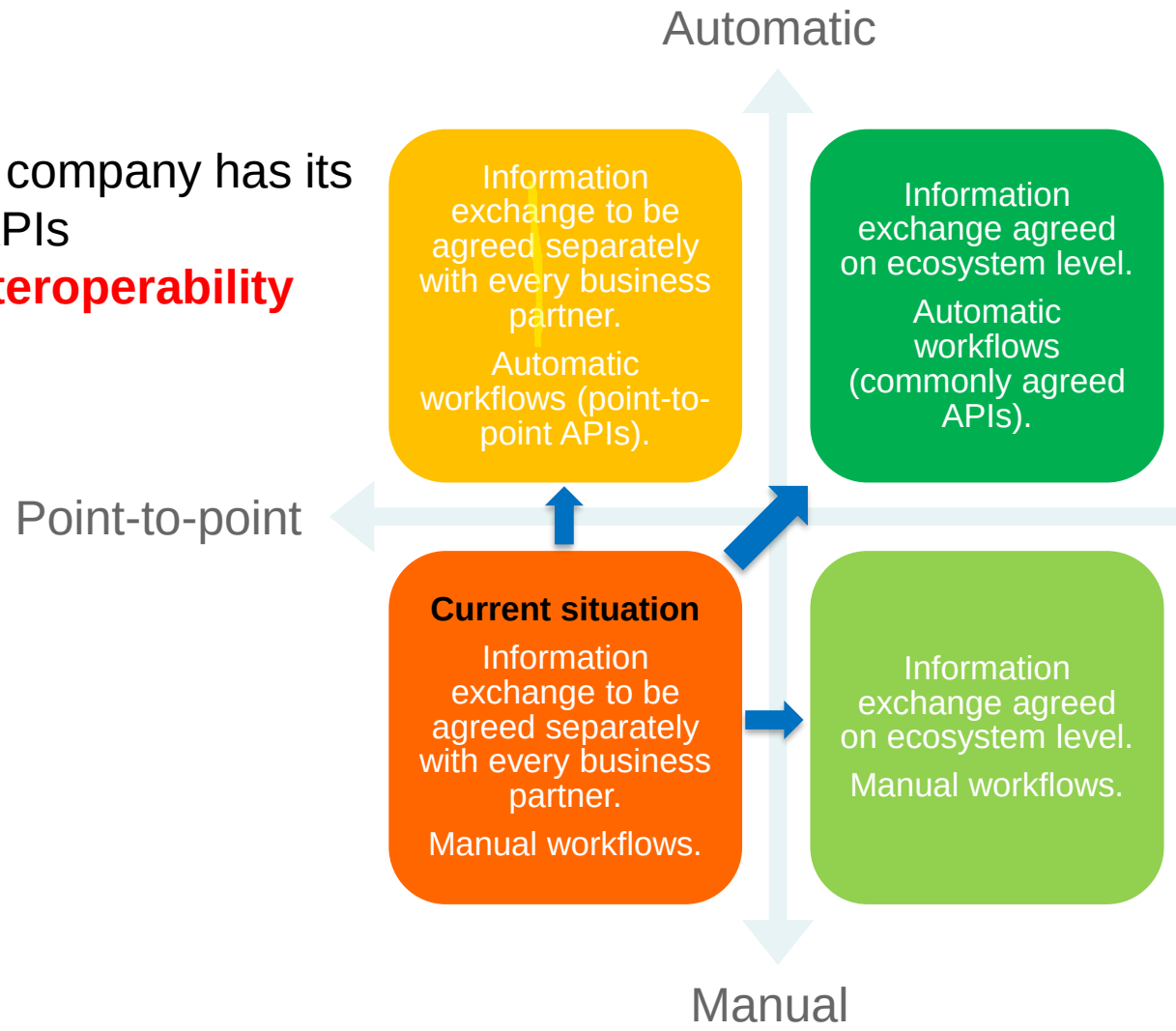
Intercompany integration development

Company's internal development

CEN CWA 2010 standard – ORCHID project

From manual point-to-point to digital ecosystem

Every company has its own APIs
No interoperability



Companies have ecosystem approved APIs
Yes – interoperability in digital operations

Companies don't have digital workflows
Yes – interoperability in manual operations

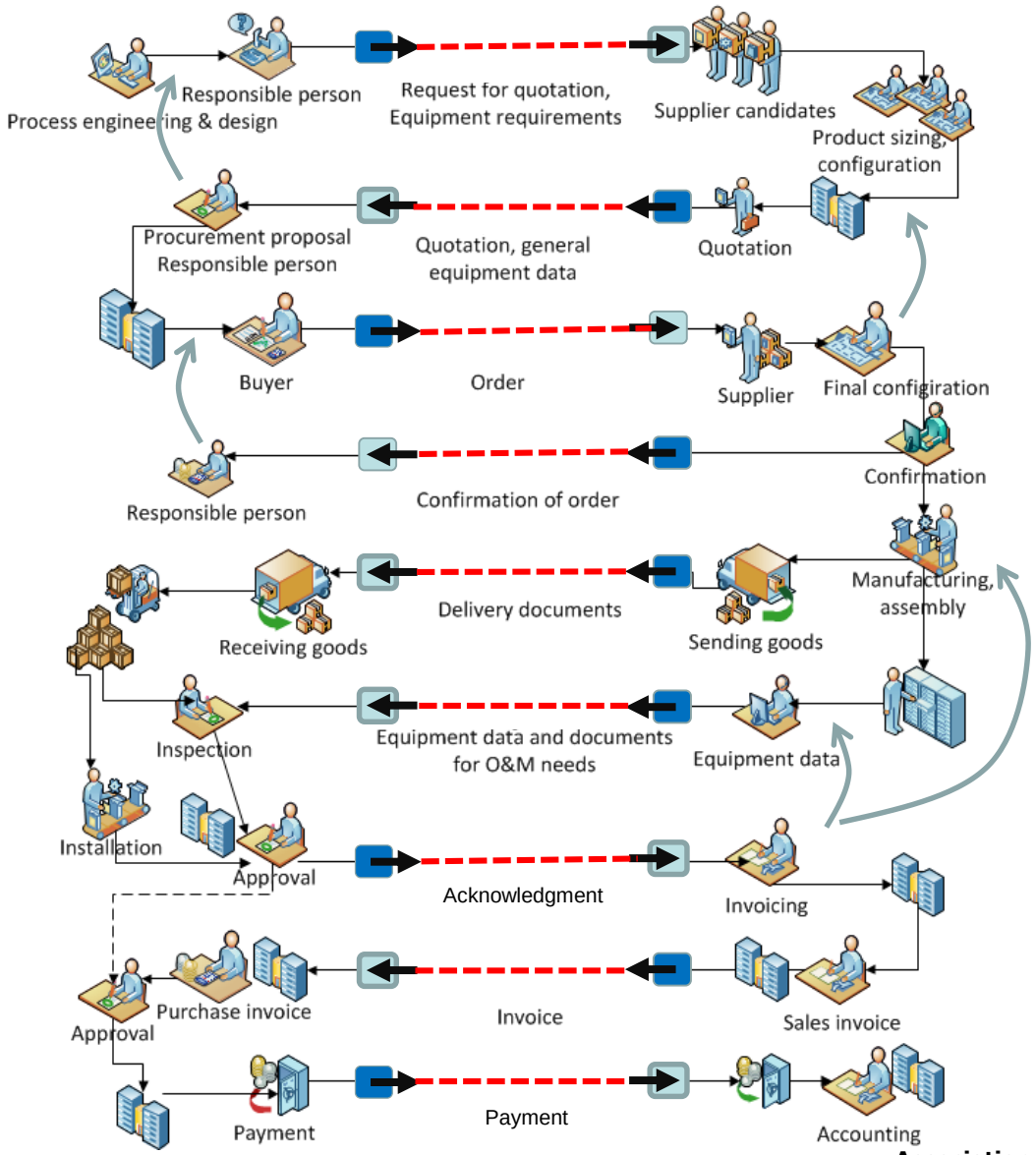
TIE development target

- Create commonly agreed concept and tools to manage technical information data models
  - based on international and industry standards (classes, content, schemas, APIs) and targeting to open solutions
  - together with companies and standardization bodies (ISO/IEC, USPI, MIMOSA, PSK, SSG, …)
  - that will be continuously maintained after the project
  - starting from existing 4 exemplar data models (automatic valves, centrifugal pumps, electric motors, flow meters)
- Create ecosystem rules and principles for projects and O&M in process industry
  - governance model for the network development and operations
  - agree and specify common business processes and corresponding use-cases – TIE to focus process industry plant lifecycle business specifications (in projects and O&M) – step-by-step via PoCs and pilots
  - network rulebook definition & development
- Support common network infrastructure component development
  - for PoCs and pilots together with other business areas and IT infrastructure companies
  - including tools development for data modelling, schema and API interoperability testing
- Support common network integration components & testing development
  - for PoCs and pilots together with other business areas and IT infrastructure companies

Example workflow in a project

API (send)

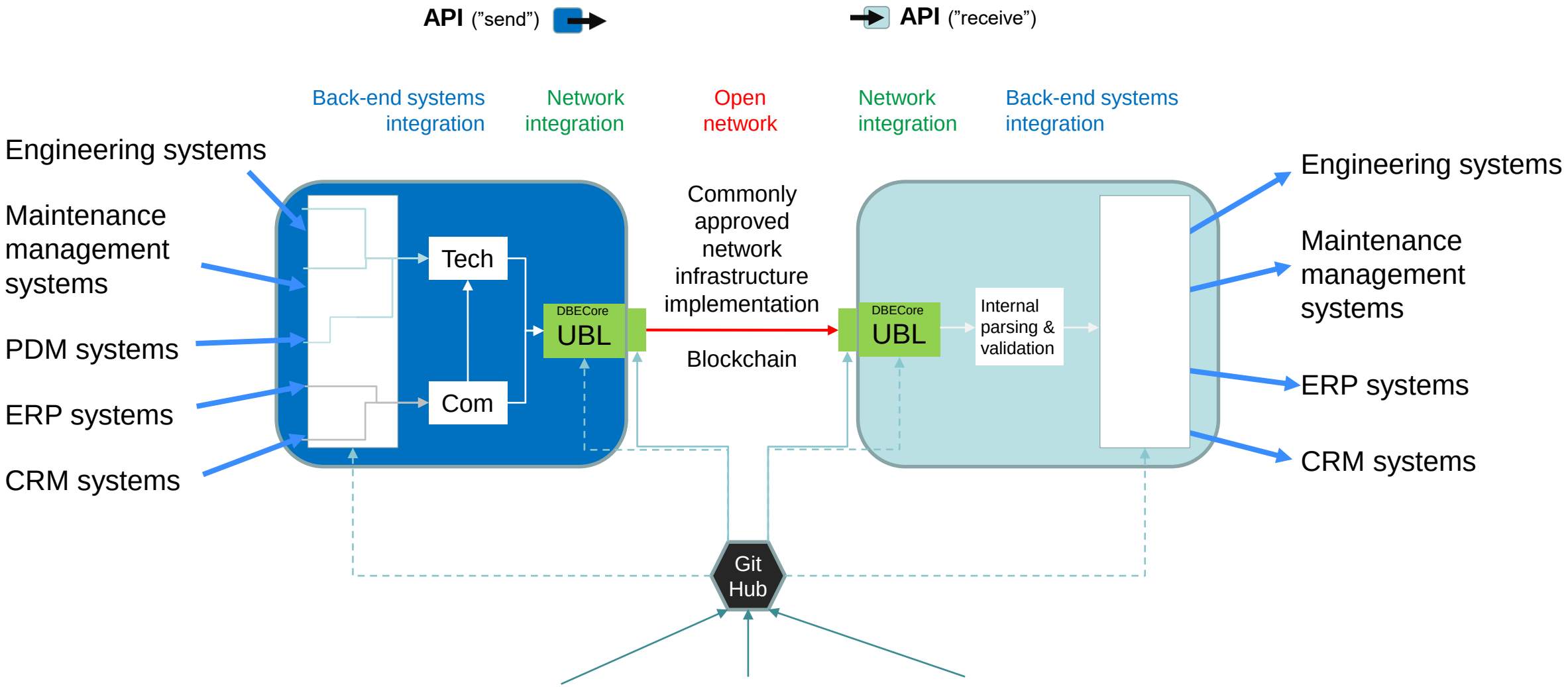
API (receive)



Manual workflow

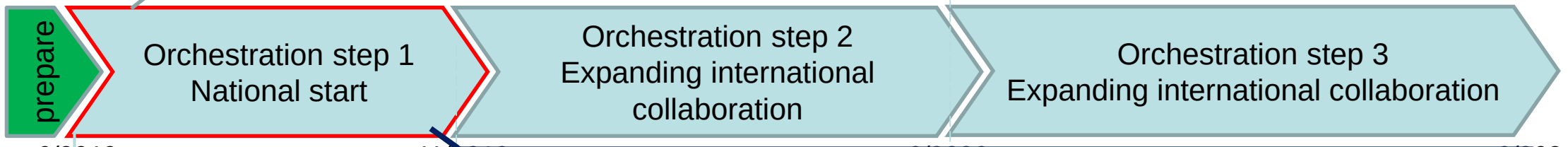
Digital workflows can be implemented transaction by transaction (according to company's corresponding internal process integration maturity level).

API ”handshake”



TIE next steps – phase 1

Basic orchestration definitions and project specification
Disseminating open concept idea, searching new partners



1st orchestration step tasks

- Agreeing business cases for PoCs and define their use-cases
- Agreeing common data modeling concept basics for orchestration step2
- Agreeing the development targets and project plan for the data modeling tool development project
- Enhance international standardization collaboration
- Find more companies to join
- Outlining common network infrastructure and integration development targets.
- Agreeing common ecosystem rules and principles

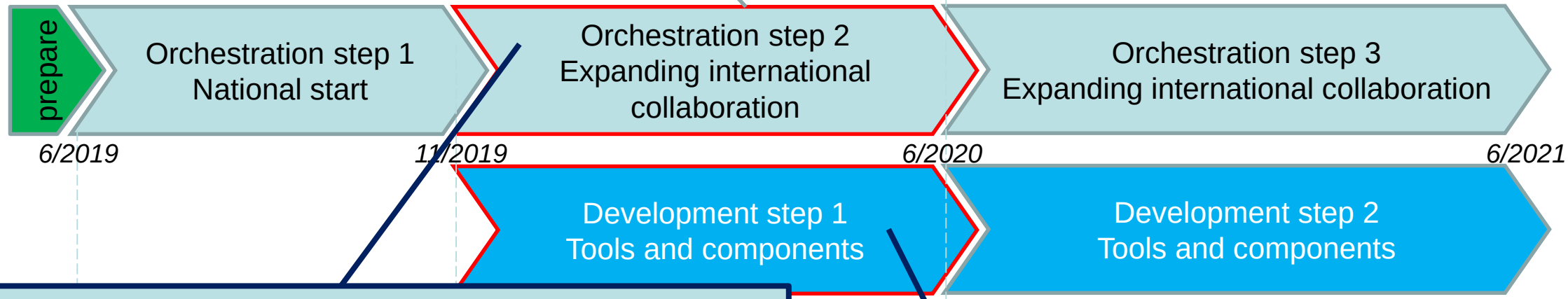
together with other business areas

- 2nd phase starts according to the approved plans
- Tech data modelling tool development starts
- Ecosystem infrastructure components development starts

1st phase Business Finland approves application, **ECOSYSTEM WILL START!**

TIE next steps – phase 2

New companies to join the orchestration
Ecosystem rules and principles



2nd orchestration step tasks

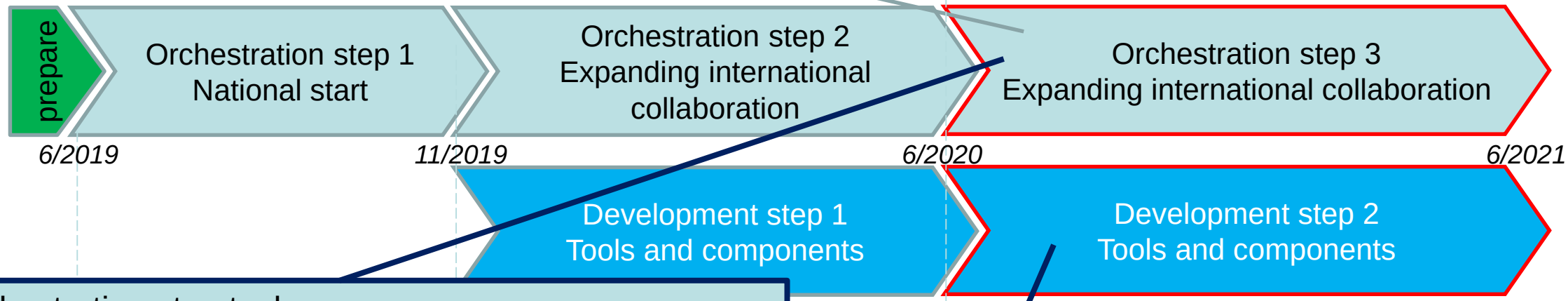
- Agreeing the next common business cases for PoCs and define corresponding use-cases together with business partners (end customer-EPC-suppliers networks)
- Attaining wider approval for the concept among standardization bodies and companies
- Agreeing additional equipment classes and their commonly needed data content
- Agreeing the concept to integrate the technical data schemas with the corresponding business documents in different phases of the workflows defined by use-cases.
- Outlining together with other business areas the common network infrastructure and integration development targets – agreeing network rulebook and metrics

1st development step tasks

- Defining and developing the data modeling tools for technical data models according to the ecosystem needs.
- Defining and developing common integration components together with other business areas.
- Common network infrastructure development together with other business areas. (common codebase for infrastructure components, network rulebook, member pilots, …)
- Defining the next development steps

TIE next steps – phase 3

New companies to join the orchestration
Ecosystem governance model



3rd orchestration step tasks

- Agreeing and defining tools & practices for testing integration and onboarding
- Agreeing and defining the rules & documentation of test network usage & onboarding
- Defining network operations and maintenance activities and responsibilities
- Agreeing and defining technical components based on the network rulebook
- Agreeing and defining the network supporting components & metrics (monitoring, etc.)

1st phase Business Finland approves applicat

2nd development step tasks

- Finishing the data modeling tools for external standardization usage.
- Finishing common integration components together with other business areas.
- Finishing common network infrastructure development together with other business areas. (common codebase for infrastructure components, network rulebook, member pilots, …)
- Finishing network integration and testing development together with other business areas. (common codebase for integration components, interoperability testing tools, member pilots, …)

Conclusions

- Limited process industry focus as a part of wider business framework
- New way to support standardization for technical information exchange
  - Wider international participation will be desirable
- Part of international standardization development
  - Common development target with USPI based on new MoU
    → CFIHOS collaboration
    → open discussion with MIMOSA and other global standardization bodies
  - Finnish partner PSK, Swedish partner SSG → deeper Scandinavian cooperation solution
- Companies' PoCs and pilots determine the development roadmap
- After the project the new established TIE division support continuity

THANKS!