



The changing role of interoperability

Speaker presentation

- Professor and Institute Director at RWTH Aachen University
- Group leader at Fraunhofer FIT, Center for Digital Energy
- Coordinator of several large EU Projects such as int:net, OneNet and Platone



What is interoperability?

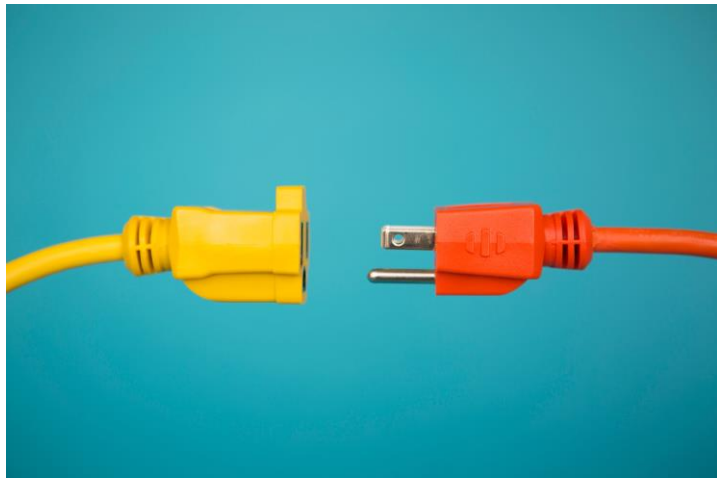
Interoperability refers to the capability of a system or a component to work with another system or component ⁽¹⁾

- What does it mean for modern power systems?
- How do we guarantee interoperability?
- How do we test/verify interoperability?

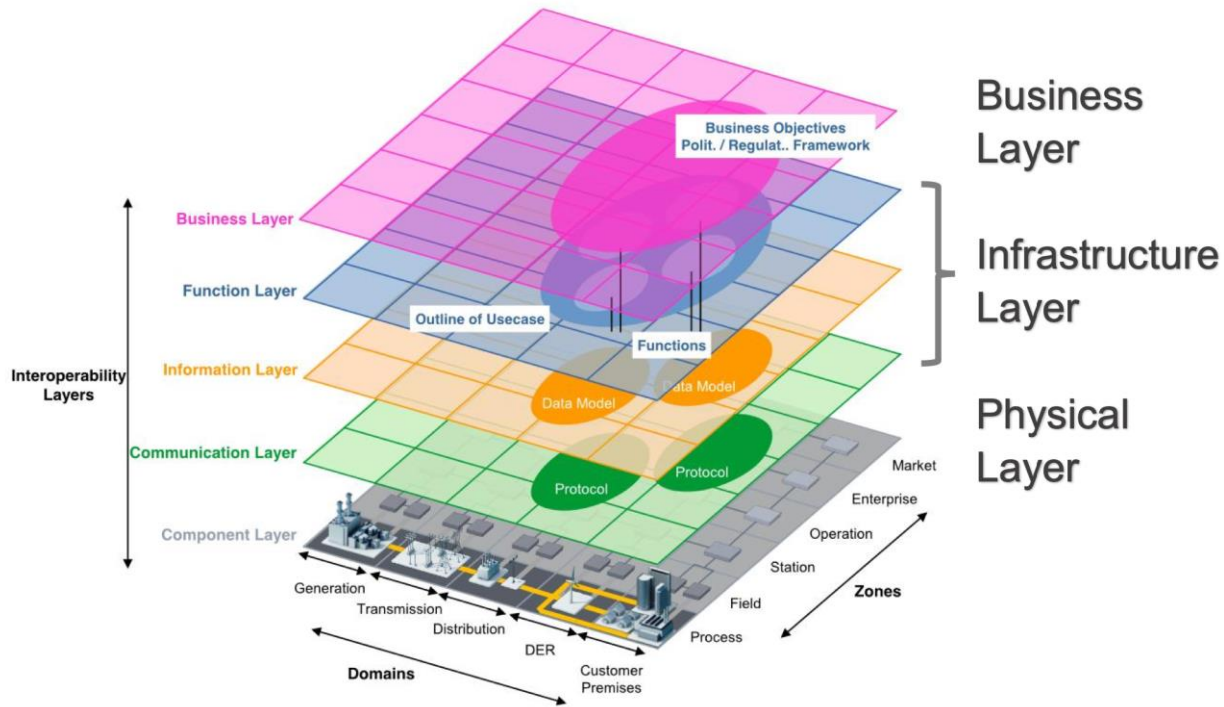
(1) Source: wikipedia

Interoperability for modern power systems?

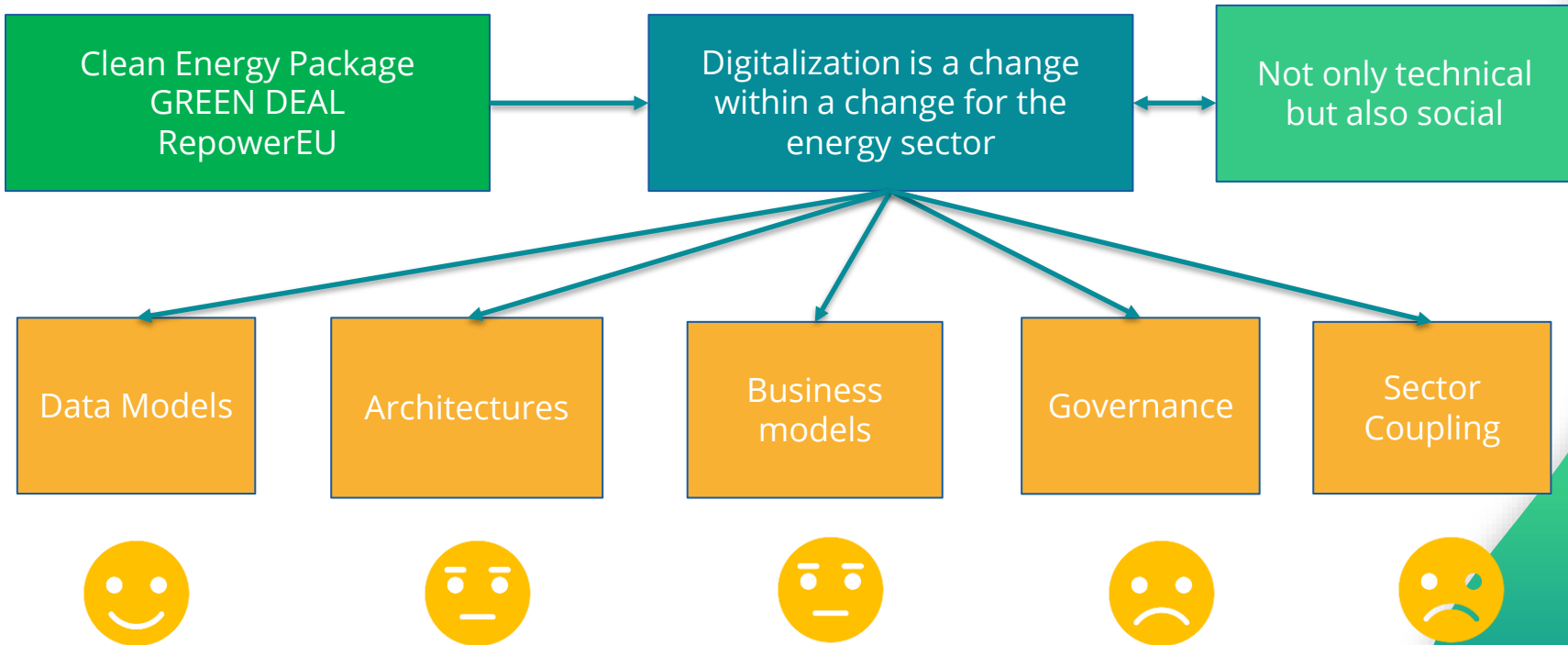
- Interoperability used to be rather systems for electrical systems



Smart Grid and Interoperability: SGAM

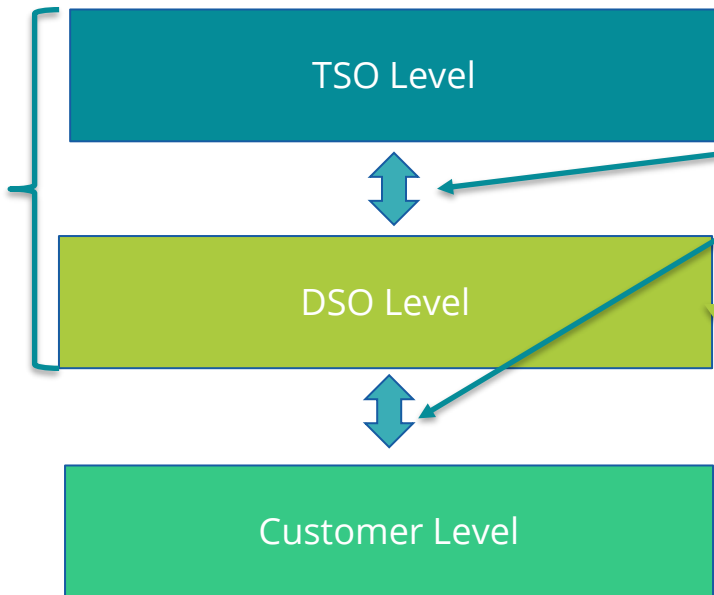


Challenges in the Energy Sector related to Data Management



Building the big picture

BRIDGE: Active System
Management Report



- Focus on TSO level
 - ENTSO-E digital activity
- Defining the interactions
 - INTERFACE
 - COORDINET
- Focus on DSO level
 - PlatOne
 - EUniversal
- Focus on customer
 - INTERCONNECT

OneNet

Key topic: interoperability

Interoperability of services

Interoperability of data exchange

Interoperability of data



Still not done

Less complete particularly when we look beyond operation

Data sovereignty
Privacy

Sector-coupling
Cross-domain

Not complete but well developed in the electrical domain

INTERNATIONAL DATA SPACES ASSOCIATION



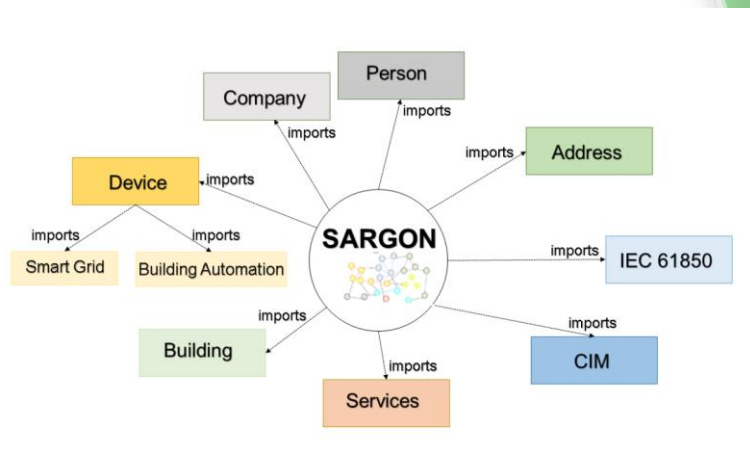
FIWARE



Co-funded by the European Union

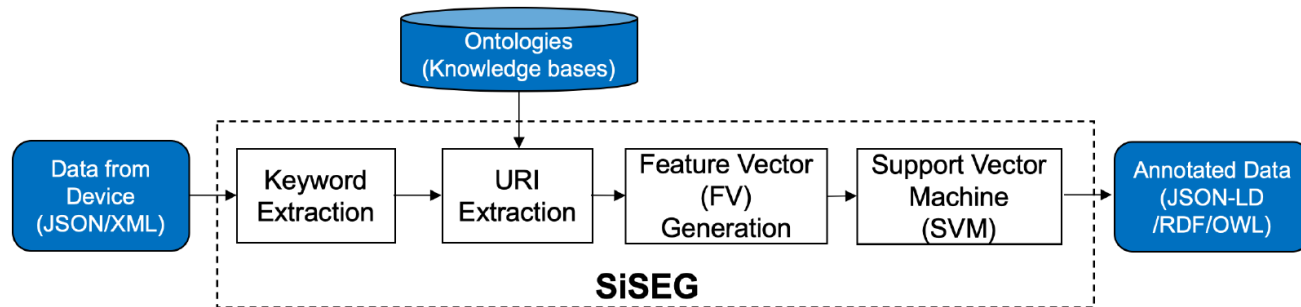
Key ingredient: ontology

- Classical data modeling is not enough to build a digital twin
- Main Challenge are data from multiple sources and in multiple format
- Advanced ontology SARGON as starting point for further development

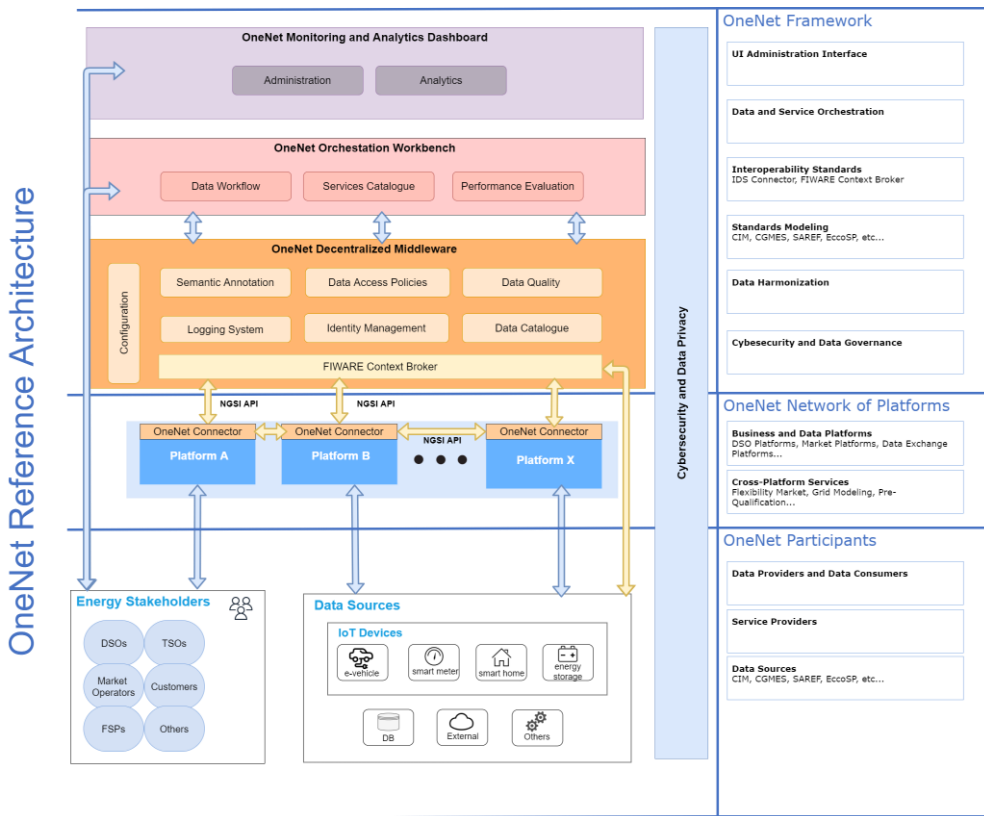


Key needed ingredient: automatic annotation

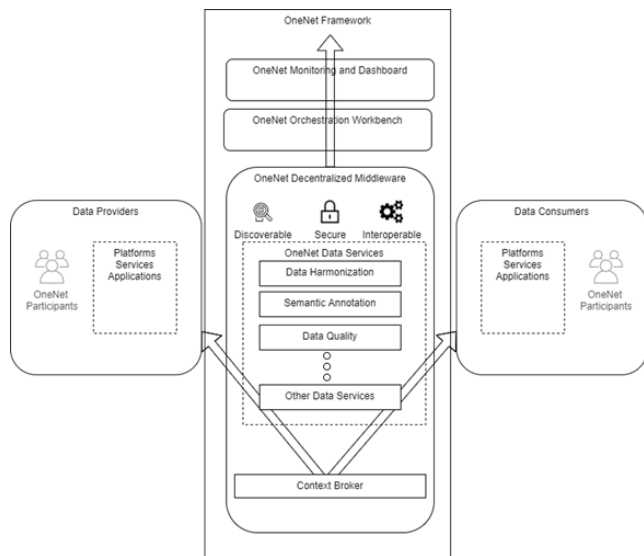
- Data from different sources are hard to integrate
- Data may not be automatically ready for inclusion by means of the available ontology
- The process should be fully automatic



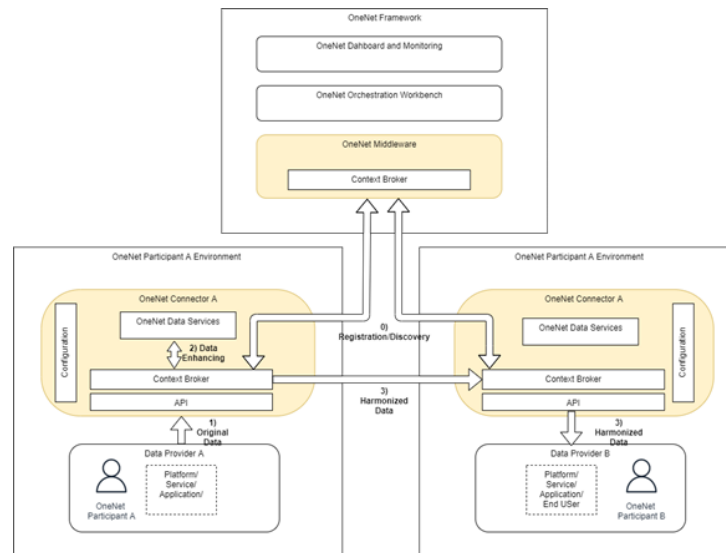
Key ingredient: data connectors



Key ingredient: data connectors (2)

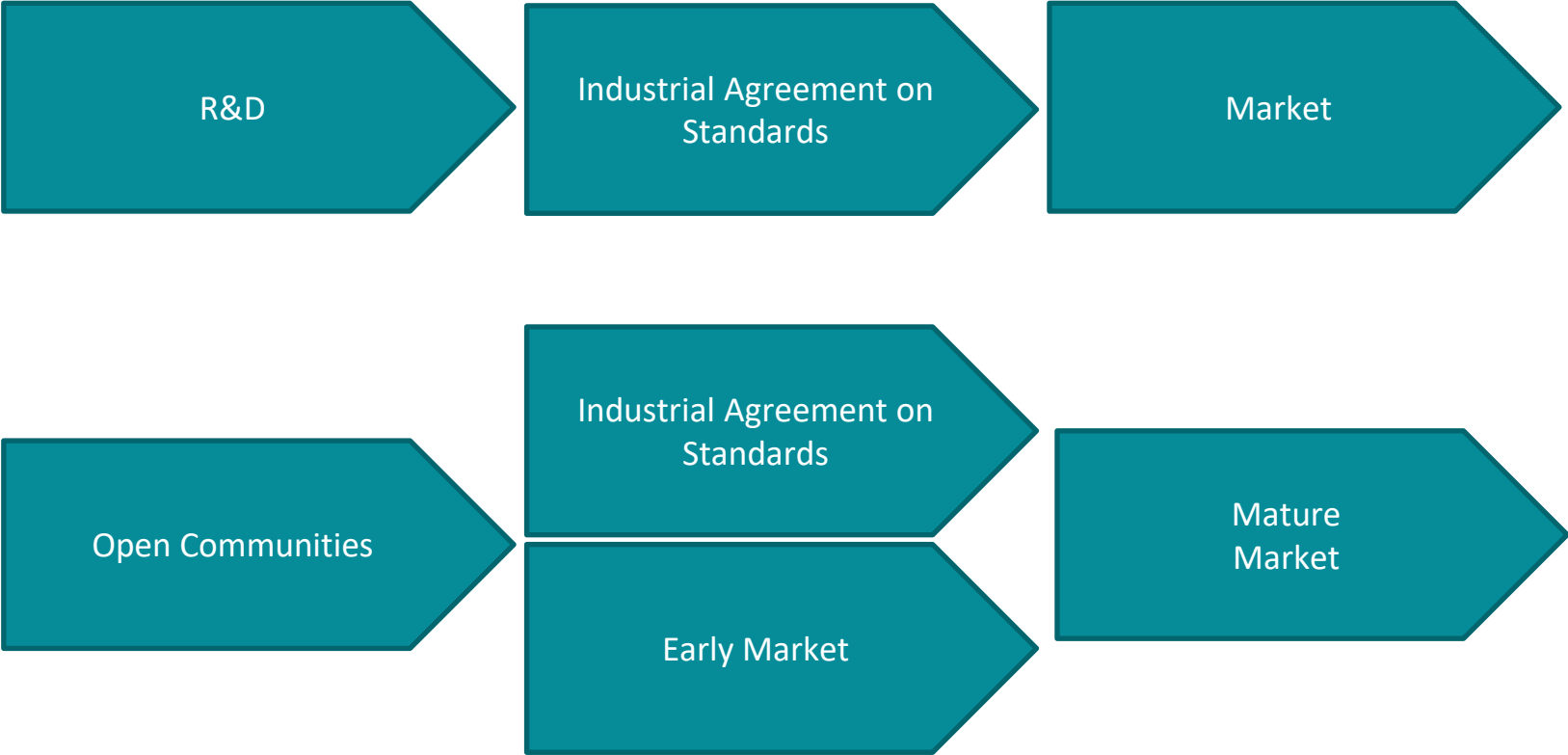


Logical View



Deployment View

Interoperability paths



The need of sharing



Data



Research



Business



Research



Business



Research Data Infrastructures



Data Spaces



Joined structured development



Only with governance



Software

How to share

Research Data Infrastructure

Data Spaces

Joined Structured Development

Code & Governance

National:
NFDI in D

Key standards:
IDSA

CRESYM

LFE

EU:
eg EriGrid2

Reference Implementations

Coordination
Int:net

About open source

Open source means low quality software developed by Universities

Open Source software is not secure

Open Source means that I do not get professional support

Open source cannot work for the energy sector

What we really mean

Software developed as a community process with shared effort and according to clear rules of governance

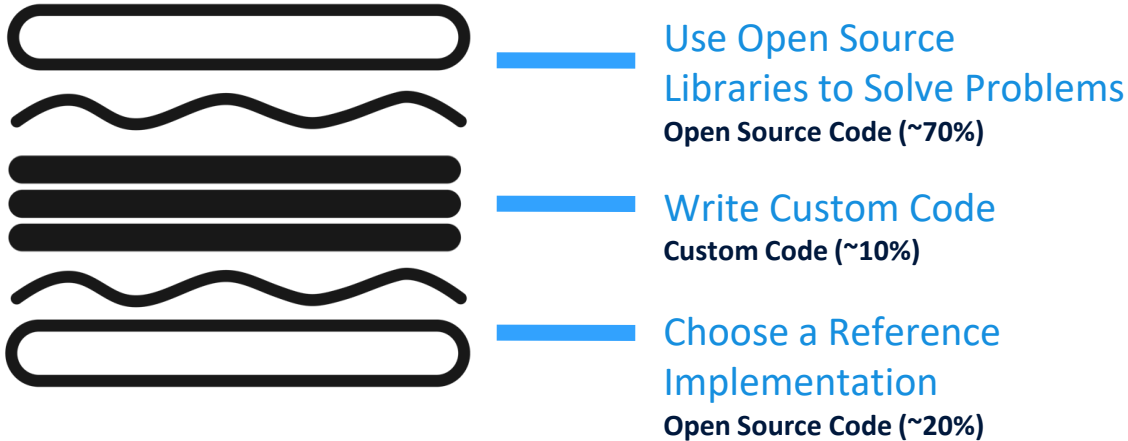
Software that is of high quality and then secure thanks to validated processes of security and highest industrial standards

Software that can coexist with proprietary solutions but that creates a reference model of interoperability

Software that avoids vendor lockin giving the grid operator full control of their process of digitalization

Software that allows a significant cost reduction thanks to shared development

Today open source generally comprises 80-90% of a modern system's total codebase



LF Energy Members

Strategic



General



Associate



LF Energy Projects (+1)





CRESYM – Collaborative Research for Energy SYSTEM Modeling

Developing an ecosystem of research between industry and academics
based on open source and shared knowledge



The 3 key ambitions of CRESYM

*A R&D collaborative association for the development of
open-source energy system simulation tools
for energy system players*



**DEVELOP SCIENTIFIC &
TECHNOLOGICAL** EXCELLENCE



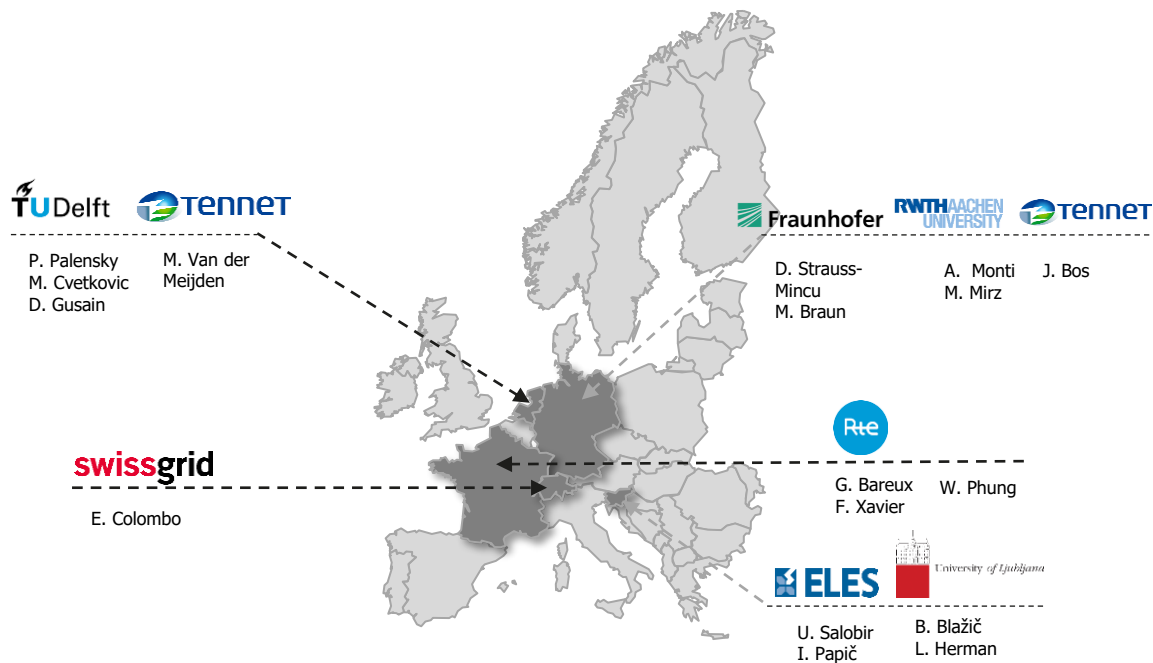
FEDERATE AN ECOSYSTEM OF
PARTNERS & FOSTER
COLLABORATIONS



ENCOURAGE THE
DISSEMINATION &
TRANSFERT OF KNOWLEDGE
AND TECHNOLOGICAL
BUILDING BLOCKS

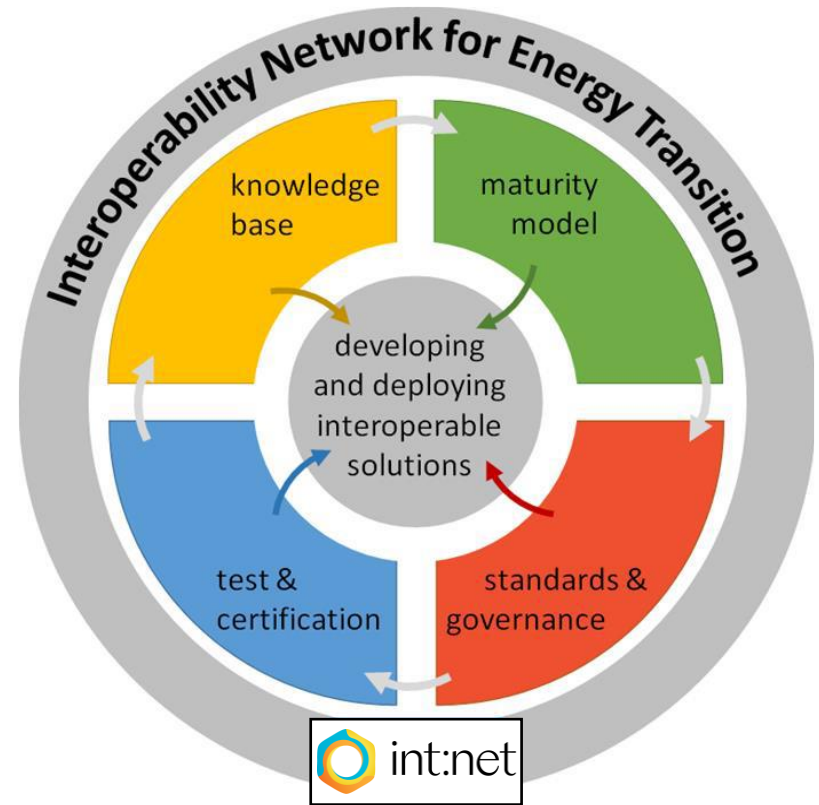


Partners involved in this initiative



Project objectives

- Consolidating a common knowledge base for interoperability activities on energy services in Europe
- Developing a comprehensive and accepted Interoperability Maturity Model (IMM)
- Deploying a framework for interoperability testing in a network of interoperability testing facilities
- Fostering a community network of standards and regulatory environment for a European interoperability ecosystem



Project outcomes

- Standardized way of storing and making knowledge publicly available
- Tool to assess and increase, via IMM, the level of interoperability maturity in organizations
- Self-sustained and formally institutionalized distributed “network” of interoperability testing labs (living labs and digital innovation hubs)

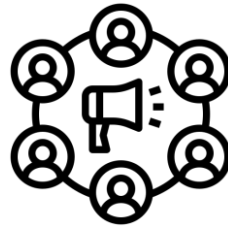


Community network for a European interoperability ecosystem

- Horizontal coordination, support, up-take of energy services related to **interoperability, data spaces and digital twins**:
 - Legal and regulatory framework setters in cross-domain modelling and interoperability testing exercises (e.g., connectathons)
 - Cross-fertilisation process for regional testing infrastructures
 - Initiatives external to the project (Gaia-X, ISGAN, ETIP SNET, BRIDGE, EIRIE, etc.)
- int:net community as formal institution (association) to be self-maintained in the long term



Engage Stakeholders



Disseminate Results



Create a Community

Contributions to interoperability



- How do we organize stakeholders?
- How do we define components?
- How do we update the rules?
- How do we provide reference implementations?

- How do we provide testing procedures?
- How do we provide testing capabilities?
- How do we certify the process?

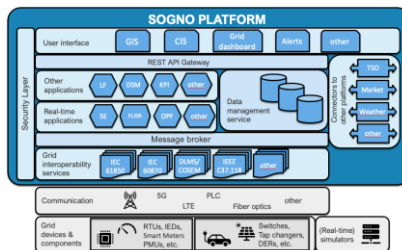
Reference example 1



Rome



+



- First real open-source DMS in Europe
- Customer engagement
- Flexibility market
- Huge savings in network expansion

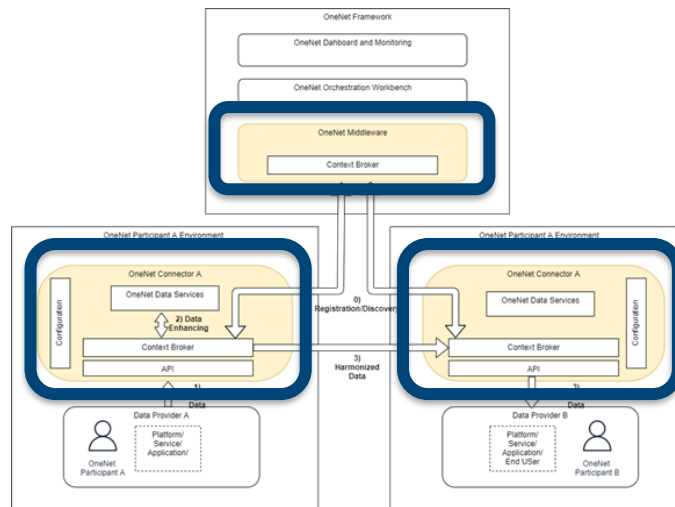
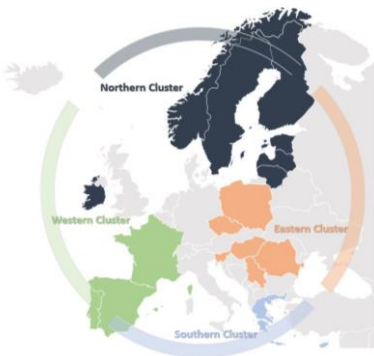


Storage System



Light Node

Reference example 2



Sharing data thanks to open solutions

Thank you

Contacts