Linux Day 2024: open-source per la digitalizzazione e la transizione energetica

Linux Foundation Energy (LFE) e progetto OneNet

26 OTTOBRE 2024

eng

Building a Better Tomorrow

We are the largest Italian **Tech Company** and the ultimate **business partner** for **sustainable digital transformation**.

We seamlessly integrate **business**, **technology** and **ESG principles**, offering comprehensive **advisory**, **implementation** and **managed services** that accelerate innovation, drive global success and promote sustainability.

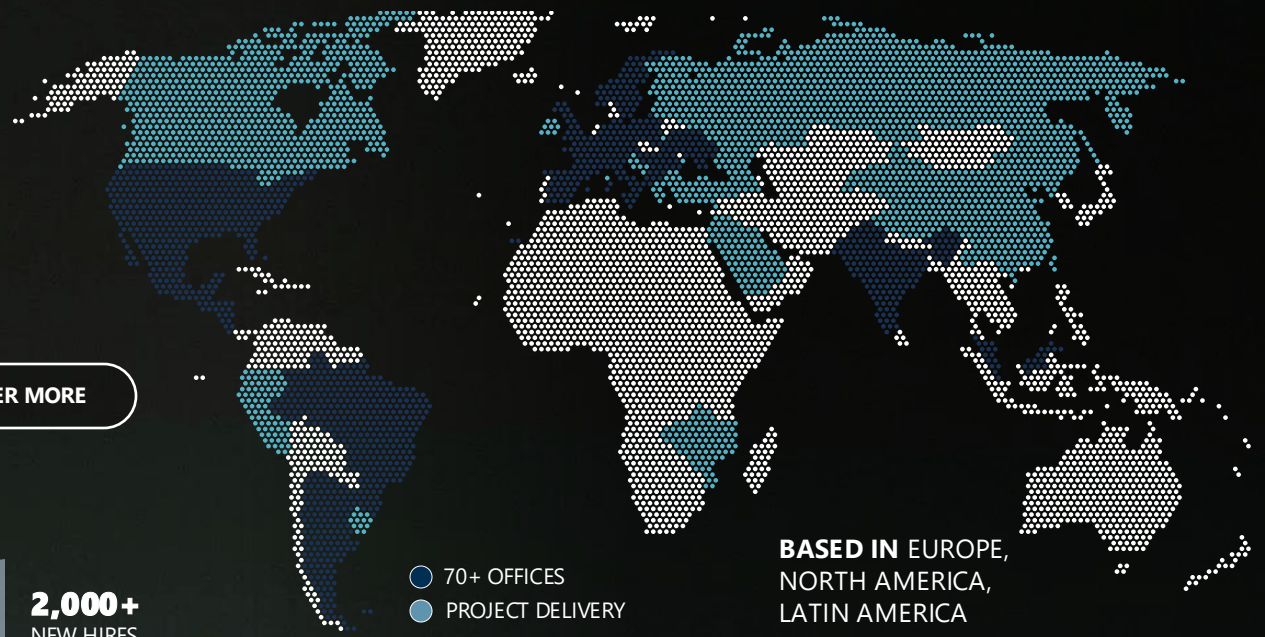
WATCH VIDEO

At a Glance

REVENUE

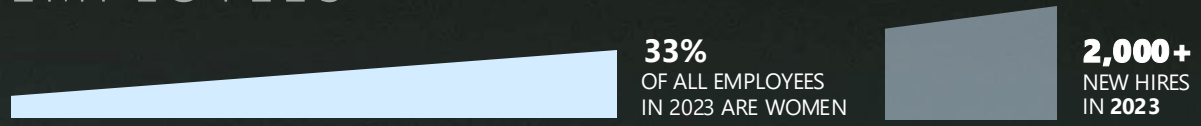
FY2021	FY2022	FY2023	83%
1.285 Bn€	1.460 Bn€	**1.7 Bn€**	IN ITALY

DISCOVER MORE



BASED IN EUROPE, NORTH AMERICA, LATIN AMERICA

EMPLOYEES



2017	2019	2023
10.273~	11.600~	**15.000~**

33% OF ALL EMPLOYEES IN 2023 ARE WOMEN

2,000+ NEW HIRES IN **2023**

+ ADVISORY
+ TECHNOLOGY & IMPLEMENTATION
+ MANAGED SERVICES

CLIENTS

95% ARE LARGE ORGANIZATIONS OR PUBLIC SECTOR

96% OF SATISFIED CLIENTS

BainCapital | NB | RENAISSANCE

49.8% * **49.8%**

Golden Power
SINCE 2020

* The share of Management Co-Invest accounts for the remaining 0.4%

Research & Innovation

Advanced digital, technological, and applied research to drive market impact and stay ahead in a rapidly evolving world.

We support the digital transformation of organizations and institutions worldwide, consolidating our position as a key European research player. By exploring emerging technologies and addressing business challenges, we deliver comprehensive, solution-oriented MVPs, ensuring our portfolio meets evolving market needs.

EMERGING TECHNOLOGY TRENDS

Through an **interdisciplinary approach** and constant attention to emerging technologies, the two research laboratories, Data&Analytics and Digital Experience, operate in various technological fields focusing on AI & Advanced Analytics, AR/MR,VR (XR), Blockchain, Cloud, Cybersecurity , Digital Twin, IoT, and Metaverse.

EMERGING BUSINESS TRENDS

We explore market trends to be always ready to welcome and face new challenges, in the areas of:

- Industry,
- Healthcare,
- Defense & Homeland Security,
- Energy & Utilities,
- Government,
- Augmented City, Agriculture,
- Transportation,
- Media & Communication.

GLOBAL INNOVATION NETWORK

We collaborate with important scientific organizations and top-tier industrial players in digital, technological, and applied research. Coordinating several national and international projects, **we play a strategic role in the international research** community, partnering with industrial, scientific, and academic excellences.

30 €m+
Investments / year

450+
Researchers & Data Scientists

140+
Live Research Projects

500+
Completed Research Projects

2
R&I Labs

13
R&I Units

IL NOSTRO NETWORK INTERNAZIONALE

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Evolution of Energy Sector

FEW BIG PLAYERS

System Operators manage the power system

CENTRALISED

The flow of electricity is unidirectional

ISOLATED AND CLOSED SYSTEMS

Software application designed for the specific needs

MANY SMALL PLAYERS

Customers become active players

DECENTRALISED

Drawing power from multiple, localised energy networks

OPEN AND STANDARDIZED

Openness, Interoperability and Standardization as key factors

The Challenge: Digitalisation of the Energy Sector

The digitalization of the energy sector demands an higher level of operational excellence with the adoption of disruptive technologies to foster cross-domain data sharing and data driven innovation.

Following **key elements** in data management in support of a data economy need to be fulfilled:

- **Data models / Semantics**: Defining an appropriate data model beyond a single sector is a key ingredient for interoperability;
- **Context Information**: Defining the context is a key ingredient for bringing the gap between different verticals;
- **Data Sovereignty**: The ability of a data owner to define what a third party is allowed to do with her/his data;
- **Open API**: Closed solutions will not create a real open and competitive market. Open APIs offer the perfect bridge between private infrastructure spaces.

Open source as enabler for digitalisation of the energy sector

64% of energy sector companies already using open-source software

"Open source serves as a crucial catalyst for improving efficiency, accelerating time to market, and facilitating knowledge sharing."

Benefits

- reducing costs
- building a larger ecosystem of solutions
- removing lock-in
- ensuring interoperability

Barriers

- performance concerns
- lack of support options
- security

Source: Linux Foundation Energy

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What is LF Energy?

Linux Foundation Energy (LF Energy) is an **independent, member-funded non-profit** organization whose purpose is to **accelerate the energy transition** through **collaboration** on **open source technologies and standards**.

We are part of the Linux Foundation, the largest shared technology investment in the world.

What is LF Energy?

LF Energy serves as an **independent, neutral steward** for **transparently governed open source** technologies and standards that serve as the **trustworthy, secure digital foundation for grid modernization and modern energy services**.

Supported by **70+ member organizations**, **1,000+ contributors** from utilities, vendors, research and energy majors collaborate on shared, pre-competitive challenges through **30+ projects**.

LF Energy hosts **LF Energy Summit**, the **only conference focused on open source for the digital energy transition**.

Project Landscape

LF Energy complements existing organizations for providing a place to collaborate on open **industrial-grade technology platforms and agile standards**.

IEEE

Publications, conferences, standards

cigre

Publications, conferences

LFENERGY

Open industrial-grade technology platforms and agile standards

EPRI

Early-stage research and prototypes

EEI Edison Electric INSTITUTE

Advocacy for investor-owned electric companies

Members

LF Energy Member - Strategic (5) +1

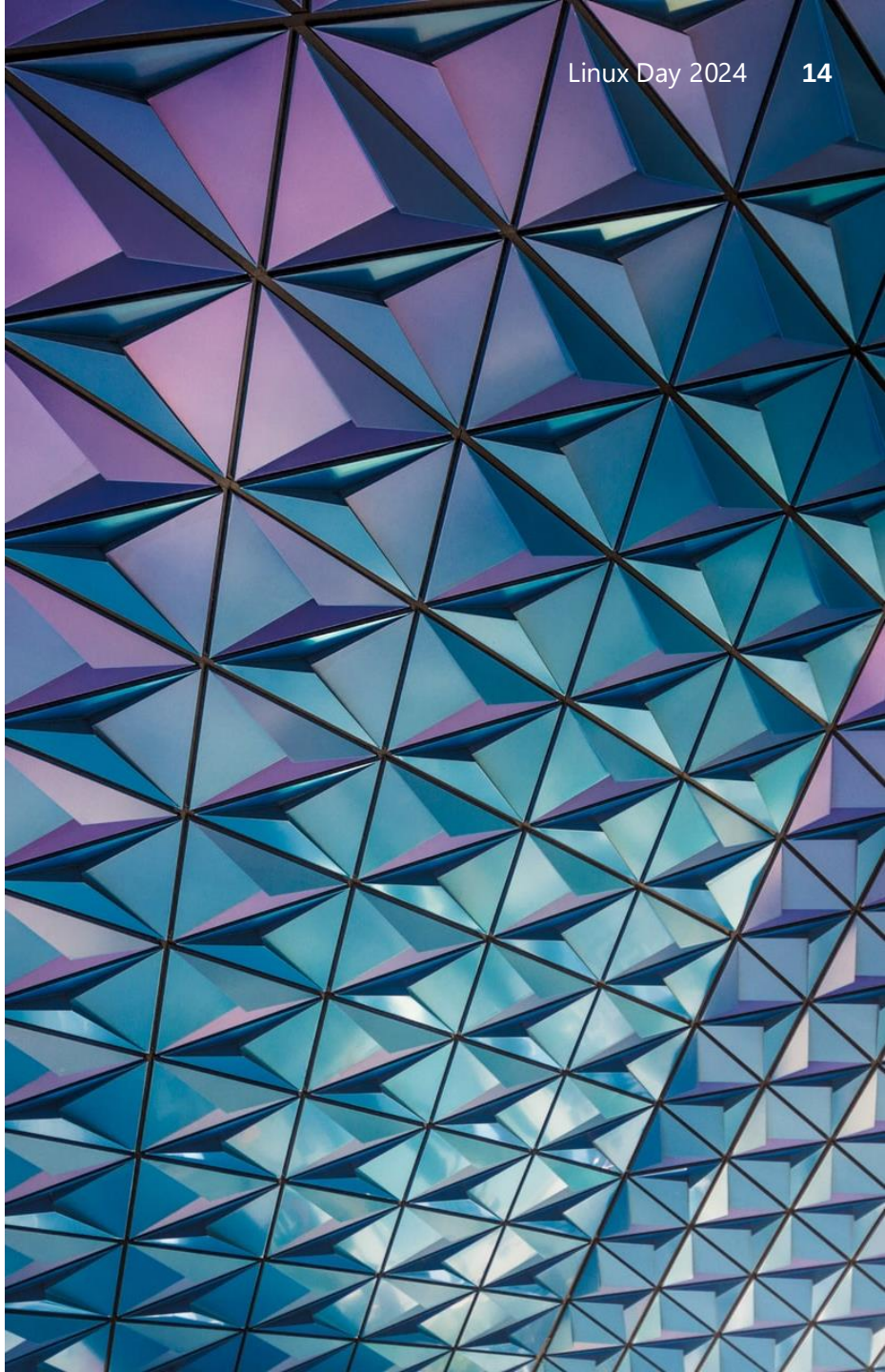
alliander · Google · Microsoft · RTE · Shell

LF Energy Member - General (21) +3

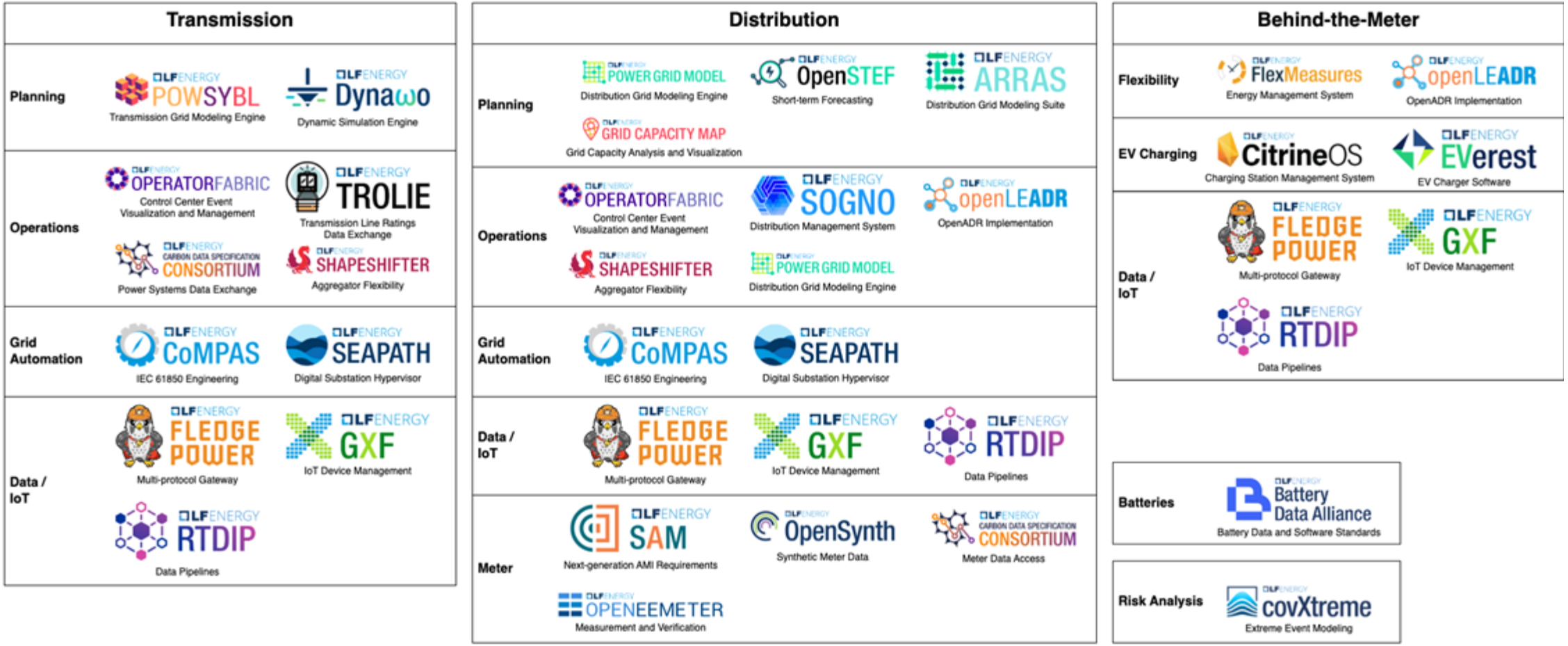
Artelys · aspentech · AVEVA · chargebyte · d-fine · ENERGINET · FUTUREWEI · GE · Hydro Québec · LUTECH · PIONIX · RECURVE · Savoir-faire Linux · REPLY · Statnett · TenneT · Utilidata · UTILITYAPI · VATTENFALL · WattCarbon · WELOTEC

LF Energy Member - Associate (40) +3

Carbon Co-op · Cerdordenmark · CRESYM · TU Delft · EDSN · TU/e · Elaadnl · EPRI · ENACCESS · Energy Foundation · Energy & Berlin · EnergyTag · entsoe · EPFL · FIWARE · Fraunhofer IIS · FAU · Iowa State University · KTH · Hochschule Luzern · M-RETS · NREL · Open Climate Fix · OpenEarth Foundation · openADR · OpenUK · OwnTech Fondation · Pecan Street · Project Haystack · RWTH Aachen University · Stanford · The Alan Turing Institute · The Energy Coalition · Trusted Computing Group · Universiti Teknologi MARA · Universität Kassel · Vanderbilt University · VF Volta Foundation · Washington State University · WattTime



Project Landscape



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OneNet Vision

OneNet Framework: **P2P fully decentralised ecosystem for interoperability and data exchange.**

In OneNet Framework two systems (OneNet Participants) can exchange their own data directly each other, without intermediation by a third party.

Any kind of energy stakeholders is able to participate in the OneNet Ecosystem using the OneNet Decentralised Middleware and the OneNet Connector

- 10 demonstration countries
- 4 European cluster
- 21 use cases applications (4 cross-country)

Northern Cluster Demonstrator
Ireland, Norway, Sweden, Finland, Estonia, Latvia, Lithuania

Western Cluster Demonstrator
Portugal, Spain and France

Eastern Cluster Demonstrator
Czech Republic, Poland, Hungary, Slovenia

Southern Cluster Demonstrator
Greece and Cyprus

OneNet has been funded under European Union's Horizon 2020 research and innovation programme under grant agreement No 957739

OneNet Architecture

OneNet Participants

Any kind of actor involved in the OneNet ecosystem. Can be divided into data source, data provider, data consumer and service provider.

OneNet Network of Platforms

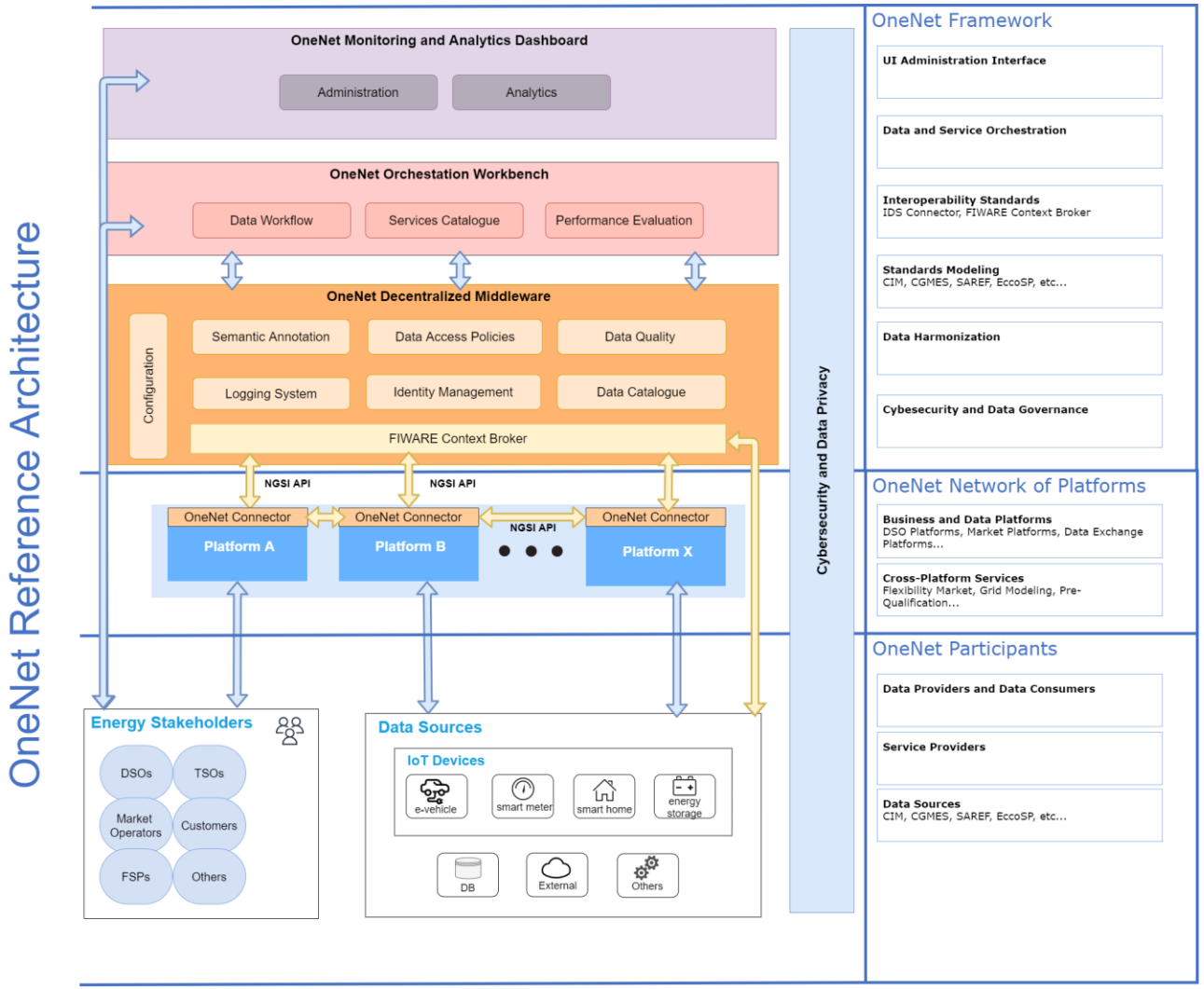
Any Demo Platform (e.g., DSO platforms, Market platforms, DEPs) able to connect with the OneNet Middleware using the OneNet Connector.

It aims to be a P2P fully decentralised ecosystem for interoperability. In the OneNet Network of Platforms, two systems (OneNet Participants) can interact directly with each other, without intermediation by a third party.

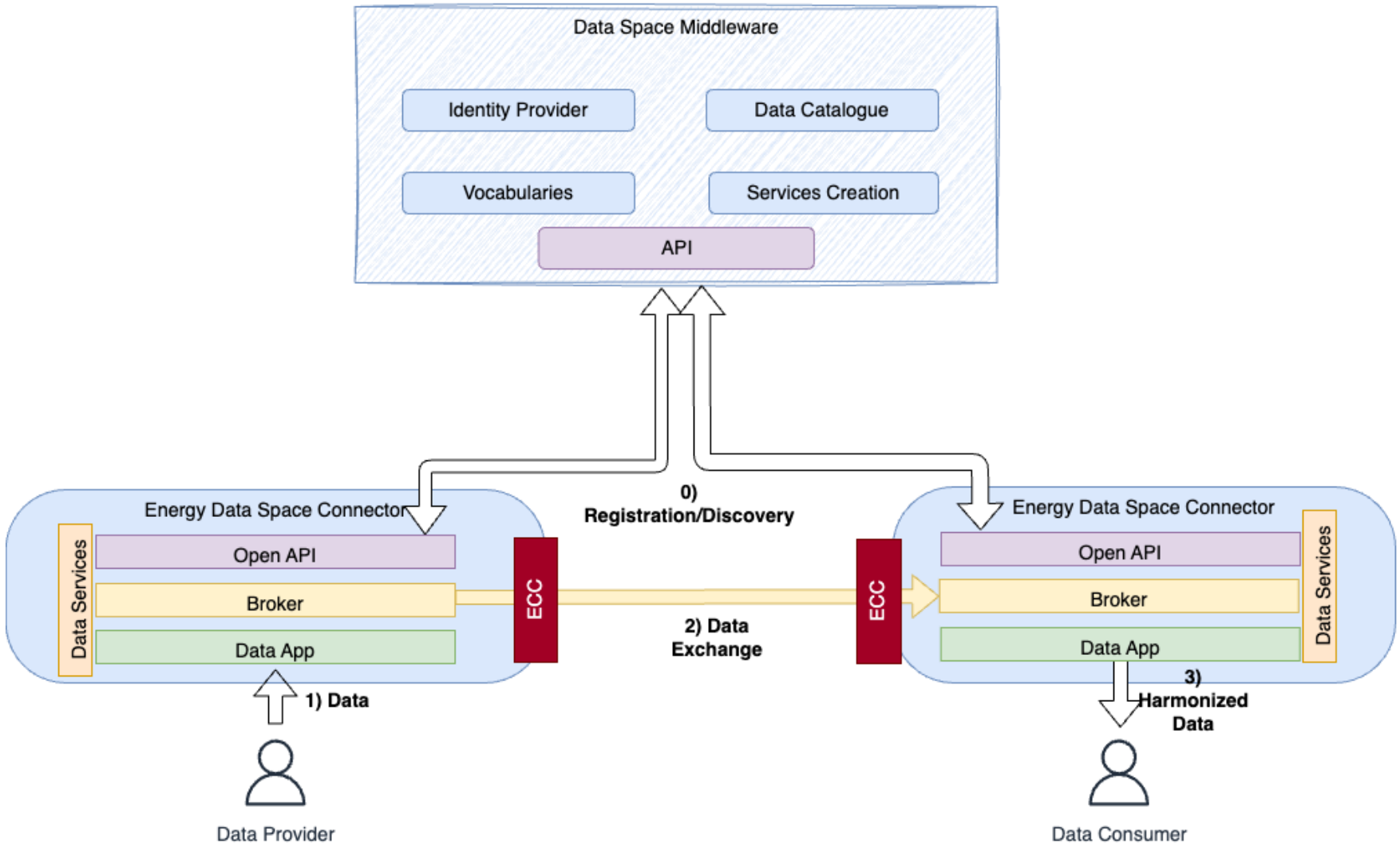
OneNet Framework

The core of the OneNet Architecture. It consists of three main components:

- OneNet Decentralized Middleware
- OneNet Orchestration Workbench
- OneNet Monitoring and Analytics Dashboard



OneNet Middleware and Connector



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Starting Point: TRUE Connector

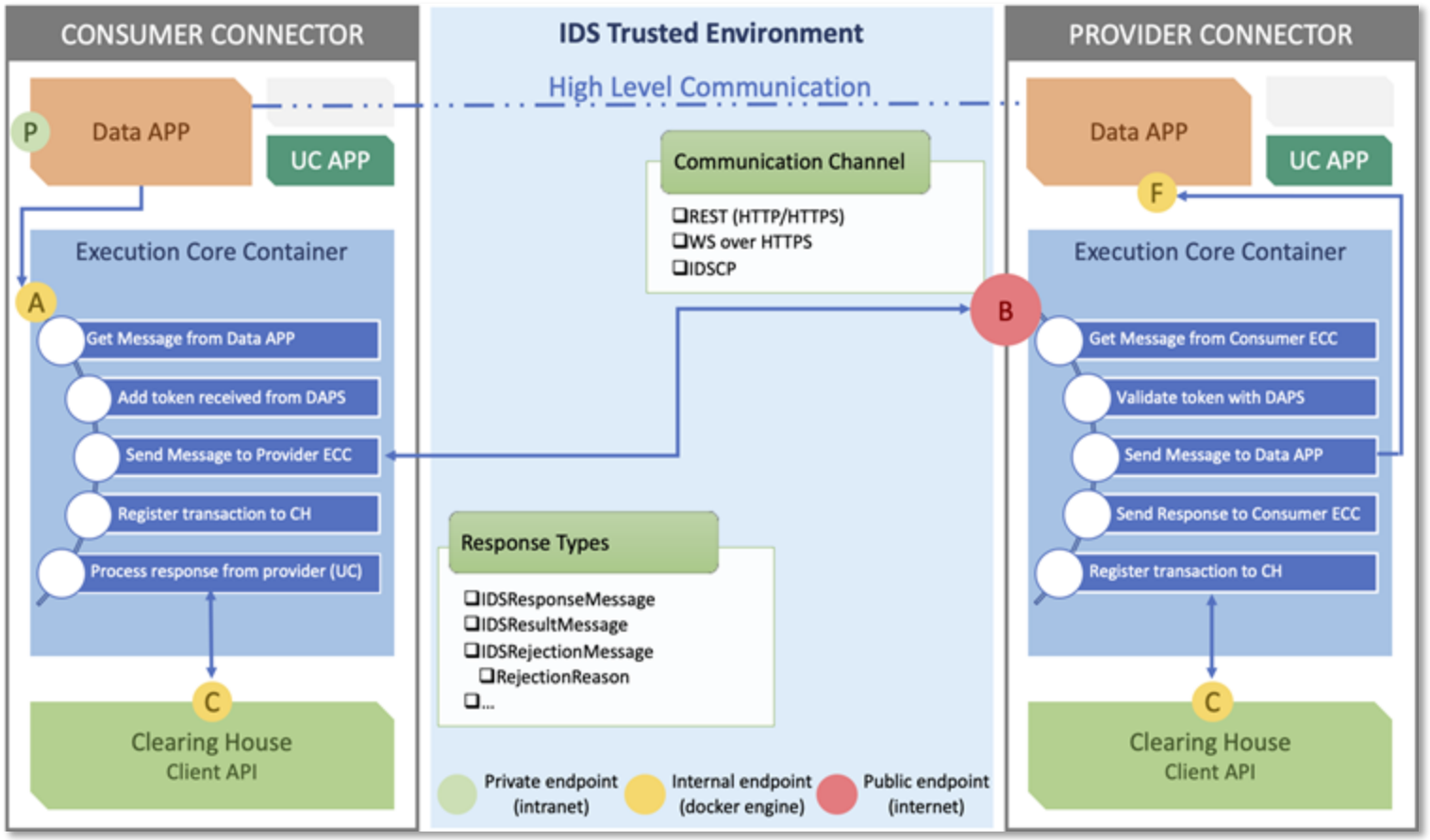
TRUE connector is a connector for the **IDS (International Data Space) ecosystem**

- It enables the trusted data exchange in order to be active part of an IDS Ecosystem, a virtual data space leveraging existing standards and technologies, as well as governance models well-accepted in the data economy, to facilitate secure and standardized data exchange and data linkage in a trusted business ecosystem.
- The connector is compliant with the latest IDS specifications and can be easily customized to fit a wide spread of scenarios thanks to the internal separation of Execution Core Container and Data App.
- It is integrable with a lot of existing IDS services and totally configurable in terms of internal/external data format (multipart/mixed, multipart/form, http-header) and protocols (HTTP, HTTPS, Web Socket over HTTPS, IDSCPv2).
- It is **certified** "Trust Level 1, Assurance Level 2" according to *IDS Certification for connectors*.

Starting Point: TRUE Connector

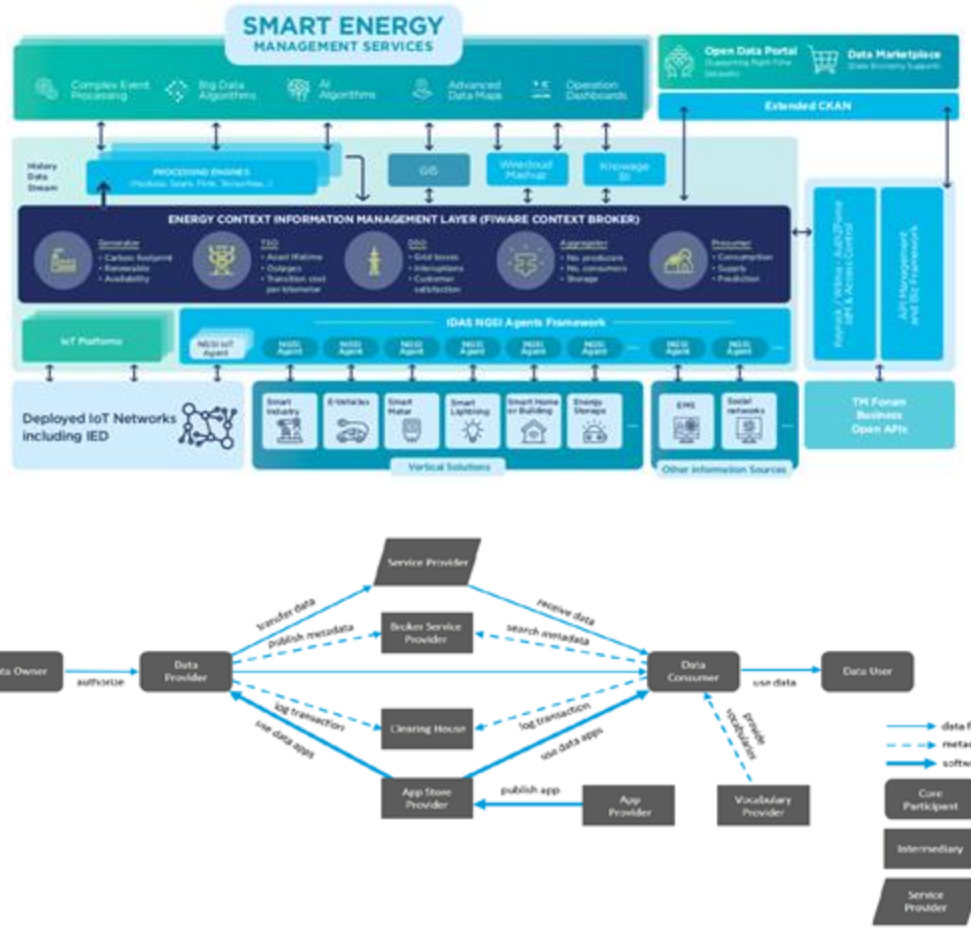
Components

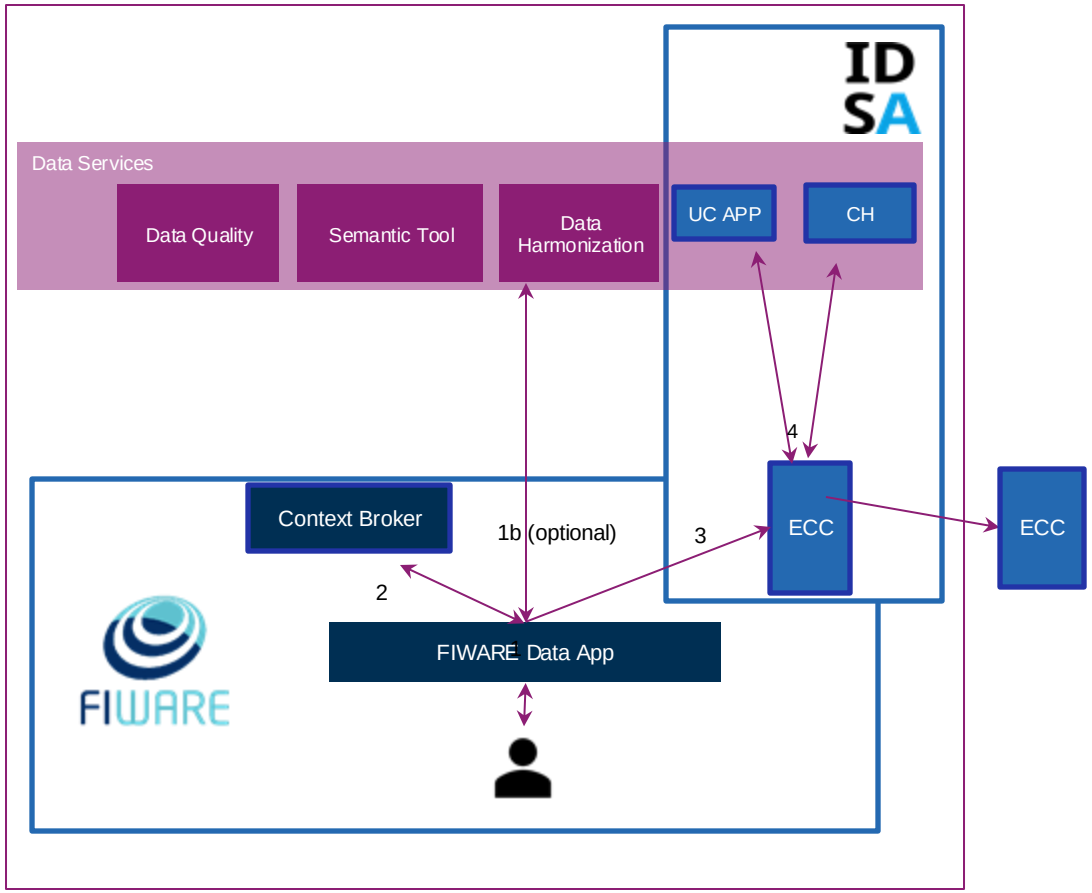
- IDS Based ECC
- Configurable Data APP
- Clearing House
- Usage Control APP



OneNet Connector: Energy Context

Energy Data Space – FIWARE and IDSA





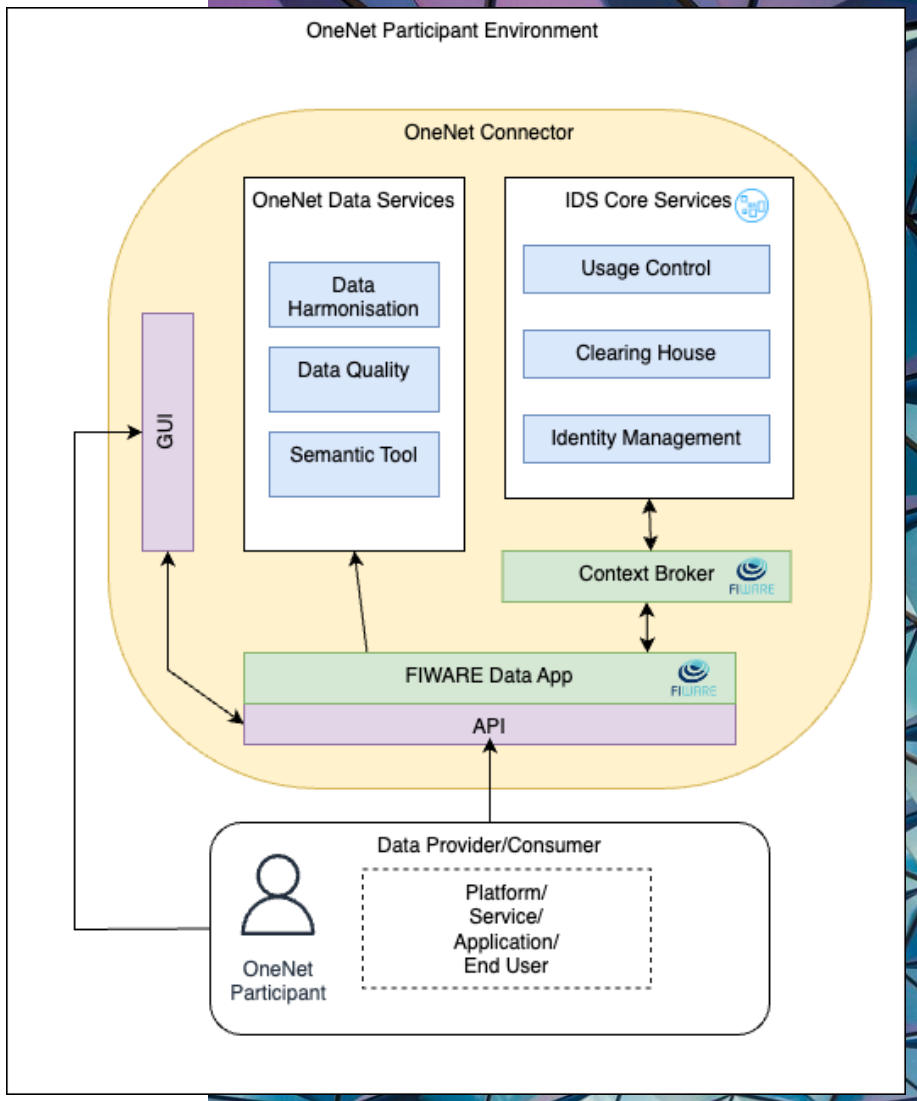
Evolution: OneNet Connector

Technological Maturation

- FIWARE Context Broker fully integrated in the Connector Architecture
- Additional Data Services (Data Quality, Data Harmonisation, …)
- Standardised API for any Energy Data
- GUI for facilitating the Connector usage

The energy context… Tailoring for Energy Domain

- 10 services categories
- 64 energy services
- Standardization adoption



OneNet Connector: Advantages

- Open to all Energy Stakeholders
- “Standardised” processes & data
- One-to-One secure data exchange
- Easy to use (GUI, open APIs) and deploy
- Submitted as **Linux Foundation Energy (LFE) Project**

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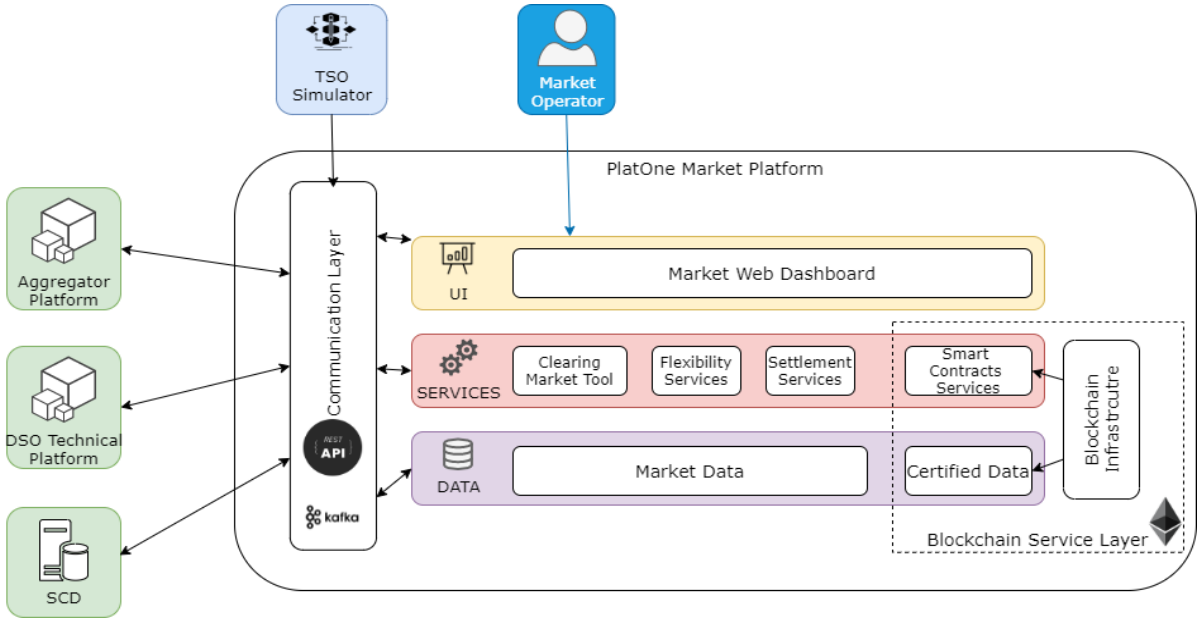
Platone - Flexibility Market Platform

Enables the local flexibility market, including TSOs for wide geographical area flexibility requests, DSOs for local flexibility requests and Aggregators for flexibility offers.

It is able to:

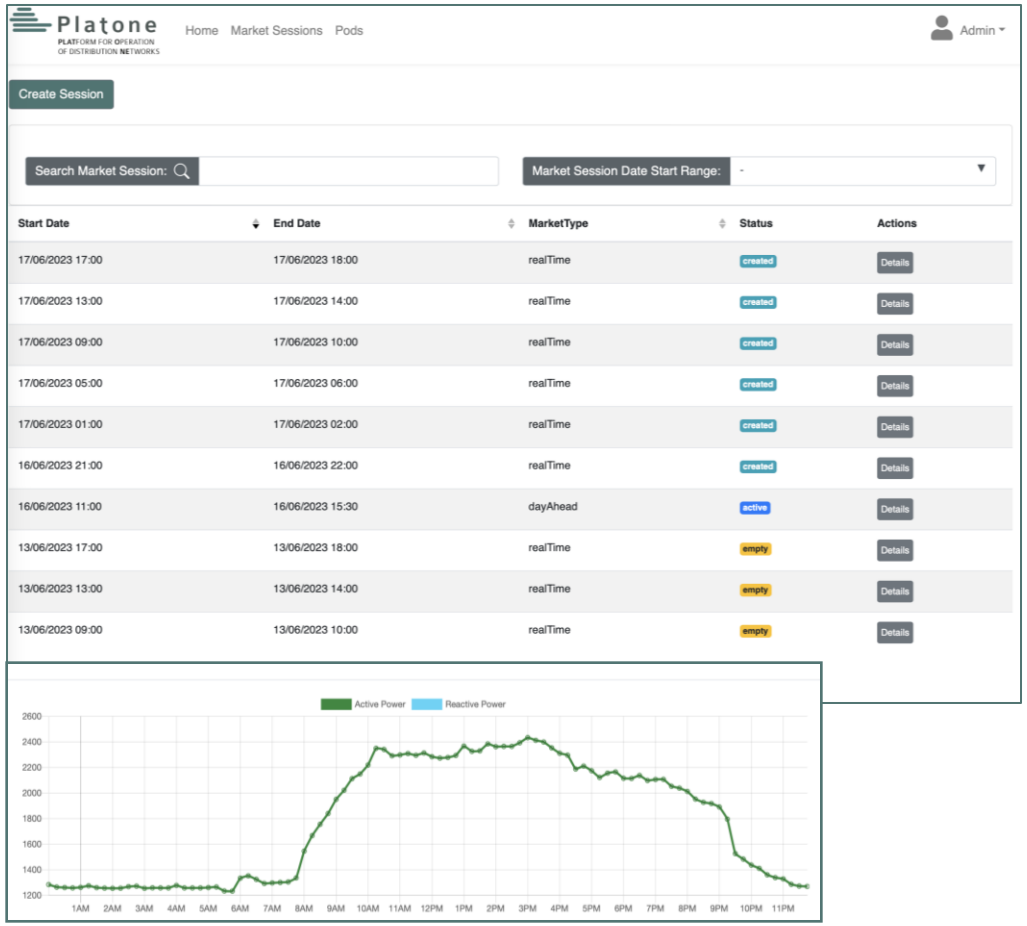
- **Collect flexibility requests and offers** from Market Participants
- **Calculate and share Market Results**, matching requests and offers
- **Validate flexibility services** and **perform settlement based on tokenization** mechanism



Main Results

Web platform a **Fair and Transparent Day-ahead and Intra-day Flexibility Market**, available to multiple Market Participants (TSO, DSO, Aggregator, Customers)

Blockchain Technology for the **Certification of Market Operations** (Offers, Requests and Results) and **innovative Settlement** phase based on **Tokenisation mechanisms**



Maturation towards Italian Flexibility Market RomeFlex

RomeFlex Evolution - Market Interface Platform

RomeFlex: an advanced and inclusive Local Flexibility Market serving all users in the City of Rome managed by Areti and in collaboration with GME.

MIP is in charge of:

- Receive **flexibility requests and offers from DSOs and BSPs**
- Interface with the **GME market platform, which processes the market results** and transmits them to the MIP
- **Share market results** with other platforms (SetPoint)
- **Validate the availability and activation of flexibility services**, providing the results to GME for economic settlement.
- **Certify all market data** (requests, offers, results) on blockchain
- Offer an innovative **settlement service based on Smart Contracts and tokens** to incentivize and engage customers.

Thank you for your attention.

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