



Enershare

The Energy Data Space for Europe

The Enershare Reference Architecture

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Contributions

Approach towards Reference Architecture

- Reference Architecture that hybridizes SGAM with IDSA and GAIA-X
- Create and evolve building blocks of IDSA-compliant components for interoperability, trust, governance and data value (across-energy and cross-sector use cases)
- Prepare the ground for the common European energy dataspace helping to align relevant initiatives and contribute to standardization

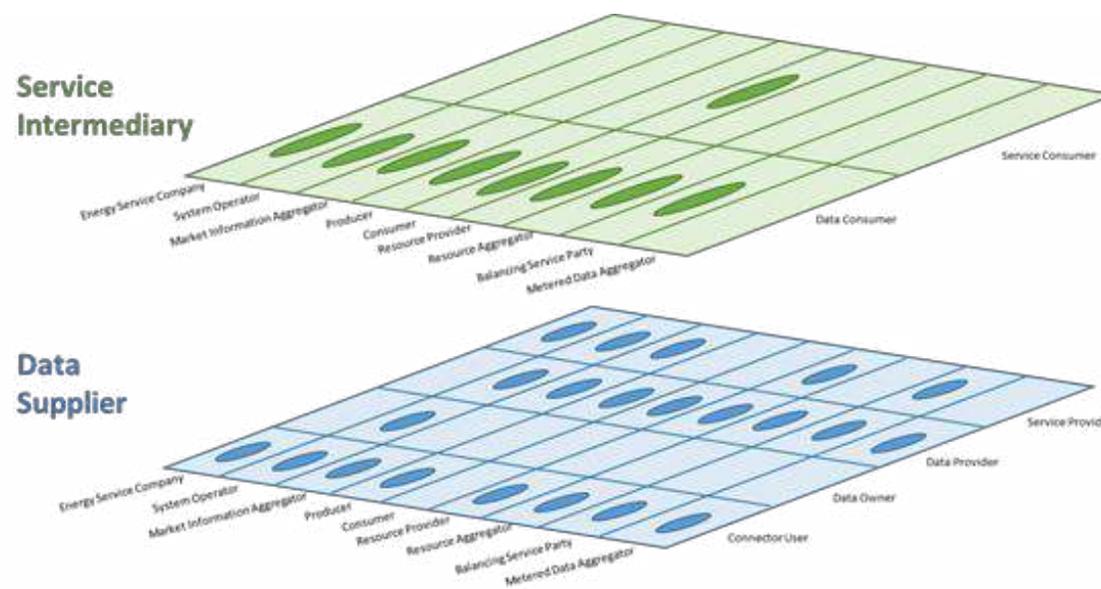
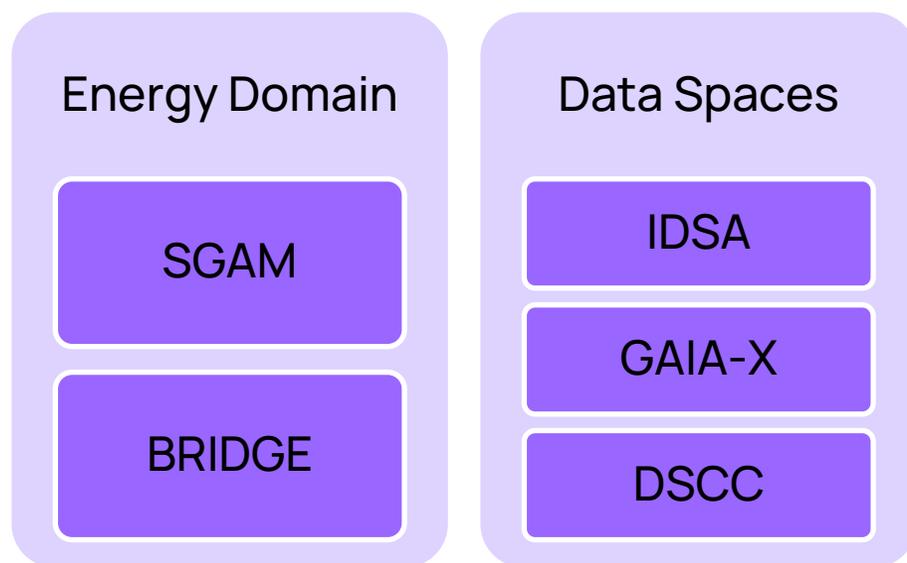


Figure 1: Harmonised Electricity Market Role Model entities and their mapping to Energy Domain Data roles

Alignment with Standards

- **Challenges**
 - Monitoring existing standards or upcoming standards for alignment
 - Defining specific needs in upcoming standards
- **Best practices and guidelines for reference architectures:** ISO/IEC JTC1/AG8 Draft standing document
- **Policy and behavioural interoperability:** ISO/IEC 21823-5
- **Trustworthiness Standards**
 - ISO/IEC 5723 Trustworthiness – vocabulary
 - ISO/IEC PWI 5957 Trustworthiness – Reference architecture
 - ISO/IEC PWI 9814 Trustworthiness – Overview and concepts
 - ISO/IEC PWI 18149 Trustworthiness – Ontology
- **Cybersecurity and Privacy Standards**
 - CEN-CENELEC standards on RED
 - ISO/IEC 5181 Data provenance
 - ISO/IEC 27568 Security and privacy of digital twins
- **AI Standards**
 - CEN-CENELEC JTC21 work item on AI trustworthiness characterization
 - ISO/IEC 27090 Guidance for addressing security threats and failures in artificial intelligence systems



Enershare RA

- Derivation of required BBs
 - Use case descriptions
 - Focus on data and trusted exchanges
 - Alignment with standards
- Five horizontal layers
 - Business
 - Function
 - Information
 - Communication
 - Component
- Vertical split
 - Local functionalities for specific use cases

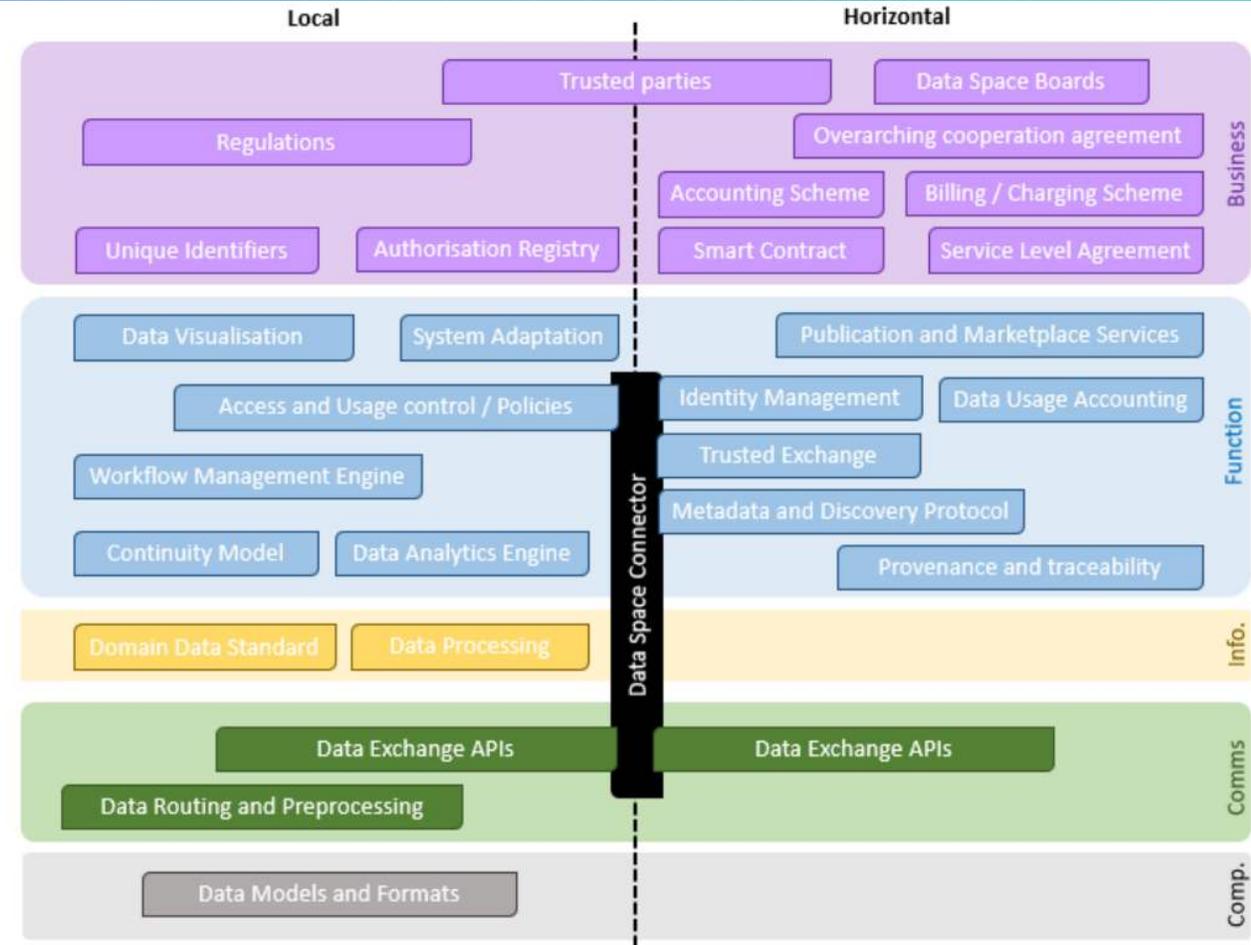


Figure 2: Enershare Reference Architecture

Digital Twins in Enershare

Integrating Digital Twins in Data Spaces

- Contributions to Joint Publication
 - Guidance for the Integration of Digital Twins in Data Spaces
- Digital Twins in Enershare:
 - Digital Twin for optimal data-driven Power-to-Gas optimal planning
 - Digital Twin based O&M algorithms and generation of synthetic failures data
 - Digital Twin for flexible energy networks



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Guidance for the Integration of Digital Twins in Data Spaces

Joint Publication

2024

Joint publication

 Alliance for IoT and Edge Computing Innovation	WG Standardisation Task Force High Level Architecture
 BDVA BIG DATA VALUE ASSOCIATION	BDVA Task force Data space, Task force Standards and benchmarking
 StandICT.eu	TWG – Digital Twins
 HSbooster.eu Horizon Standardisation Booster	

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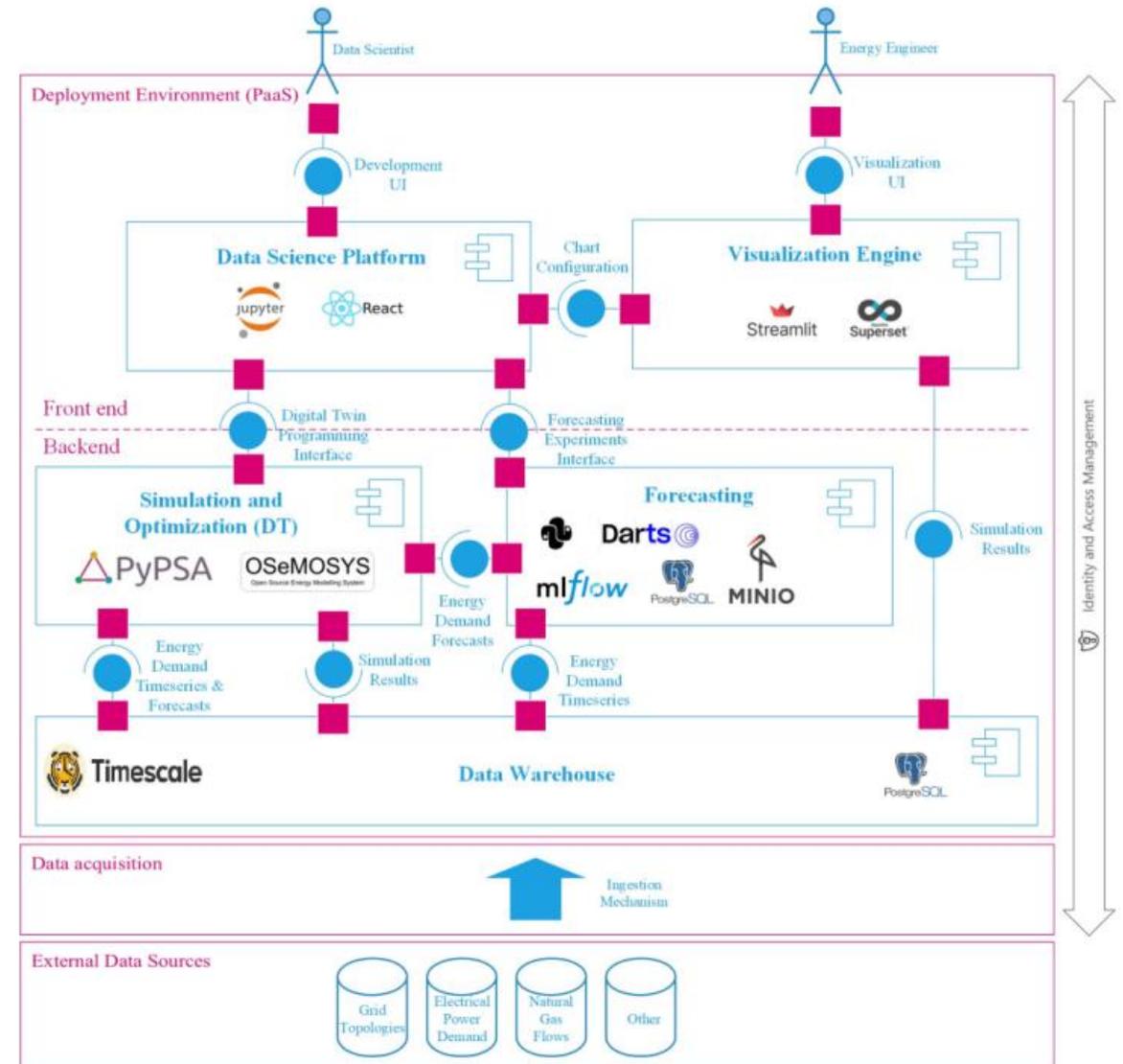
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Digital Twins in Enershare

Digital Twin for optimal data-driven Power-to-Gas optimal planning

- Enable multi-resolution simulations involving power-toGas (P2G) technologies and regenerative hydrogen fuel cells.
- Optimize the use of surplus renewable energy for green hydrogen production through electrolysis.



Digital Twins in Enershare

- Digital Twin for flexible energy networks
 - Simulation tool DPsim
 - Acquisition of measurement points from a real electrical network
 - Replicate the behavior of the network in real time settings
 - Most up-to-date status information that becomes available to make the calculations.
- Digital Twin based O&M algorithms and generation of synthetic failures data
 - Improvement the O&M of wind turbines.
 - Integrate anomaly detection functionality for the gearbox, electric generator and the hydraulic pitch system, based in simulation models.

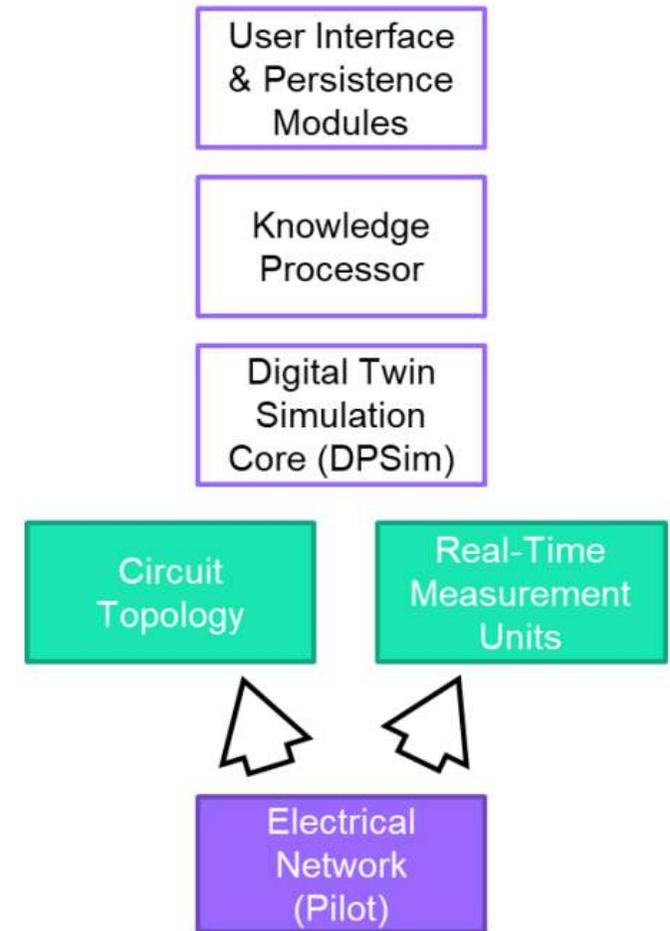


Figure 3: High-level architecture of the DT for flexibility in electrical networks

Thank you!

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