WG Data Management
Action #2 – EU data exchange reference architecture

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BRIDGE - Event on the EU INDUSTRY WEEK
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Agenda

- Overview of BRIDGE workflow & motivation
- Survey on Interoperable Data Exchange Platforms
  - Approach
  - Survey results
- Cross-sector integration
- Final remarks
Motivation

“An electricity network that can *intelligently* integrate the actions of all users connected to it – generators, consumers and those that do both – in order to *efficiently* deliver sustainable, *economic* and *secure* electricity supplies”
Overview of the workflow

- Develop conceptual European data exchange model, involving elements like functionalities, governance, data access, open source, standardisation needs.
- Define “interoperability of platforms” and identify platforms with European ambition and potential for replicability and scalability.
- Ensure GDPR compliance and data owner's control over their data.
Landscape of data exchange platforms

<table>
<thead>
<tr>
<th>Project name</th>
<th>Data exchange platform</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTERFACE</td>
<td>IEGSA Platform, enabling coordination and the more robust operation of the power systems</td>
</tr>
<tr>
<td>EU-SysFlex</td>
<td>Platform scaling and replicating Estfeed distributed solution and agnostic to specific business processes</td>
</tr>
<tr>
<td>FLEXIGRID</td>
<td>FLEXIGRID DEP based on ATOS FUSE</td>
</tr>
<tr>
<td>GIFT</td>
<td>Enterprise Service Bus based DEP</td>
</tr>
<tr>
<td>InterConnect</td>
<td>Platform focusing on semantic interoperability</td>
</tr>
<tr>
<td>Platoon</td>
<td>Platoon DEP COSMAG compliant</td>
</tr>
<tr>
<td>SYNERGY</td>
<td>SYNERGY Big Data-driven Energy-as-a-Service (EaaS)</td>
</tr>
<tr>
<td>CoordiNet</td>
<td>CoordiNet Platform grid monitoring &amp; operation, market operation and aggregation &amp; disaggregation</td>
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<tr>
<td>BD4OPEM</td>
<td>DEP that leverages smart grid big data</td>
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<tr>
<td>TDX-ASSIST</td>
<td>Cloudera platform exploiting ECCo SP</td>
</tr>
<tr>
<td>ebalance-plus</td>
<td>concept of distributed data storage (middleware) that is deployed on management units</td>
</tr>
<tr>
<td>RENAISSANCE</td>
<td>DEP based on Atos</td>
</tr>
</tbody>
</table>
Interoperable Data Exchange Platforms

- General information
- Project specific
- Envision/insights

- Organizational
- Informational
- Technical

- ✓ Mapping of results on SGAM
  ✓ Methodological approach applied
  ✓ Standardization of processes & functionalities

11 analytical contributions received
Survey Results

- Phase of implementation

<table>
<thead>
<tr>
<th>Phase of Implementation</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not yet developed. Methodology is under discussion.</td>
<td>40.00%</td>
</tr>
<tr>
<td>Not yet developed. Methodology is thoroughly defined.</td>
<td>20.00%</td>
</tr>
<tr>
<td>Under development, but still space for discussion, if needed.</td>
<td>20.00%</td>
</tr>
<tr>
<td>Well advanced.</td>
<td>0.00%</td>
</tr>
<tr>
<td>Completed.</td>
<td>20.00%</td>
</tr>
</tbody>
</table>
Survey Results

Standardization of processes in data exchange platforms

Data governance processes
- Data collection & governance
- Data transfer/sharing
- Data source integration
- Authentication of data users
- Data logs
- Service provider integration
- Personal data handling
- Consent management

Flexibility processes
- Flexibility prediction
- Flexibility activations
- Flexibility baseline calculation
- Flexibility bidding
- Flexibility prequalification
- Flexibility verification
Mapping Results on SGAM Layers

- Business layers (e.g. regulatory framework -local, national and EU level-)
- Economic/regulatory (i.e. political and economic perspective)
- Role-oriented/business procedures (to avoid lock-in effects)
- Business objectives (i.e. strategic and tactical objectives)

- Functions and services including their relationships and interactions
- Data management (i.e. semantics, data profiling)
- Information and Communication Technologies (e.g. exchange protocols, authentication, syntactic)
- Software APIs (e.g. power flows, state-estimation engines, optimizers)
Survey Results

Layers of interoperability features lacking utmost

Comparative analysis

- Effort
- Lack
Survey Results

- Methodological approach applied
Survey Results (insights)

- Pillars envisaged as the most significant towards common architecture

- Open Source solutions
- Free-flow of data and common consensus among entities for the treatment of data and meta-data
- Use of repositories not limited to standards
- Establish a novel EU entity for the interoperability management.
- Alignment of network codes (cross-border, national towards EU standardization)
- Deployment of secure block-chain, IoT based solution enhanced with cyber-security features.
Survey results (insights)

• **100%** of participants find beneficial a common architecture

<table>
<thead>
<tr>
<th>Benefits from the enhanced cooperation between actors in electricity sector: customers (engagement, improved Quality of Service)</th>
<th>Benefits based on market parties coordination (facilitate Demand Side Flexibility, integration of DER)</th>
<th>Benefits based on TSO/DSO coordination: optimal decision-making leads to lower operational costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>100,00%</td>
<td>90,91%</td>
<td>90,91%</td>
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</tbody>
</table>

• Participants:
  – *Decreased ICT development and maintenance costs,*
  – *the whole electricity data value chain at multiple layers*
  – *Complex task (investments, effort), actors should be open-minded -> increased cooperation*
  – *Benefits for technology providers (applicability across EU), for tech procurers*
Preliminary results (insights)

Limited standards or need for advances/updates

Competition among vendors/suppliers

Vulnerability to cyber-attacks

unwillingness among players to exchange private data and models due to privacy issues
Cross-sector integration

- The current energy sector is: multi-carrier energy systems:
  - Electrical + Natural Gas + district heating utilities

- Dependencies among sector due to seasonality and variability effects

- Fusion of sensory devices and ICT by the utilities (e.g., electricity, gas, heating, water)

Interoperable data exchange platforms