# BRIDGE Webinar – EU Industry days 2021
## Enabling the interoperability of flexibility assets


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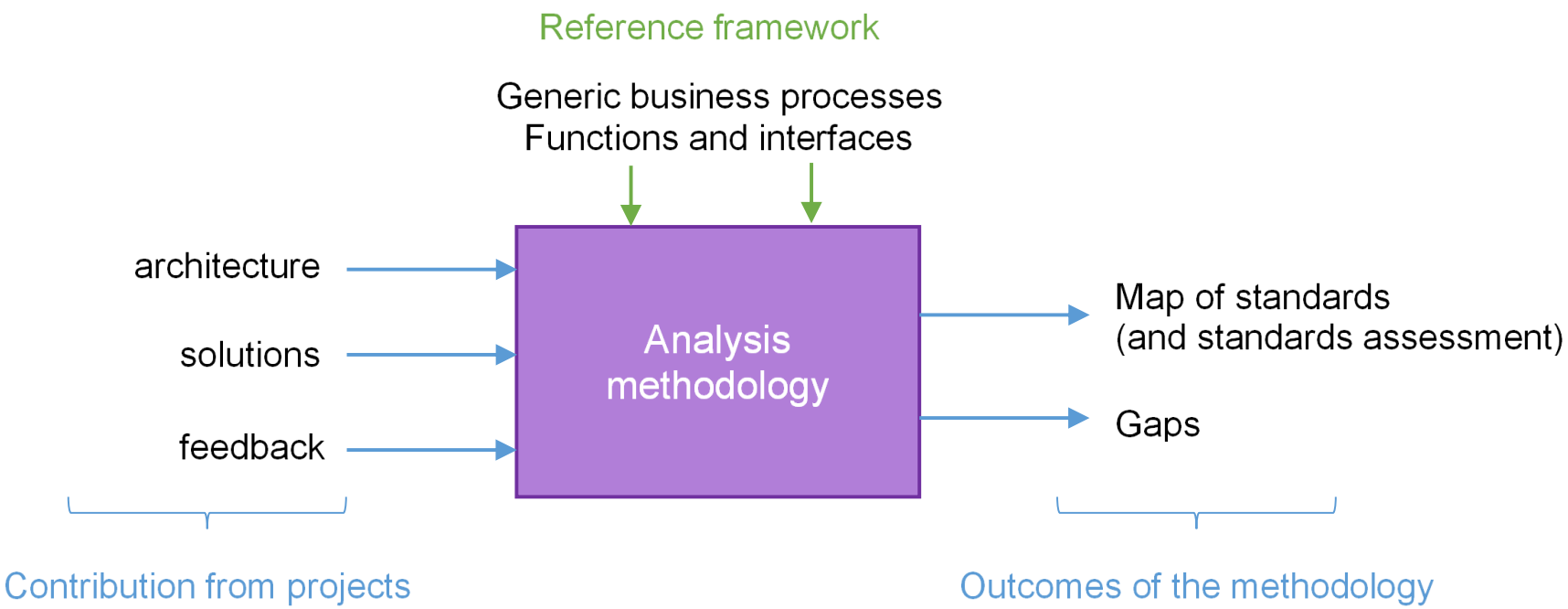
# BRIDGE work on interoperability of flexibility assets: purpose and approach

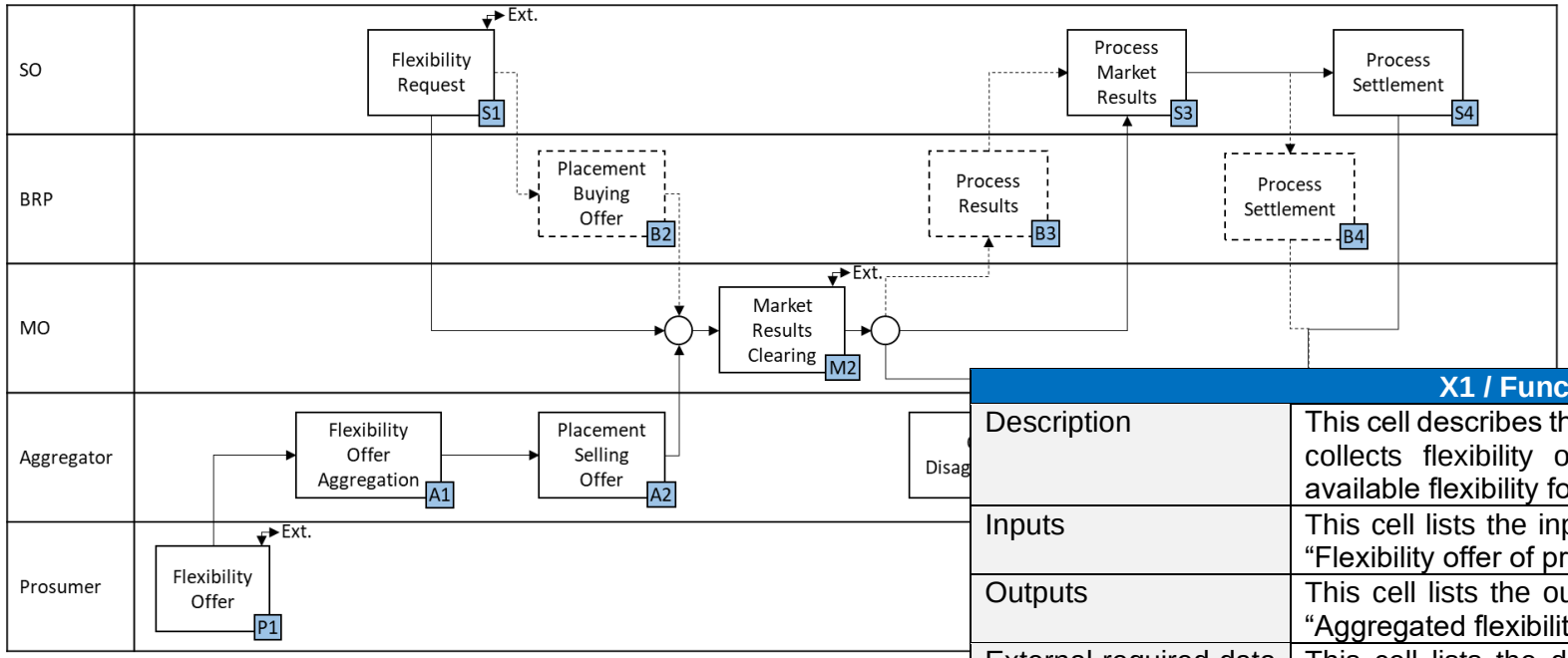
- Objectives (defined during BRIDGE GA 2020):
  - Enable interoperability of flexibility assets by maintaining a **set of recommendations, best practices and possibly tools**
  - Focus on interoperability at **function layer** (system use-cases, services) and **information layer** (semantic interoperability, data models …)
  - Cover the **full flexibility chain**, from the bidding/negotiation/activation of flexibility to the control of the flexibility assets on the field
  - Rely on **inputs from the BRIDGE projects** when it is it the most relevant considering their timeline
  - Define and run a stable methodology that will be used during **several years**
- Approach
  - Methodology that allows to analyse use-cases and system implementation of BRIDGE projects
  - Reference framework as a common ground to map projects' use-cases and implementation
  - Analysis of a first set of 4 projects to demonstrate the methodology

# Methodology




Color legend: stable – update in case of novel use-cases – regular update to include inputs from new projects

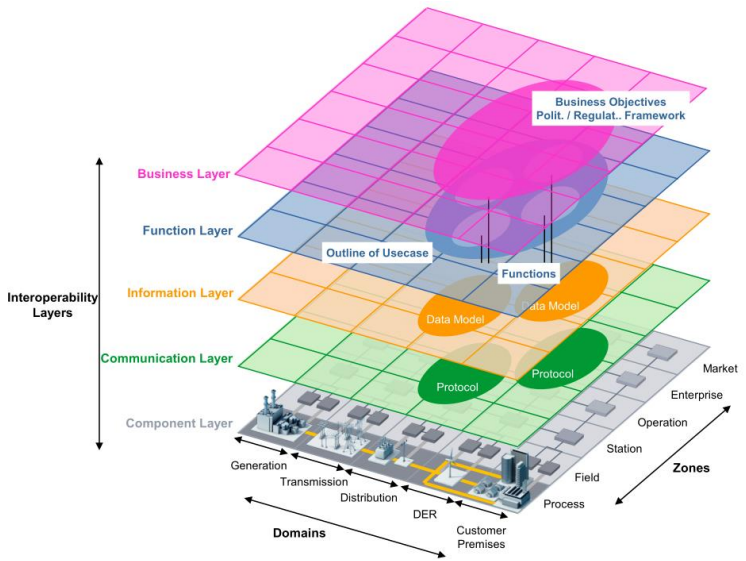
# Reference framework ⇒ Generic business processes



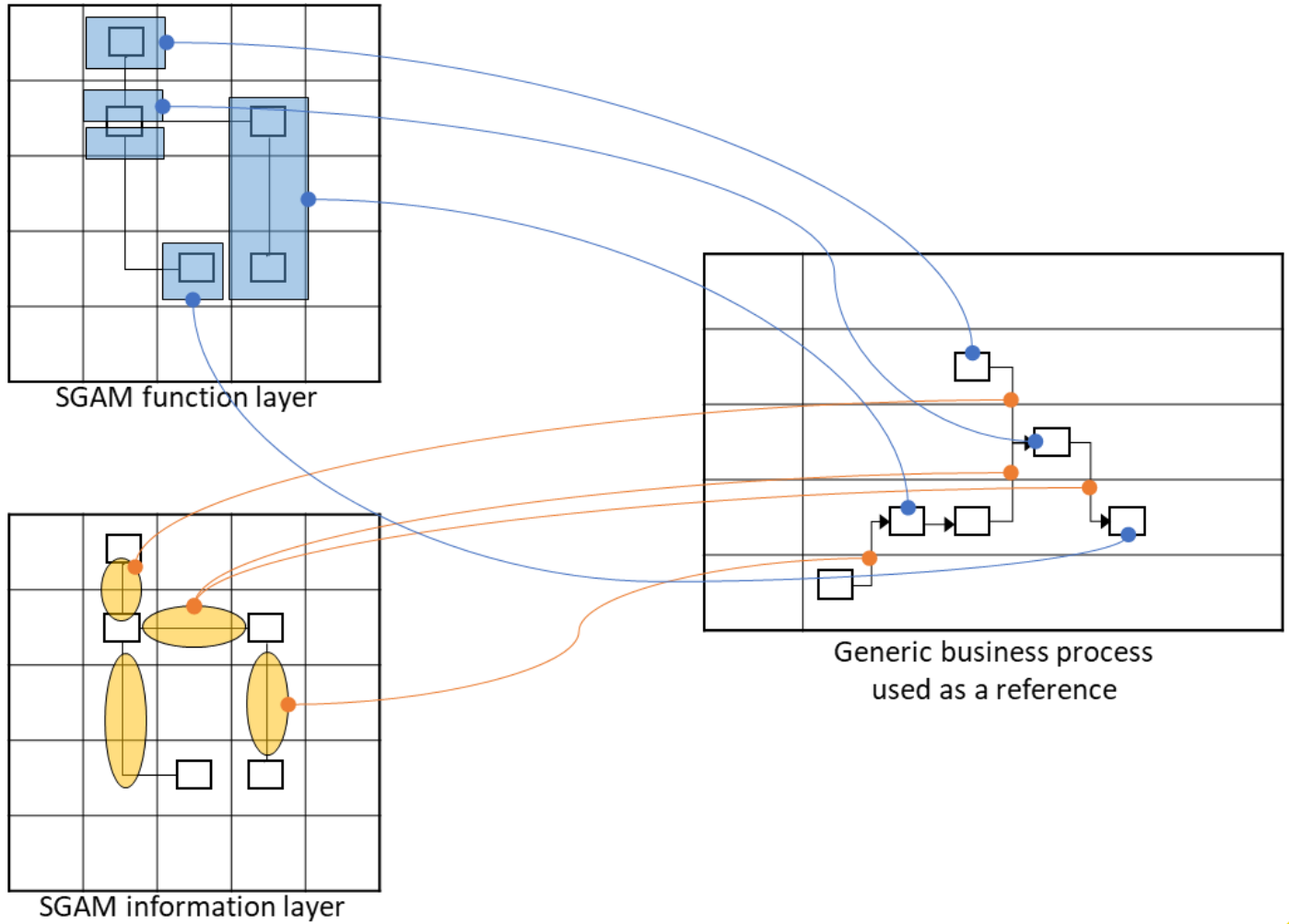

| X1 / Function name | |
|---|---|
| Description | This cell describes the purpose of the function, e.g. “the Aggregator collects flexibility offers of all prosumers and calculates the available flexibility for its portfolio” |
| Inputs | This cell lists the inputs received from the previous function, e.g. “Flexibility offer of prosumer(s)” |
| Outputs | This cell lists the outputs provided to the following function, e.g. “Aggregated flexibility” |
| External required data or command | This cell lists the data or commands that are not linked to the previous or following functions but are required to realize the function. An example of external data could be “weather data”, “metering data”. An example of command could be “control of |
| Decomposition functions/subfunc | |

| X1 → Y1 | |
|---|---|
| Purpose | This cell describes the purpose of the information exchange, e.g. “inform Aggregator about possible flexibility on Prosumer side” |
| Involved roles | This cell lists the involved roles |
| List of exchanged data | This cell lists the exchanged data, e.g. “Flexibility offer” |

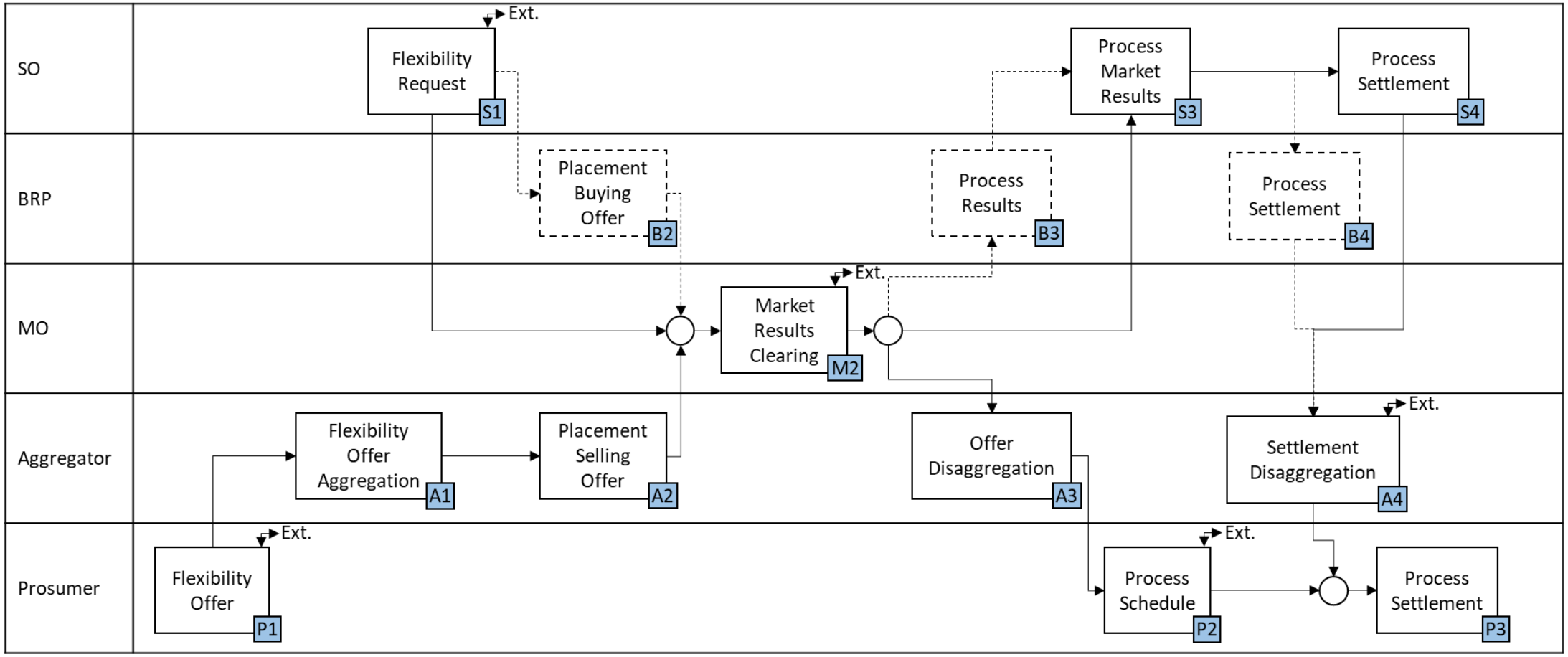
# Mapping between system implementation and GBPs




*Smart Grid Architecture Model*
*(as defined by IEC TS 63200)*

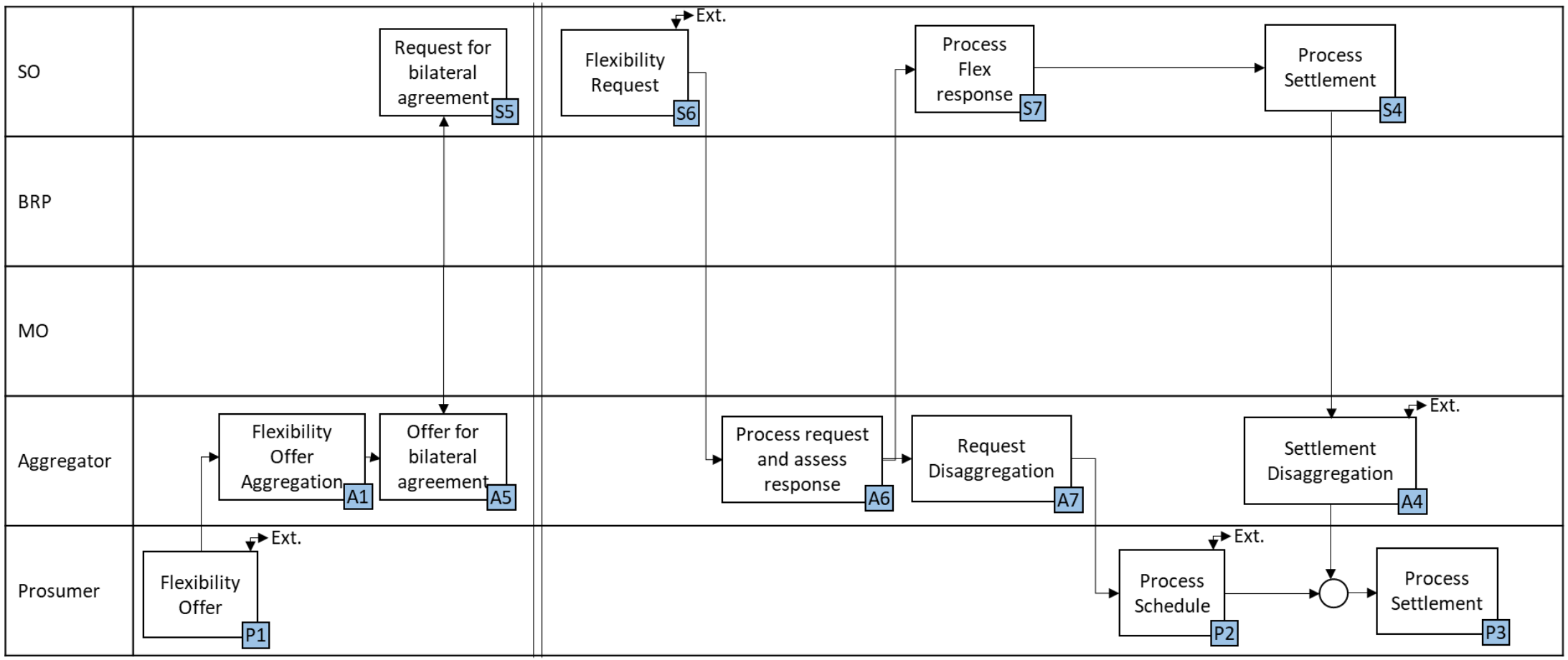


# Reference framework – 3 Generic Business Processes so far



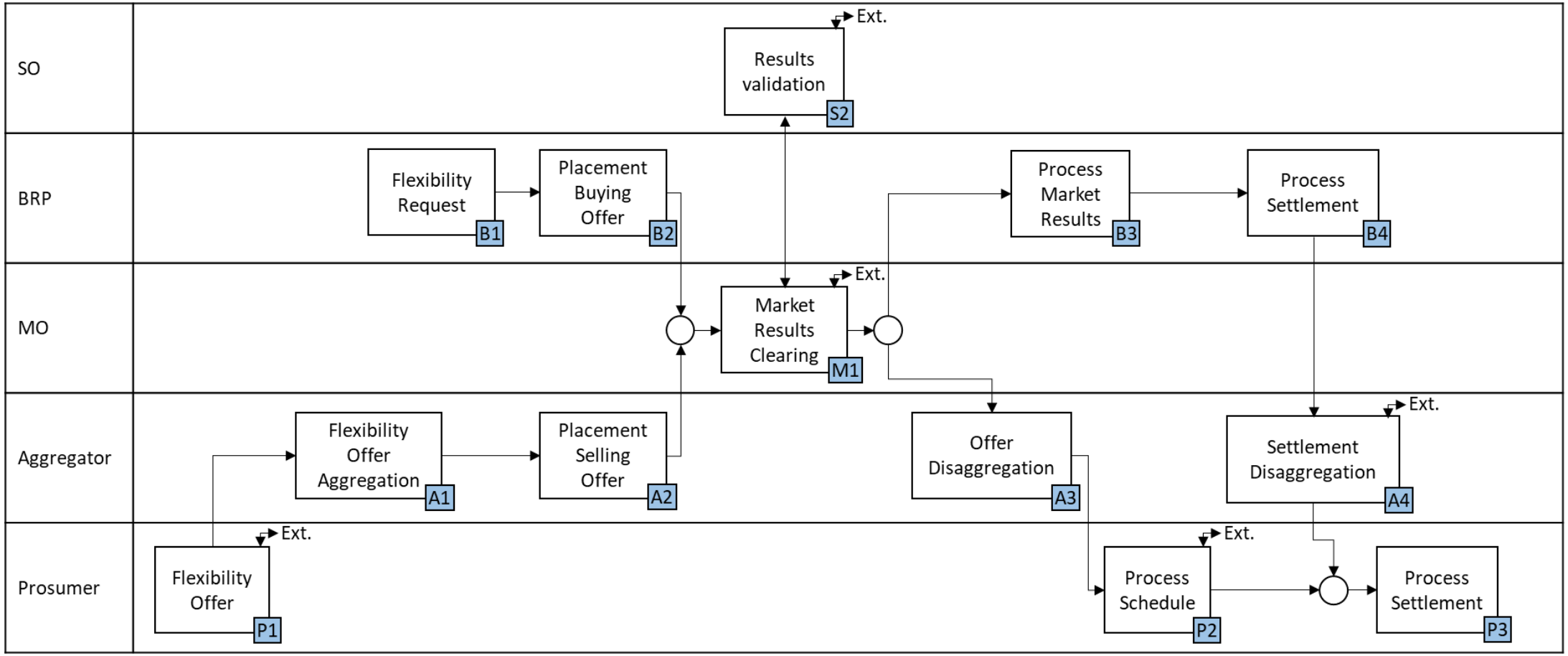

GBP1: Flexibility for SO through open market

# Reference framework – 3 Generic Business Processes so far




GBP2: Flexibility for SO via prior bilateral agreement

# Reference framework – 3 Generic Business Processes so far




GBP3: Flexibility for BRP portfolio optimisation

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# Analysis

- 7 uses-cases analysed, from 4 projects

| Project | UC # | UC name | Mapped GBP |
|---|---|---|---|
| GIFT | 1 | Congestion avoidance | 1 (SO open market) |
| FEVER | 1 | Advanced network congestion management considering DER & grid flexibility | 1 (SO open market) |
| FEVER | 14 | Form a first example of a regional flexibility exchange model | 3 (BRP portfolio optimization) |
| FLEXIGRID | 6 | Use case 6 | 2 (SO bilateral agreement) |
| FLEXIGRID | 8 | Use-case 8 | 1 (SO open market) |
| iELECTRIX | EDIS | Voltage management | 2 (SO bilateral agreement) |
| iELECTRIX | Güssing | Voltage management | 2 (SO bilateral agreement) |

- 5 analysis performed
  - 1/ List of relevant standards/solutions per GBP interface
  - 2/ List of implemented extensions/modifications per standard
  - 3/ List of identified gaps per GBP interface
  - 4/ List of system functions per GBP function
  - 5/ List of system actors per use-case and GBP actor

# Outcomes: 1/ List of relevant standards/solutions per GBP interface

- Objectives
  - Offer a catalogue of relevant standards per interface;
  - Identify if several standards are in competition for one interface and which standards are the most used
  - Identify which interfaces led to the use of internal or proprietary solutions
- Content

| Interface | List of solutions/standards (occurrence) | Number of internal or proprietary[1] |
|---|---|---|
| P1 → A1 | FlexOffer (3)<br>IEC 61850 (1)<br>IEC 62056-5-3 (1)<br>openHAB (1) | |
| A1 → A2 | CIM (1) | 1 |
| A1 → A5 | IEC 61158-6-15 (1)<br>IEC 62956-6-2 (1)<br>IEC 60870-5-104 (1) | 1 |
| A2 → M2 | FlexOffer (2) | 1 |
| S1 → B2 | | |
| B2 → M2 | | |
| S1 → M2 | CIM (1)<br>FlexOffer (1) | |

*(extract)*

# Outcomes: 2/ List of implemented extensions/modifications per standard

- Objectives
  - Feed standards development by highlighting needs from standards' users and possible solutions
  - Allow reusability of extension/modifications done by previous projects, by pinpointing which project did which extension
- Content

| Standard | Project / UC | Extension/modification/deviation |
|---|---|---|
| FlexOffer | FEVER | Needed extension to support settlement information |
| CIM | GIFT | Addition of readingQuality to Reading class<br>ReadingType moved from Reading to MeterReading |
| | FLEXIGRID | Adding type of economics (typeOfEconomics) indicating whether economics option is set to 1-pricing signal or 2-number of activation |
| | FLEXIGRID | Addition of information about used activation option (typeOfEconomicsApplied) |
| | FEVER | Work ongoing. Modification in Meas package might be identified. |
| OCPP | | |

*(extract)*

# Outcomes: 3/ List of identified gaps per GBP interface

- Objectives
  - Feed standardization roadmap by identifying standardization gaps, i.e. interfaces for which a standard is missing
  - Feed standards development by highlighting needs from standards' users
- Content

| Interface | Project / UC | Gaps identified |
|---|---|---|
| P1 → A1 | GIFT | No standard solution for flexibility offer data exchange ? using open specification FlexOffer |
| A1 → A2 | | |
| A1 → A5 | iELECTRIX (EDIS) | The IEC 61158-6-15 does not specify<br>o Network topologies,<br>o Specification of ethernet-based and fibreoptic communication and<br>o Specification of the wiring and optical fibres.<br>Hence it has been combined with IEC 61918 |
| A2 → M2 | | |
| S1 → B2 | | |
| B2 → M2 | | |

*(extract)*

# Outcomes: 4/ List of system functions per GBP function

- Objectives
  - Show differences in system implementation of the GBP functions, based on the system function names
  - Identify the GBP functions that are rarely or never implemented in the systems
- Content

| Function | System functions (Project/UC) |
|---|---|
| S1 / Flexibility Request | Forecast (GIFT)<br>Requesting flexibility services (FEVER 1)<br>Flexibility request (FLEXIGRID 8) |
| S2 / Results validation | |
| S3 / Process Market Results | Flexibility trading (FEVER 1)<br>Critical event prevention (FEVER 1) |
| S4 / Process Settlement | Flexibility trading (FEVER 1)<br>Process settlement (FLEXIGRID 8)<br>Sendpoint sent to BESS controller (iELECTRIX EDIS)<br>Sendpoint sent to BESS inverter and dispatchable loads (iELECTRIX Güssing) |
| S5 / Request for bilateral agreement | |

*(extract)*

# Outcomes: 5/ List of system actors per use-case and GBP actor

- Objectives
  - Show differences in system implementation of the GBP actors, based on the system actors names;
  - Identify the GBP actors that are rarely or never implemented in the systems;
  - Prepare a possible catalogue of solutions existing for each GBP actor, to be reused as part of the exploitation of each project results, e.g. for future projects or pilots or commer
- Content

**GBP1 "SO flexibility through open market" use-cases**

| Business role | GIFT | FEVER 1 | FLEXIGRID 8 |
|---|---|---|---|
| SO | Grid observability system<br>+ VPS module "Grid operation" | DSO Toolbox<br>Flexibility Service Consuming Agent (FSCA)<br>Supervisory Control and Data Acquisition system for Distribution System (DS-SCADA)<br>Advanced Metering Infrastructure (AMI) | EDYNA (DSO) |
| BRP | | | |
| MO | VPS module "Flexibility market" | Flexibility Trading Platform (FTP) | |
| Aggregator | VPS module "Flexibility manager" | Flexibility Management System (FMS) | Smart Grid Controller (SGC) |

*(extract)*

# Conclusion of the analysis

- Based on 1/ List of relevant standards/solutions per GBP interface
  - Catalogue started but largely incomplete ⇒ more projects needed
- Based on 2/ List of implemented extensions/modifications per standard
  - Few extensions/modifications identified
- Based on 3/ List of identified gaps per GBP interface
  - Few gaps identified, but sometimes not consistent with 1/ Catalogue
- Based on 4/ List of system functions per GBP function
  - Only 7 use-cases from 4 projects ⇒ results not significant enough so far
- Based on 5/ List of system actors per use-case and GBP actor
  - Only 7 use-cases from 4 projects ⇒ results not significant enough so far

# Conclusions and next steps

- Conclusions
  - Methodology and reference framework defined
    - Based on 3 first Generic Business Processes
    - Common denominator between use-cases from different projects aiming the same business objectives
  - Outcomes:
    - Catalogue of standards, gaps, extensions, …
    - Mapping of system implementation (actors & functions) with business roles & use-cases
- Work to be continued in 2021:
  - Publish results on the EIRIE knowledge platform
  - Collect inputs from more BRIDGE projects
  - Improve the Reference framework by challenging/updating the existing GBPs and adding new GBPs
    - Based on the use-cases effectively implemented by BRIDGE projects
  - Collaborate with standardisation bodies to enable BRIDGE to provide feedback on standards based on the projects' experience

Thank you for your participation!

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