

# Description of data exchange use cases based on IEC 62559 methodology

---

D5.2



EU-**Sys**Flex

© Copyright 2020 The EU-SYSFLEX Consortium

<b>PROGRAMME</b>	H2020 COMPETITIVE LOW CARBON ENERGY 2017-2-SMART-GRIDS
<b>GRANT AGREEMENT NUMBER</b>	773505
<b>PROJECT ACRONYM</b>	EU-SYSFLEX
<b>DOCUMENT</b>	<b>D5.2</b>
<b>TYPE (DISTRIBUTION LEVEL)</b>	<input checked="" type="checkbox"/> Public <input type="checkbox"/> Confidential <input type="checkbox"/> Restricted
<b>DUE DELIVERY DATE</b>	October 2020 (M36)
<b>DATE OF DELIVERY</b>	13/10/2020
<b>STATUS AND VERSION</b>	V1 - FINAL
<b>NUMBER OF PAGES</b>	311
<b>WORK PACKAGE / TASK RELATED</b>	WP5 / T5.2
<b>WORK PACKAGE / TASK RESPONSIBLE</b>	Kalle Kukkk / Eric Suignard
<b>AUTHOR (S)</b>	EDF R&D (Eric Suignard, Ricardo Jover) innogy (Wiebke Albers, Jan Budke) Elering (Kalle Kukkk)

## DOCUMENT HISTORY

<b>VERS</b>	<b>ISSUE DATE</b>	<b>CONTENT AND CHANGES</b>
V1	13/10/2020	Report submitted to EC

## DOCUMENT APPROVERS

<b>PARTNER</b>	<b>APPROVER</b>
Elering	Kalle Kukkk – Work Package Leader
EDF	Marie-Ann Evans – Technical Manager
EirGrid, EDF, SONI, VITO, innogy, Elering, EDP, EURACTIV, Zabala	EU-SysFlex Project Management Board
EIRGRID	John Lowry – Project Coordinator

## TABLE OF CONTENTS

<b>EXECUTIVE SUMMARY .....</b>	<b>7</b>
<b>1. INTRODUCTION .....</b>	<b>12</b>
1.1 BACKGROUND .....	12
1.2 OBJECTIVES.....	12
1.3 STRUCTURE OF THIS DELIVERABLE.....	13
<b>2. DEFINITIONS .....</b>	<b>14</b>
<b>3. METHODOLOGY .....</b>	<b>15</b>
3.1 IEC 62559 .....	15
3.2 DATA EXCHANGE SYSTEM USE CASES' DEPENDENCIES WITHIN EU-SYSFLEX PROJECT.....	16
3.3 PRINCIPLES FOR DATA EXCHANGE SYSTEM USE CASES MODELLING .....	17
<b>4. OVERVIEW OF DATA EXCHANGE SYSTEM USES CASES.....</b>	<b>18</b>
4.1 RELATED BUSINESS USE CASES .....	18
4.2 IDENTIFIED LIST OF DATA EXCHANGE SYSTEM USE CASES .....	23
4.3 ANALYSIS OF SYSTEM USE CASES.....	25
4.3.1 SCOPE AND OBJECTIVES OF SYSTEM USE CASES .....	25
4.3.2 SYSTEM ROLES .....	31
4.3.3 BUSINESS ROLES.....	33
4.3.4 CROSS-ANALYSIS OF ROLES AND SYSTEM USE CASES.....	38
4.3.5 BUSINESS OBJECTS .....	40
4.3.6 COMPARISON OF ALTERNATIVE SYSTEM USE CASES.....	42
4.3.7 PERSONAL DATA MANAGEMENT .....	45
<b>5. COMPARISON OF DATA EXCHANGE SYSTEM USE CASES WITH EU-SYSFLEX DEMONSTRATORS' SPECIFICATIONS.....</b>	<b>47</b>
<b>6. CONCLUSION .....</b>	<b>50</b>
<b>7. COPYRIGHT .....</b>	<b>52</b>
<b>8. BIBLIOGRAPHY.....</b>	<b>53</b>
<b>9. ANNEX .....</b>	<b>54</b>
9.1 AGGREGATE ENERGY DATA .....	54
9.2 ANONYMIZE ENERGY DATA .....	62
9.3 AUTHENTICATE DATA USERS .....	70
9.4 CALCULATE FLEXIBILITY BASELINE.....	83
9.5 COLLECT ENERGY DATA.....	95
9.6 ERASE AND RECTIFY PERSONAL DATA.....	110
9.7 EXCHANGE DATA BETWEEN DERS AND SYSTEM OPERATORS.....	123
9.8 MANAGE ACCESS PERMISSIONS .....	134
9.9 MANAGE DATA LOGS .....	149
9.10 MANAGE FLEXIBILITY ACTIVATIONS - ALTERNATIVE 1.....	158
9.11 MANAGE FLEXIBILITY ACTIVATIONS - ALTERNATIVE 2.....	173
9.12 MANAGE FLEXIBILITY BIDS – ALTERNATIVE 1.....	186
9.13 MANAGE FLEXIBILITY BIDS - ALTERNATIVE 2 .....	214
9.14 MANAGE SUB-METER DATA .....	235
9.15 PREDICT FLEXIBILITY AVAILABILITY.....	252
9.16 PROVIDE LIST OF SUPPLIERS AND ESCOS.....	275
9.17 TRANSFER ENERGY DATA .....	287
9.18 VERIFY AND SETTLE ACTIVATED FLEXIBILITIES .....	302

## LIST OF FIGURES

---

FIGURE 1: IEC 62559 USE CASE METHODOLOGY .....	15
FIGURE 2: USE CASE DEPENDENCIES AND ASSOCIATED WORK PACKAGES OF EU-SYSFLEX .....	16
FIGURE 3: SYSTEM ROLES DIAGRAM .....	33
FIGURE 4: BUSINESS ROLES DIAGRAM .....	37
FIGURE 5: BUSINESS OBJECTS DIAGRAM.....	41



## LIST OF TABLES

---

TABLE 1: “FLEXIBILITY” BUSINESS USE CASES OF EU-SYSFLEX .....	18
TABLE 2: “DATA” BUSINESS USE CASES OF EU-SYSFLEX .....	19
TABLE 3: CATEGORIES OF BUSINESS USE CASES.....	19
TABLE 4: CORRESPONDENCE BETWEEN “DATA” SYSTEM USE CASES AND SOME CATEGORIES OF BUSINESS USE CASES .....	23
TABLE 5: TABLE OF CORRESPONDENCE BETWEEN SYSTEM USE CASES AND DATA MANAGEMENT DEMONSTRATORS .....	24
TABLE 6: KEY SYSTEM ROLES FOR EXCHANGING DATA.....	31
TABLE 7: OTHER SYSTEM ROLES USED IN DATA EXCHANGE SYSTEM USE CASES .....	32
TABLE 8: BUSINESS ROLES INVOLVED IN DATA EXCHANGE SYSTEM USE CASES.....	34
TABLE 9: MATRIX OF CORRESPONDENCE BETWEEN SYSTEM USE CASES AND BUSINESS ROLES.....	38
TABLE 10: MATRIX OF CORRESPONDENCE BETWEEN SYSTEM USE CASES AND SYSTEM ROLES.....	39
TABLE 11: TABLE OF CORRESPONDENCE BETWEEN SYSTEM USE CASES AND BUSINESS OBJECTS .....	40
TABLE 12: ALTERNATIVES FOR “PREQUALIFICATION OF THE FLEXIBILITY SERVICE PROVIDERS AND THEIR FLEXIBILITIES” SCENARIO OF “MANAGE FLEXIBILITY BIDS” SYSTEM USE CASE.....	43
TABLE 13: ALTERNATIVES FOR “BIDDING PROCESS” SCENARIO OF “MANAGE FLEXIBILITY BIDS” SYSTEM USE CASE.....	44
TABLE 14: ALTERNATIVES FOR “MANAGE FLEXIBILITY ACTIVATION” SYSTEM USE CASE .....	45
TABLE 15: CITIZEN RIGHTS .....	46
TABLE 16: DIFFERENCES BETWEEN DATA EXCHANGE SYSTEM USE CASES AND EU-SYSFLEX DEMONSTRATORS .....	47
TABLE 17: SYSTEMS IDENTIFIED AND AS IMPLEMENTED IN DATA MANAGEMENT DEMONSTRATORS .....	49

## ABBREVIATIONS AND ACRONYMS

aFRR	Automatic Frequency Restoration Reserve. Former Secondary or R2
BUC	Business Use Case
D	Deliverable
DEP	Data Exchange Platform
DER	Distributed Energy Resource
DSO	Distribution System Operator
DSR	Demand Side Response
EC	European Commission
eIDAS	Electronic IDentification Authentication and trust Services
ESP	Energy Service Provider
EU	European Union
EV	Electric Vehicle
ESCO	Energy Service Company
EU-SYSFLEX	Pan-European System with an efficient coordinated use of flexibilities for the integration of a large share of Renewable Energy Sources (RES)
GDPR	General Data Protection Regulation
FCR	Frequency Containment Reserves. Former Primary Reserve or R1
FP	Flexibility Platform
FSP	Flexibility Service Provider
GA	Grant Agreement
ID	Identification
IEC	International Electrotechnical Commission
IT	Information Technology
KPI	Key Performance Indicator
kV	Kilovolt
mFRR	Manual Frequency Restoration Reserve
MO	Market Operator
PMB	Project Management Board
OO	Optimisation Operator
RES	Renewable Energy Sources
RR	Replacement Reserve. Former Tertiary or R3
RSC	Regional Security Coordinator
SCADA	Supervisory Control And Data Acquisition
SGU	Significant Grid User
SUC	System Use Case
TSO	Transmission System Operator
UML	Unified Modelling Language
VPP	Virtual Power Plant
WP	Work Package

## EXECUTIVE SUMMARY

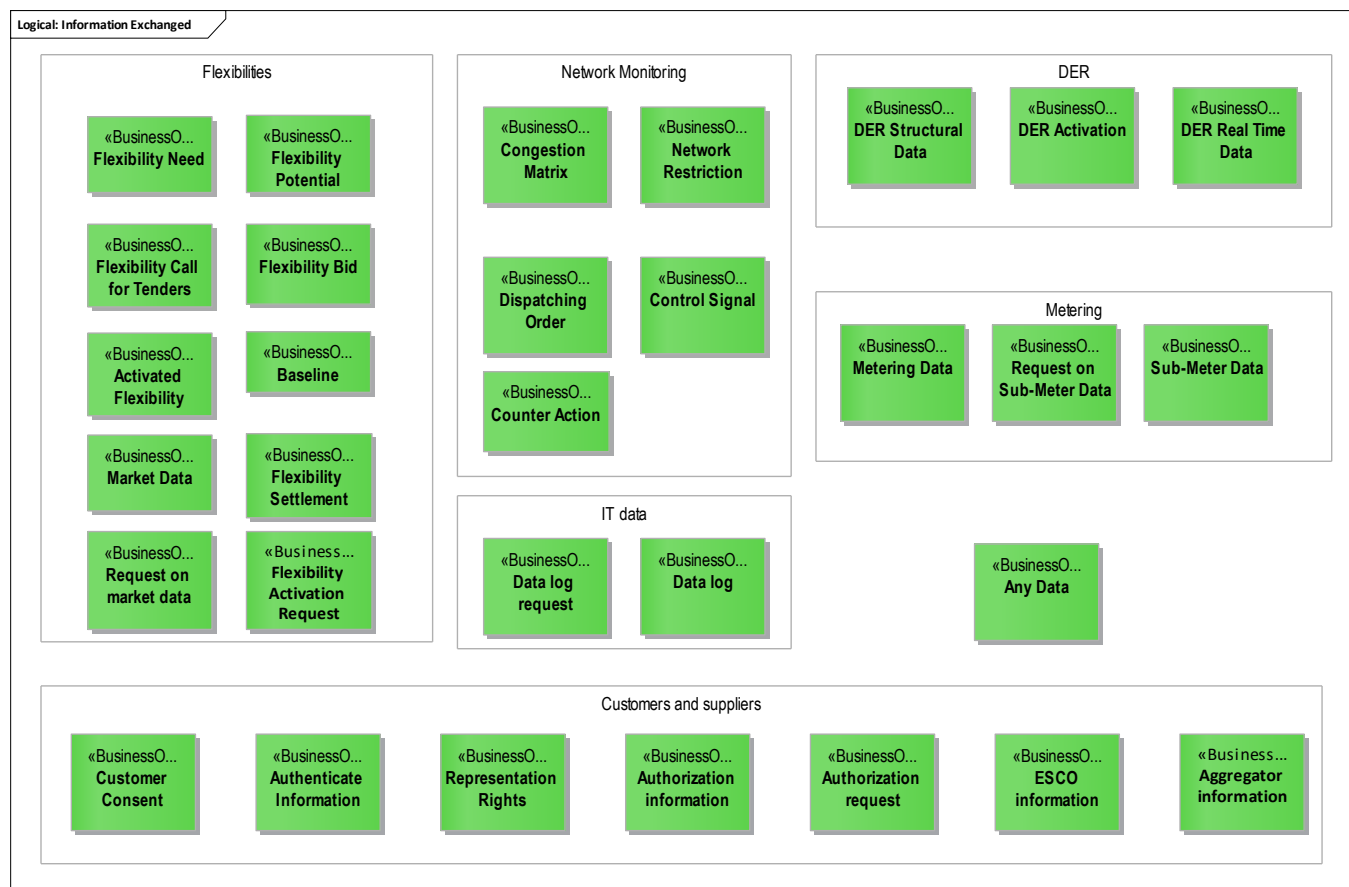
The EU-SysFlex project seeks to enable the pan-European power system to utilise efficient coordinated flexibilities in order to integrate a large share of renewable energy sources. As part of the EU-SysFlex project, Work Package 5 aims at providing recommendations for data management in flexibility services when applied in a large scale (on an IT perspective) and developing customer-centric data exchange models for flexible market design serving all stakeholders (transmission system operators (TSOs), distribution system operators (DSOs), suppliers, flexibility providers, energy service companies (ESCOs), etc.) and enabling data exchange across borders.

EU-SysFlex has identified a set of data exchange System Use Cases (SUC) and analysed most of them in detail according to a standardized UML (Unified Modelling Language) method. Some lessons learned were drawn, in particular on functionalities and key roles of several System Roles, cross-border effect and cross-sectoral data management.

While most of Task 5.2 data exchange System Use Cases are fully agnostic to specific business processes there are few which cannot be fully separated from the underlying processes. In the EU-SysFlex context these are the ones related to specific aspects of flexibility market functioning – most notably ‘Manage flexibility bids’, ‘Manage flexibility activations’, ‘Verify and settle activated flexibilities’, ‘Predict flexibility availability’ and ‘Calculate flexibility baseline’. In these cases some assumptions are made in terms of market design. While for most of these it was manageable, the two scenarios of ‘Manage flexibility bids’ – prequalification and bidding processes – and the process of ‘Manage flexibility activations’ turned out to be too sensitive to the choice of market design setup. Additionally, the value of using a Data Exchange Platform for the related data exchanges was debatable. Therefore, alternative approaches were developed for these System Use Cases to reflect quite different underlying business processes.

A cross-analysis establishing correspondences between Task 5.2 data exchange System Use Cases and involved System Roles reveals that a Data Exchange Platform is a core system, followed by Flexibility Platform, Data Hub and (third party) application. The Flexibility Platform’s key functionality<sup>1</sup> is there to support specific market processes, the other three are core systems to organize data exchange from data provider (Data Hub) to data user (Application) via a transport layer (Data Exchange Platform) in a business process agnostic way. The concept applied here supports ‘distributed’ data exchange. Other choices of data management (e.g. ‘centralized’ data collection and storage or bilateral ‘decentralized’ exchanges) are also possible. The System Roles involved in Task 5.2 data exchange System Use Cases are used to exchange Business Objects represented in the following figure.

<sup>1</sup> Of course, Flexibility platforms as intermediaries between buyers and sellers must be able to manage data also.



Task 5.2 data exchange System Use Cases should be considered as functional specifications of systems supporting Business Use Cases and to be implemented and tested in the demonstrators of Work Package 9, in particular for scalability and replicability purposes. The objectives of WP9 consists in testing and demonstrating the data management solutions for flexibility services specified in WP5. The aim of WP9 demonstrators is to focus on different aspects of data management, including the cross-border communication between data exchange platforms and with different stakeholders, single access point to data, sector coupling, etc. (Task 9.3). In addition, two specific applications (Task 9.1 and Task 9.2) help to verify the feasibility of such platform based approach. The table below gives the objectives of these Business Use Cases.

Task	“Data” Business Use Cases
9.1	Affordable tool for smaller DSR units
9.2	Software application facilitating TSO-DSO cooperation with the aim to enable efficient and effective supply and use of flexibility services
9.3	Operation of cross-border data exchange model/network

Task 5.2 data exchange System Use Cases comply with legal environments, incl. the Clean Energy Package, so they reflect recommendations given in several IEC standards, such as IEC TR 62357 (Power systems management and associated information exchange) and its Reference Architecture and CEN-CENELEC-ETSI Smart Grid Set of Standards (CEN-CENELEC-ETSI, 2017).

Despite the efforts to bridge mismatches between Task 5.2 data exchange System Use Cases and the specifications of the other EU-SysFlex demonstrators (WP6, WP7 and WP8), some differences remain. Therefore, an analysis was carried out comparing the demonstrators' data exchanges with the data exchange System Use Cases presented in this report. The analysis resulted in the identification of differences as depicted in the table below. Cells in blue show data exchange activities tested like explained in Task 5.2 data exchange System Use Cases. Cells in purple show data exchange activities tested in the demonstrators but with a different approach. Cells in grey show data exchange activities not in the scope of the demonstrators.

T5.2 SUCs vs demos	WP6 Germany	WP6 Italy	WP6 Finland	WP7 Portugal VPP	WP7 Portugal FlexHub	WP8 France	WP9
Aggregate energy data							
Anonymize energy data							
Authenticate data users							
Calculate flexibility baseline							
Collect energy data							
Erase and rectify personal data							
Exchange data between DERs and System Operators							
Manage access permissions							
Manage flexibility activations	Alt 2						Alt 1
Manage flexibility bids / Prequalification process	Alt 2						Alt 1
Manage flexibility bids / Bidding process	Alt 2						Alt 1
Manage data logs							
Manage sub-meter data							
Predict flexibility availability							
Provide list of suppliers and ESCOs							
Transfer energy data							
Verify and settle activated flexibilities							

Apart from the Grid Validation System and the Foreign Customer Portal, all the systems described in Task 5.2 data exchange System Use Cases are implemented in Work Package 9 demonstrators, as shown in the following table. Cells in blue show data exchange activities tested like explained in Task 5.2 data exchange System Use Cases and name the tools implementing them. Cells in grey show data exchange activities not in scope of the demonstrators. Apart from the Grid Validation System and the Foreign Customer Portal, all of the systems described in Task 5.2 data exchange System Use Cases are implemented in Work Package 9 demonstrators.

System Roles	Task 9.1 Affordable Tool for smaller DSR units	Task 9.2 Application for TSO-DSO flexibility data exchange	Task 9.3 Cross-border data exchange
Data Exchange Platform	Elering's Esfeed	Elering's Esfeed	Elering's Esfeed / ENTSO-E's ECCo SP
Data Hub	Affordable Tool	Elering's data hub	Elering's Data Hub
Grid Validation System			
Flexibility Platform		Flexibility Platform	
System Operator SCADA		TSO/DSO IT System (SO Simulator)	
Aggregator SCADA	Affordable tool	Affordable tool (FSP Simulator)	
Automation Controller	Affordable Tool		
Customer Portal	Customer interface of Affordable Tool		e-Elering
Foreign Customer Portal			
In-House Device	In-house devices used by Affordable Tool		
Meter Data Collection Tool	Affordable Tool		
Sub-Meter Data Collection Tool	Affordable Tool		
External Data Source			Estonian Building Registry /Cybernetica's Sharemind (providing baselines)

Task 5.2 data exchange System Use Cases are available in full in the annex of this report, along with their characteristics (i.e. scope, objective, short description, assumptions, prerequisites, use case diagrams, activity diagrams and requirements). Requirements falls into several categories, such as performance, personal data or security, and are intensively used for testing purposes.

## 1. INTRODUCTION

### 1.1 BACKGROUND

The EU-SysFlex project seeks to enable the pan-European power system to utilise efficient coordinated flexibilities in order to integrate a large share of renewable energy sources. The overall objective is to ensure an efficient and sufficient level of system services which are provided to reach climate protection goals by means of renewables in electricity, while maintaining the level of resilience that consumers and society have come to expect from the European electricity system.

### 1.2 OBJECTIVES

As part of the EU-SysFlex project, Work Package 5 aimed at:

- Providing recommendations for data management in flexibility services when applied in a large scale (on an IT perspective). The demonstrators in Work Packages 6, 7, 8 & 9 exchange flexibility data inside each demonstrator and then give their feedback on the data models and platforms they use. With these elements, Work Package 5 has estimated the volume of data exchanges, has worked on the guidelines and requirements (cybersecurity, data privacy, time constraints of data exchanges, procedures for handling massive flows of data, etc.) and will provide recommendations at each level in order to ensure the scalability of flexibility services. Those recommendations will be then tested in Work Package 9 demonstrations,
- Developing customer-centric data exchange model for flexible market design serving all stakeholders (TSOs, DSOs, suppliers, flexibility providers, ESCOs, etc.) and enabling data exchange across borders. The aim is not a single data exchange platform but consists in ensuring the interoperability of different solutions.

One of the main objectives of Work Package 5 consists in ensuring, at a pan European scale:

- The replicability of the recommendations for data management in different flexibility and other energy services needed by concerned stakeholders (TSOs, DSOs, suppliers, flexibility providers, ESCOs, etc.),
- The scalability of the recommendations for data management in large scale roll-out of flexibility markets and other data management systems.

Within Work Package 5, Task 5.2 aimed at identifying, describing and analysing data exchange System Use Cases, from the Business Use Cases given by Work Package 3 and from the different feedbacks of Work Packages 6, 7 & 8 demonstrators. It focused on data exchange System Use Cases that could impact the feasibility of scaling up flexibility services (on an IT perspective) and useful for demonstrations in Work Package 9.

Task 5.2 data exchange System Use Cases were used in Work Package 5 in the following tasks:

- Exchanged data and data exchange conceptual models studied in Task 5.1,



- Options for exchanging, storing and processing massive flows of data studied in Task 5.3,
- Cyber security methods and data privacy guidelines for data exchange platform studied in Task 5.4,
- Data exchange standards and protocols studied in Task 5.5.

The scope and core objectives of Task 5.2 deliverable were twofold:

- A repository of applicable data exchange System Use Cases both in UML format and generated Word documents,
- Use cases useful for scalability studies and for Work Package 9 demonstrations.

### 1.3 STRUCTURE OF THIS DELIVERABLE

---

This document first provides definitions of terms.

Then, it explains dependencies between Task 5.2 and other tasks or other Work Packages, in order to point out Task 5.2 inputs and outputs.

Then, it describes IEC 62559 methodology used to write Task 5.2 data exchange System Use Cases and how this standard was applied in the project.

Then, it provides an overview of Task 5.2 data exchange System Use Cases: related Business Use Cases from several Work Packages, identified list of data exchange System Use Cases and a work analysis (i.e. identified System Roles, involved Business Roles, exchanged Business Objects, comparison of alternative System Use Cases and personal data management).

Then, it gives a comparison of Task 5.2 data exchange System Use Cases with Work Packages 6, 7 & 8 demonstrators' specifications.

## 2. DEFINITIONS

**System Use Cases** describe how System and/or Business Roles of a given system interact to perform a Smart Grid Function required to enable / facilitate the business processes described in Business Use Cases. Their purpose is to detail the execution of those processes from an Information System perspective (source: IEC/TS62913-1).

E.g. Transfer energy data, Manage flexibility activations.

A **System Role** describes a finite set of functionalities that is assumed by an entity (devices, information system, equipment) (source: IEC/TS62913-1).

E.g. Data Exchange Platform, Geographic Information System, SCADA.

**Business Use Cases** describe how Business Roles of a given system interact to execute a business process. These processes are derived from services, i.e. business transactions, which have previously been identified (source: IEC/TS62913-1).

E.g. business processes related to wind flexibility, battery storage, heat storage.

A **Business Role** describes a finite set of responsibilities that is assumed by a party (organisations, organisational entities or physical persons) (source: IEC/TS62913-1).

E.g. Consumption Aggregator, Balance Responsible Party.

A **system** is a collection of components organized to accomplish a specific function or set of functions (source: ISO/IEC 42010:2007).

E.g. electricity meter, SCADA.

A **System Stakeholder** is an individual, team, or organization (or classes thereof) with interests in, or concerns relative to, a system (source: ISO/IEC 42010:2007).

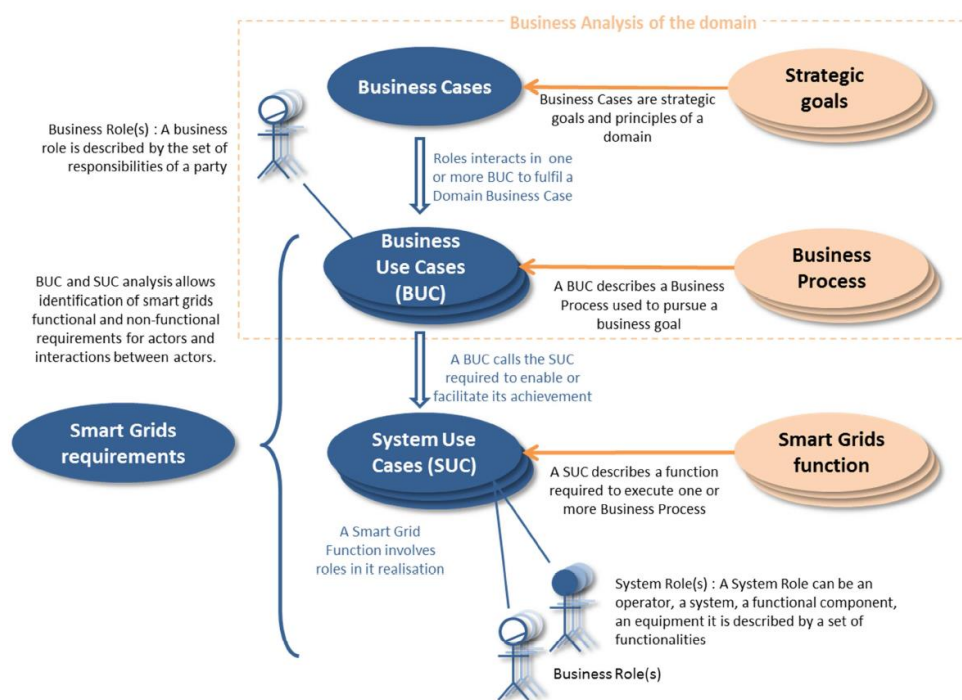
E.g. RTE, PSE, Elering.

➔ A System Stakeholder is similar to a party or a player.

### 3. METHODOLOGY

#### 3.1 IEC 62559

IEC 62559 use case methodology and associated Word document template were applied on Task 5.2. The use cases are defined in UML language with the Sparx Enterprise Architect UML tool. IEC 62559 use case methodology can be represented as below:



(source IEC/TS62913-1)

FIGURE 1: IEC 62559 USE CASE METHODOLOGY

EDF has provided Modsarus, a freeware plugin for Sparx Enterprise Architect. Modsarus tool:

- Facilitates use case imports from Word documents compliant with IEC 62559 Word document template, incl. description of scope, objectives and narrative of use cases, along with rules, limitations and prerequisites,
- Facilitates IEC 62559 methodology application, by means of tool boxes useful to define use cases, draw UML diagrams, link the UML elements with each other and ensure UML model coherency,
- Generates Word documents compliant with IEC 62559 Word document template.

A data exchange System Use Case:

- Is linked to one or several Business Use Cases and defines how they can be implemented with System Roles,
- By means of UML activity diagrams, defines how Business Roles and System Roles interact with each other in order to realise the data exchange,

- Defines requirements that must be respected by System Roles, in terms of frequency, volumetry, cybersecurity, data privacy, time constraints of data exchanges and procedures for handling massive flows of data, in order to design the System Roles to be used and tested in the demonstrators.

### 3.2 DATA EXCHANGE SYSTEM USE CASES' DEPENDENCIES WITHIN EU-SYSFLEX PROJECT

The definitions provided in chapter 2 highlight the dependencies between System Use Cases and:

- Business Roles defined in Task 3.2<sup>2</sup>,
- Business Use Cases defined in Task 3.3<sup>3</sup> on the basis of Work Packages 6, 7 & 8 demonstrators, for the services to be provided to TSOs,
- Business Use Cases defined in Work Package 9<sup>4</sup> for data management.

“Data” System Use Cases need to be associated with “Data” Business Use Cases, in order to take into account the flow of data in business processes between IT Business Roles (e.g. Data Exchange Platform Operator, Customer Portal Operator)<sup>5</sup> and ensure scalability and replicability of the proposed solutions. These “Data” Business Use Cases determine how data needed for “Flexibility” Business Use Cases can be managed by the involved Business Roles on market side. “Data” System Use Cases also need to be compared with “Flexibility” System Use Cases studied in Work Packages 6, 7 & 8 demonstrators and have been used for: comparisons were produced and alternative use case descriptions were produced. The figure below describes these use case dependencies and the associated Work Packages.

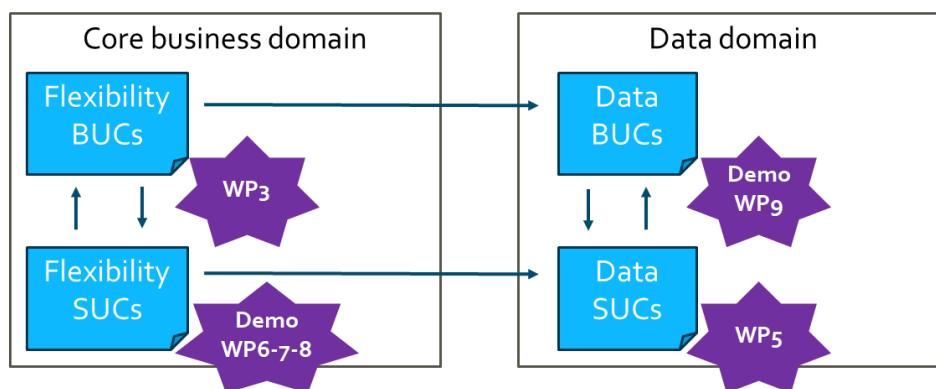


FIGURE 2: USE CASE DEPENDENCIES AND ASSOCIATED WORK PACKAGES OF EU-SYSFLEX

From the beginning of the project, Work Packages 6, 7 & 8 started their demonstrators and defined technical specifications. In parallel, Work Package 3 defined Business Processes involving Business Roles. These Work Packages worked together as part of the project’s “fast track”. In parallel, Work Package 9 defined business needs for data exchanges, as well as IT needs in order to ensure the scalability of flexibility services. From there, Task 5.2 started to define data exchange System Use Cases: functional specifications for systems to be used for data

<sup>2</sup> Conceptual market organisations for the provision of innovative system services: role models, associated market designs and regulatory frameworks

<sup>3</sup> Functional specification of system services in terms of Business Use Cases

<sup>4</sup> Demonstration of cross-border and cross-sector data management and exchanges

<sup>5</sup> However, relevant market side Business Roles (e.g. Flexibility Service Provider, System Operator, Market Operator) are included to complete the description of data exchanges in different processes.

exchanges. These specifications define how Business Roles are involved in scenarios in which they exchange Business Objects with each other and by means of systems.

Task 5.2 data exchange System Use Cases have been used by Work Package 9 demonstrators as specifications for data management solutions to be demonstrated for flexibility services.

Task 5.2 data exchange System Use Cases have been compared with Work Packages 6, 7 & 8 demonstrators' specifications, so that same investigated subjects and differences could be pointed out. These differences are due to business or IT needs covered in Task 5.2, not objected nor needed by Work Packages 6, 7 & 8 demonstrators but to be demonstrated in Work Package 9.

### 3.3 PRINCIPLES FOR DATA EXCHANGE SYSTEM USE CASES MODELLING

---

The modelling of System Use Cases was based on some principles:

- Data exchange System Use Cases are not intended to reverse engineer all existing systems. They are considered as functional specifications for new systems to be tested in Work Package 9.
- Data exchange System Use Cases only describe exchanged data. They do not describe data structures or formats (studied in Task 5.1), nor business processes' algorithms (defined in Work Packages 6, 7, 8 & 9).
- Data exchange System Use Cases contain as many requirements as possible on cybersecurity and big data, useful for the design and the sizing of systems (further studied in Task 5.3).
- Architectural options (e.g. Hadoop framework) are not in the scope of Task 5.2. They have been defined in Work Package 9 but can be reverse engineered in the UML model for knowledge capitalization.
- No confusion should be made between:
  - A System Role: a system/software/application enabling automated tasks (e.g. a Data Exchange Platform),
  - A Business Role using a system, defined by a finite set of responsibilities that is assumed by a party (e.g. a System Operator).
- A Business Role can be a core Business Role (e.g. System Operator) or an IT oriented Business Role (e.g. DEP Operator).
- System Use Cases must be generic (i.e. common for every country), in particular for replicability purpose. Some rules can be specific to countries in which case they should be written as disclaimers.
- System Use Cases must describe the "To be" and innovative systems connected to "As is" systems, without giving explicit recommendations on the business process behind.
- The emphasis has been on defining main data exchanges to support flexibility services. A further detailed analysis was carried out as part of Task 5.3 to define requirements relating to volume, frequency and type of exchanged data ('big data' requirements). These requirements were integrated into data exchange System Use Cases.

## 4. OVERVIEW OF DATA EXCHANGE SYSTEM USES CASES

### 4.1 RELATED BUSINESS USE CASES

In early phase of the project (“fast track”), Work Package 3 (cf. D3.3) identified several “Flexibility” Business Use Cases for the demonstrators in Germany, Italy, Finland and Portugal (Table 1).

TABLE 1: “FLEXIBILITY” BUSINESS USE CASES OF EU-SYSFLEX

Demonstrator	“Flexibility” Business Use Cases
Germany (WP6)	<ol style="list-style-type: none"> <li>1. Manage active power flexibility to support congestion management and voltage control in the German demo</li> <li>2. Manage reactive power flexibility to support voltage control and congestion management in the German demo</li> </ol>
Italy (WP6)	<ol style="list-style-type: none"> <li>1. Manage active power flexibility to support mFRR/RR and congestion management in the Italian demo</li> <li>2. Manage reactive power flexibility to support voltage control and congestion management in the Italian demo</li> </ol>
Finland (WP6)	<ol style="list-style-type: none"> <li>1. Manage active power flexibility to support FCR in the Finnish demo</li> <li>2. Manage active power flexibility to support mFRR/RR in the Finnish demo</li> <li>3. Manage reactive power flexibility to support voltage control in the Finnish demo</li> </ol>
Portugal FlexHub (WP7)	<ol style="list-style-type: none"> <li>1. Manage reactive power flexibility to support voltage control and congestion management in the FlexHub Portuguese demo</li> <li>2. Manage active power flexibility to support mFRR/RR and congestion management in the FlexHub Portuguese demo</li> <li>3. Provide active distribution grid dynamic model for transmission operator in the FlexHub Portuguese demo</li> </ol>
Portugal VPP (WP7)	<ol style="list-style-type: none"> <li>1. Manage VPP active power flexibility to support aFRR in VPP Portuguese demo</li> <li>2. Manage VPP active power flexibility to support mFRR/RR in VPP Portuguese demo</li> </ol>

In parallel, Work Package 9 partners worked on the “Data” Business Use Cases in order to demonstrate data management for flexibility services. The aim of these demonstrators is to focus on different aspects of data management, including the cross-border communication between data exchange platforms and with different stakeholders, single access point to data, sector coupling, etc. (Task 9.3). In addition, two specific applications (Task 9.1 and Task 9.2) help to verify the feasibility of such platform based approach (Table 2).

**TABLE 2: “DATA” BUSINESS USE CASES OF EU-SYSFLEX**

Task	“Data” Business Use Cases
9.1	Affordable tool for smaller DSR units
9.2	Software application facilitating TSO-DSO cooperation with the aim to enable efficient and effective supply and use of flexibility services
9.3	Operation of cross-border data exchange model/network

Work Package 5 gathered all these “Flexibility” and “Data” Business Use Cases into a list of categories of potential energy domain Business Use Cases. These categories of Business Cases correspond to either a domain or a business case<sup>6</sup> (Table 3).

**TABLE 3: CATEGORIES OF BUSINESS USE CASES**

Categories of Business Use Cases	Examples of specific Business Use Cases
Access to data	<ul style="list-style-type: none"> <li>Customer’s access to his/her own data – “Download My Data”</li> <li>Handling of and access to data – “Share My Data” (Access to customer’s data by all stakeholders, including supplier, balance responsible party, system operator, aggregator or any other interested party based on customer’s consent)</li> <li>Data exchange platforms as facilitators of data exchange, incl. authentication and consent management</li> <li>Easy access to data (single entry gate to data)</li> <li>Access to different data types / sectors (e.g. electricity, gas, heat, prices, weather)</li> </ul>
Balance management	<ul style="list-style-type: none"> <li>Managing open supply chain</li> <li>Balance scheduling (day-ahead schedules provided by balance responsible parties)</li> <li>Imbalance settlement</li> </ul>

<sup>6</sup> According to Modsarus help, “domains represent the main aspects of a project. Each domain can have its own business logic and goals described through business cases [...]. In a project, domains allow to modularize the content while preserving common definitions like roles”. A business case “can be seen as a potential objective for the domain”.

Categories of Business Use Cases	Examples of specific Business Use Cases
Capacity allocation	<ul style="list-style-type: none"> <li>• Cross-border capacity calculation</li> <li>• Calculation of day-ahead and intra-day min and max electricity prices</li> <li>• Redispatching</li> <li>• Counter trading</li> <li>• Cross-border congestion income calculation and sharing</li> <li>• ITC calculation</li> <li>• Forward capacity trading</li> </ul>
Connecting to the network	<ul style="list-style-type: none"> <li>• Conditional (non-firm) connection</li> <li>• TSO-DSO coordinated actions in connecting new parties to the network</li> </ul>
Energy trading	<ul style="list-style-type: none"> <li>• Day-ahead</li> <li>• Intra-day</li> <li>• Forward</li> </ul>
Long-term network planning	<ul style="list-style-type: none"> <li>• Coordination of long-term network planning between TSO and DSO</li> <li>• Coordination of system restoration practices using DSO connected resources</li> <li>• Capacity markets/mechanisms</li> </ul>



Categories of Business Use Cases	Examples of specific Business Use Cases
Market for flexibilities	<ul style="list-style-type: none"> <li>• Flexibility marketplaces for flexibility providers, flexibility users and several services: application for TSO-DSO flexibility data exchange, coordination of distributed flexibility in a marketplace with a common pool of resources</li> <li>• Prequalification of flexibility resources</li> <li>• Balancing (frequency regulation) service: activation of DSO connected resources by the TSO for balancing purposes, enabling provision of contracted frequency reserve on distribution grid</li> <li>• Transmission congestion management service: optimize active power management for the TSO's congestion management purposes, remaining flexibility (not used by DSO) from 110kV RES plants to manage TSO congestion</li> <li>• Distribution congestion management service: optimize active power management for the DSO's congestion management purposes, provision of active power from 110kV RES plants to DSO</li> <li>• Reactive power management service: optimize reactive power management for the DSO's voltage control purposes, optimize reactive power management for the TSO's voltage control purposes, mandatory provision of reactive power flexibility by 110 kV RES plants</li> <li>• Other flexibility services</li> <li>• Affordable tool for smaller DSR units providing flexibility</li> <li>• Aggregation of flexibilities</li> </ul>
Operational planning and forecasting	<ul style="list-style-type: none"> <li>• Coordination of operational planning activities between TSO and DSO (day-ahead and intraday)</li> <li>• Optimise work programmes (TSO, DSO and SGUs)</li> <li>• Improve system real-time supervision and control through better coordination (TSO, DSO and SGUs)</li> <li>• Improve fault location close to the TSO-DSO interface</li> <li>• Sharing grid and generation related maintenance information to grid operators and other market actors</li> <li>• Sharing of selected structural data (maximum and minimum power, maximum slope, state of the unit)</li> </ul>
Reporting	<ul style="list-style-type: none"> <li>• Selected publication of market information where this information improves the efficiency of the market: outages, market limitations, prices, capacities</li> </ul>

Categories of Business Use Cases	Examples of specific Business Use Cases
RES administration	<ul style="list-style-type: none"> <li>• Calculation of RES production and subsidies, calculation of residual mix</li> <li>• Registry for green certificates</li> </ul>
Services related to end customers	<ul style="list-style-type: none"> <li>• Meter point management</li> <li>• Customer management</li> <li>• Supplier switching</li> <li>• Aggregator switching</li> <li>• Comparison tool</li> <li>• Move in, move out of customer</li> <li>• Billing agent</li> <li>• Joint invoicing with network invoice forwarding</li> <li>• Wholesale settlement</li> <li>• Energy quality check</li> <li>• Specific services to energy communities</li> </ul>
Services of RSCs	<ul style="list-style-type: none"> <li>• Outage planning coordination</li> <li>• Short &amp; medium term adequacy forecast</li> <li>• Coordinated capacity calculation</li> <li>• Coordinated security analysis</li> <li>• Improved Individual Grid Model / Common Grid Model delivery</li> </ul>

## 4.2 IDENTIFIED LIST OF DATA EXCHANGE SYSTEM USE CASES

Based on the understanding of the high-level needs of the EU-SysFlex demonstrators, a set of “Data” System Use Cases was identified. 16 System Use Cases were selected for the full description. Table 4 lists these and indicates the related categories of Business Use Cases most relevant to the EU-SysFlex project.

**TABLE 4: CORRESPONDENCE BETWEEN “DATA” SYSTEM USE CASES AND SOME CATEGORIES OF BUSINESS USE CASES**

SUCs	Access to data	Balance management	Market for flexibilities	Operational planning and forecasting	Services related to end customers
Aggregate energy data	X	X	X	X	X
Anonymize energy data	X		X		X
Authenticate data users	X	X	X	X	X
Calculate flexibility baseline			X		
Collect energy data	X	X	X	X	X
Erase and rectify personal data	X	X	X	X	X
Exchange data between DERs and System Operators			X	X	
Manage access permissions	X	X	X	X	X
Manage data logs	X	X	X	X	X
Manage flexibility activations			X	X	X
Manage flexibility bids			X		
Manage sub-meter data	X		X	X	X
Predict flexibility availability			X		
Provide list of suppliers and ESCOs	X		X		X
Transfer energy data	X	X	X	X	X
Verify and settle activated flexibilities		X	X	X	

These System Use Cases are tested in the Work Package 9 demonstrators (Table 5).

**TABLE 5: TABLE OF CORRESPONDENCE BETWEEN SYSTEM USE CASES AND DATA MANAGEMENT DEMONSTRATORS**

SUCs	Affordable tool for smaller DSR units (Task 9.1)	Operation of single flexibility marketplace (Task 9.2)	Operation of cross-border data exchange model/network (Task 9.3)
Aggregate energy data	X	X	X
Anonymize energy data			X
Authenticate data users	X	X	X
Calculate flexibility baseline	X	X	
Collect energy data	X	X	X
Erase and rectify personal data	X	X	X
Exchange data between DERs and System Operators	X	X	
Manage access permissions	X	X	X
Manage data logs	X	X	X
Manage flexibility activations	X	X	
Manage flexibility bids	X	X	
Manage sub-meter data	X	X	X
Predict flexibility availability	X	X	
Provide list of suppliers and ESCOs		X	X
Transfer energy data	X	X	X
Verify and settle activated flexibilities	X	X	

### 4.3 ANALYSIS OF SYSTEM USE CASES

---

The identified data exchange System Use Cases were written in accordance with the methodology described in §3. The following sub-chapters give an overview of these Use Cases and the annexes describe them in detail.

#### 4.3.1 SCOPE AND OBJECTIVES OF SYSTEM USE CASES

---

Aggregate energy data:

- Scope: Aggregation of different types of data made available through data exchange platform.
- Objective: Making private data available to other parties without authorization (permission) requirement: Making different types of data available for reporting and statistics.
- Short description: Data Exchange Platforms can support data aggregation by transporting aggregated data from a data source to an application. Aggregation itself takes place at data source. Aggregated data may be useful for different applications (services) – e.g. related to benchmarking, national statistics, imbalance reporting. Also, aggregated data would not require consent (permission rights) for personal data or commercially sensitive data.

Anonymize energy data:

- Scope: Anonymization of personally identifiable data.
- Objective: Making private data available to other parties without authorization (permission) using anonymization techniques
- Short description: Private data without identifying the person behind may be useful for some applications and services – e.g. for academic studies, benchmarking, reporting, etc. Using techniques to anonymize data makes access to data easier for these parties as no consent is needed from every individual consumer.

Authenticate data users:

- Scope: Access to private data and other information with restricted access through a Customer Portal and a Data Exchange Platform only to authorized users
- Objective: Support easy but secure access to data
- Short description: All data users need to be authenticated to a Customer Portal before having access to a Data Exchange Platform (DEP), for the exchange of individual metering data (private data) or any other information with restricted access.

Calculate flexibility baseline:

- Scope: Define the power schedule/baseline of a given Flexibility Service Provider (FSP), which participates in the flexibility market
- Objective: Encourage the participation in the flexibility market of new resources, including Demand Side Resources (DSR) and variable (intermittent) Renewable Energy Sources (RES).

- Short description: If a market participant bids flexibility in the flexibility market, the baseline consumption/generation of such market participant needs to be identified for the verification and settlement processes (see SUC 'Verify and settle activated flexibilities'). There are two options for this:
  1. Market participant has to declare its power schedule (baseline) ex ante in such a way to permit the System Operator (SO) to implement the settlement processes. Such player (FSP) usually declares directly the baseline, but the SO could provide specific tools to help market participants in the baseline definition, promoting market participation.
  2. Market operator (TSO or DSO or Flexibility Platform Operator) itself calculates the baseline ex post based on meter data. The methodology to calculate baseline is transparent and public.

The baseline cannot be measured directly, so it must be calculated based on other available measured data, using an agreed, robust methodology. When choosing the suitable baseline methodology it is crucial to understand the most important baseline characteristics: these are accuracy, simplicity, integrity and alignment, meaning that additionally to the accuracy of the methodology it is important at the same time that it would be simple enough for all stakeholders to calculate and understand. Additionally to that, suitable methodology should minimize the availability of data manipulation as well as minimize unintended consequences.

Several types of baseline can exist and may be needed, depending on the type of service/product provided, depending on the reserve origin (consumption, production, storage) and depending on the consumer's group who offered the flexibility (residential, offices, industrial consumers, etc).

Data from sub-meters could be used besides data from 'certified' meters when calculating the baseline.

#### Collect energy data:

- Scope: Collection of different types of energy related data from data providers to data hubs
- Objective: Collection of data which can be shared.
- Short description: Collection of different types of meter, market and grid data to be made available through a data exchange platform to interested parties. Users of data exchange platform can receive data directly from data provider (data source) or from a data hub which collects (and stores) data. This use case focuses on data necessary for flexibility trading. See separate use case description for sub-meter data (because the involved systems are different).

#### Erase and rectify personal data:

- Scope: Erasure and rectification of personally identifiable data.
- Objective: Safeguard the rights of every individual to have control over their own data.
- Short description: According to data protection rules (GDPR), one has the right (unless otherwise stated in the laws) to execute control over one's data, in particular to delete or rectify them.

#### Exchange data between DERs and System Operators:

- Scope: Data exchange between DER (Distributed Energy Resources) and SCADA systems of TSO and DSOs, using the Data Exchange Platform as an intermediary.

- Objective: Ensuring the observability and controllability of DER units providing electrical energy and flexibility services to the power system.
- Short description: The use case includes data exchange between distributed generators, demand response (DR) resources and energy storage devices, and a Data Exchange Platform (DEP) that communicates with TSO and DSO SCADA systems.

DEP is not appropriate for time-critical data exchange (like activation of very fast products) thus being out of scope of this use case. It is assumed that the SCADA systems may require both schedule data for planning purpose and structural data (including connection diagrams) each time they are changed.

#### Manage access permissions:

- Scope: Giving authorization by data owners (e.g. consumers) to other parties interested in using this data.
- Objective: Facilitating exchange of personal and other sensitive data as well as associated energy services (incl. across country borders).
- Short description: The party who is the data owner (e.g. electricity consumer is the owner of its consumption data) can authorize any application to have access to its data. Cross-border acknowledgement of authorizations shall be enabled.

#### Manage data logs:

- Scope: Making available security logs including data access logs and authorization logs.
- Objective: Ensure personal data protection.
- Short description: Data Owner's access to data logs contributes to personal data protection. The data logs include information about data access (e.g. who has accessed consumption data and when), authorizations (e.g. who has issued a new authorization and when) and authentication (e.g. who has identified himself/herself in Customer Portal and when).

#### Manage flexibility activations – Alternative 1:

- Scope: Developing generic case describing the data exchange for the process of flexibility activation.
- Objective: Make data exchange for activation of flexibilities effective and reliable.
- Short description: Description of the needed data exchange for the selection (taking into account any grid limitations) and initiation of activation of flexibilities bids that previously have been sent to the Flexibility Platform. Delivery of notification of activation requests to the Flexibility Service Providers (FSPs), in a reliable and timely manner according to the relevant terms and conditions applicable to FSPs.

According to EU-SysFlex WP3 suggestion, the function of grid impact assessment and hosting of Grid Validation System could be taken over by Optimisation Operator role from the Primary and Secondary System Operator roles.<sup>7</sup>

<sup>7</sup> The Optimisation Operator role could theoretically be allocated to different actors, among them System Operators.

#### Manage flexibility activations – Alternative 2:

- Scope: Developing generic case describing the data exchange for the process of flexibility activation where the capacity has already been reserved during earlier time frames and a new grid assessment is necessary to select the best flexibility.
- Objective: Make data exchange for activation of flexibilities effective and reliable.
- Short description: Description of the needed data exchange for the selection (taking into account any grid limitations) and initiation of activation of flexibilities bids that previously have been sent to the Flexibility Platform and where previously the bids were not activated but their capacity was reserved in the bidding process. Delivery of notification of activation requests to the Flexibility Service Providers (FSPs), in a reliable and timely manner according to the relevant terms and conditions applicable to FSPs.

According to EU-SysFlex WP3 suggestion, the function of grid impact assessment and hosting of Grid Validation System could be taken over by Optimisation Operator role from the Primary and Secondary System Operator roles.

#### Manage flexibility bids – Alternative 1:

- Scope: Describing the pre-qualification and bidding processes on the flexibility services market and defining required data flow to support management of pre-qualification of Flexibility Service Providers and management of flexibility bids.
- Objective: Explanation regarding the exchange of information supporting the pre-qualification and bidding processes in the Flexibility Services Market.
- Short description: The use case describes the process of pre-qualification of the Flexibility Service Providers (aggregators and individual consumption, generation and storage units) and the bidding process ending with the merit order of flexibility bids, which will then be activated by the Primary System Operator (see separate system use case for flexibility activation). Implementation of these processes takes place on the Flexibility Platform (flexibility register), which gathers flexibility needs provided by System Operators as well as flexibility potentials, and registers flexibility bids provided by Flexibility Service Providers.

According to EU-SysFlex WP3 suggestion, the function of grid impact assessment and hosting of Grid Validation System could be taken over by Optimisation Operator role from the Primary and Secondary System Operator roles.

#### Manage flexibility bids – Alternative 2:

- Scope: Describing the pre-qualification and bidding processes on the flexibility services market and defining required data flow to support management of pre-qualification of Flexibility Service Providers and management of flexibility bids.
- Objective: Explanation regarding the exchange of information supporting the pre-qualification and bidding processes in the Flexibility Services Market.
- Short description: The use case describes the process of pre-qualification of the Flexibility Service Providers (aggregators and individual consumption, generation and storage units) and the bidding process ending with the selection of flexibility bids, leading to the initiation of activation in case of energy bids or the



reservation of capacity in case of capacity bids. Implementation of these processes takes place on the Flexibility Platform (flexibility register), which gathers flexibility needs provided by System Operators as well as flexibility potentials, and registers flexibility bids provided by Flexibility Service Providers.

According to EU-SysFlex WP3 suggestion, the function of grid impact assessment and hosting of Grid Validation System could be taken over by Optimisation Operator role from the Primary and Secondary System Operator roles.

#### Manage sub-meter data:

- Scope: Using data exchange platform for exchanging sub-meter data. A sub-meter data is a data measured by a non-revenue grade meter and related to tariffs.
- Objective: Support easy access to sub-meter data
- Short description: Communication with different energy consuming and producing devices should be enabled in an organized way to satisfy the needs of different stakeholders. Customers need to monitor and control their devices. Flexibility service providers (flexibility aggregators) and other energy service providers need access for service provision based on these devices. TSOs and DSOs need information for flexibility settlement.<sup>8</sup>

#### Predict flexibility availability:

- Scope: The scope of this use case is the prediction of flexibility product availability.
- Objective: The objective of this use case is to detail how the prediction of flexibility product availability is undertaken.
- Short description: This use case describes how the prediction of flexibility availability is undertaken. Flexibility products are described as either slow (e.g. Manual Frequency Restoration Reserve (mFRR) and the UK Short Term Operating Reserve (STOR)) or semi-fast (e.g. Automatic Frequency Restoration Reserve (aFRR)) or fast (e.g. Frequency Containment Reserves (FCR) and Fast Frequency Response (FFR)) and can provide services for balancing and congestion management at local and national levels for TSOs and DSOs. The assessment of flexibility availability in this use case is split into three timeframes:
  - Investment planning (3+ years ahead) aims to understand future availability and if the predictions highlight insufficient capacity that needs addressing.
  - Operation planning (days to years ahead) aims to predict the short, medium and long term availability of flexible products that have committed to provide service.
  - Real time Planning (Intraday operation) aims to predict the current availability of flexible products for balancing and congestion management requirements for that day. This time frame is covered by DER-SCADA, flexibility bidding and flexibility activation SUCs. It relates to understand the real time flexibility availability which could be based on forecasting using historical data on how assets have performed. For example, the flexibility bidding SUC could say that today 10MW had been awarded for usage, the flexibility activation SUC could identify that, when called on, only 9MW

<sup>8</sup> In this context the assumption is that system operators are the parties carrying out the settlement.

responded. This information would be fed into the prediction forecaster, so that in the future it could tell the flexibility bidding SUC that, if it wants 10MW, then it should get 11MW as it is predicted that 10% will not respond.

Provide list of suppliers and ESCOs:

- Scope: Set up, store and share the list of suppliers and service providers.
- Objective: To make available the list of suppliers and service providers: through data exchange platform and list of aggregators through flexibility platform to make easier to get in contact for the interested parties.
- Short description:
  - 1) Set up and share the list of suppliers and service providers to be made available through a data exchange platform for the interested parties. The list is available for authorised parties who can get in contact with suppliers and service provider for any kind of business purpose.
  - 2) Set up and share the list of aggregators to be made available through a flexibility platform for the individual Flexibility Service Providers. Individual Flexibility Service Providers can contact the aggregators in the list and find a suitable one.

Transfer energy data:

- Scope: Transfer of different types of energy related data. The system use case describes the data flow through data exchange platform from the data provider (data hub or any other data source) to data user (data owner) or to a third party application (supplier, aggregator, ESCO), who has consent or legal mandate to use the data. Data transfer does not necessarily need a central storage.
- Objective: To support business use cases and to ensure access to needed data for the relevant processes.
- Short description: The granularity of data and frequency of data transfer could be different depending on the business use case, but the purpose is the same: ensuring the needed data in order to support business processes. Some other system use cases (data collection, authentication of data users, authorization, anonymization of data, aggregation of data) are strongly connected to this use case, which are considered as preconditions.

Verify and settle activated flexibilities:

- Scope: Verification of the flexibilities actually delivered by Flexibility Service Providers.
- Objective: Calculate actually delivered flexibility as response to activation request. Verify that flexibility delivered matches with flexibility requested. Calculate the penalty if flexibility delivered is less than flexibility requested.
- Short description: Actual flexibility delivered is calculated as the difference between baseline and metered consumption/generation of that Flexibility Service Provider. The verification takes place by comparing the actually delivered flexibility and flexibility requested by the System Operator. Settlement means that a Flexibility Service Provider is asked for a penalty if actually delivered flexibility is less than requested flexibility. Imbalance settlement process follows but is out of the scope of this use case.

### 4.3.2 SYSTEM ROLES

The data exchange System Use Cases rely on several key System Roles which may not already exist but are necessary for exchanging data. Table 6 presents the list of these key System Roles with their definitions and involved System Use Cases.

**TABLE 6: KEY SYSTEM ROLES FOR EXCHANGING DATA**

Roles	Descriptions	SUCs
Customer Portal	Customer Portal manages data users' authentication, access permissions and data logs. Customer Portals store data related to its services (e.g. authentication information, representation rights, access permissions, data logs).	Manage data logs Transfer energy data Authenticate data users Manage access permissions
Data Exchange Platform	Data exchange platform (DEP) is a communication platform the basic functionality of which is to secure data transfer (routing) from data providers (e.g. data hubs, flexibility service providers, TSOs, DSOs) to the data users (e.g. TSOs, DSOs, consumers, suppliers, energy service providers). DEP stores data related to its services (e.g. cryptographic hash of the data requested). The DEP does not store core energy data (e.g. meter data, grid data, market data) while these data can be stored by data hubs. Several DEPs may exist in different countries and inside one country.	Erase and rectify personal data Verify and settle activated flexibilities Manage flexibility bids Predict flexibility availability Calculate flexibility baseline Provide list of suppliers and ESCOs Transfer energy data Aggregate energy data Manage sub-meter data Exchange data between DERs and System Operators Manage access permissions Authenticate data users Manage flexibility activations Anonymize energy data Manage data logs
Data Hub	Data Hub is an information system which main functionality is to store and make available measurements (e.g. meter data, operational data) and associated master data. Data Hubs are not necessarily centralized in a country or in a region.	Erase and rectify personal data Verify and settle activated flexibilities Anonymize energy data Collect energy data Manage sub-meter data Aggregate energy data
Flexibility Platform	Flexibility Platform (FP) for System Operators and Flexibility Service Providers that enables the trading of different flexibility products and services. A FP is operated by a Market Operator.  Available to System Operators and Flexibility Services Providers. It is used to support the prequalification, the bidding, the activation and the verification processes, ensuring coordination between activities undertaken by several operators using the same flexible resources. Several national and regional FPs may exist.	Provide list of suppliers and ESCOs Manage flexibility activations Manage flexibility bids Verify and settle activated flexibilities Calculate flexibility baseline Predict flexibility availability
Foreign Customer Portal	Customer Portal for another country. Can also mean a separate portal in the same country.	Manage data logs Authenticate data users Transfer energy data Manage access permissions

Other System Roles are needed for exchanging data between Business Roles. Table 7 gives the list of these System Roles with their definitions and involved System Use Cases.

TABLE 7: OTHER SYSTEM ROLES USED IN DATA EXCHANGE SYSTEM USE CASES

Roles	Descriptions	SUCs
Aggregator SCADA	SCADA operated by an Aggregator.	Exchange data between DERs and System Operators
Application	Any kind of system connected to a Data Exchange Platform and used by a market participant who wishes to receive data.	Aggregate energy data Transfer energy data Erase and rectify personal data Manage access permissions Anonymize energy data
Automation Controller	Automation Controller is an information system which main functionality is to send activation signals to In-House Devices.	Manage sub-meter data
Data Source	Any kind of system used to store data (including Data Hub and Flexibility Platform).	Manage access permissions Transfer energy data
DER App	DEP-connected system used by DER Operators.	Aggregate energy data Transfer energy data Erase and rectify personal data Manage access permissions Anonymize energy data
Energy Service Provider App	DEP-connected system used by Energy Service Providers.	Aggregate energy data Transfer energy data Erase and rectify personal data Manage access permissions Anonymize energy data
External Data Sources	Contains external data such as weather information.	Calculate flexibility baseline
Grid Validation System	System hosted by Optimisation Operators and used for the power grid congestion assessment, including grid validation if activation will cause congestion.	Manage flexibility activations Manage flexibility bids Exchange data between DERs and System Operators
In-House Device	Any kind of electrical device installed at a customer's location. E.g. heat pump, water boiler, EV charger.	Manage sub-meter data
Meter Data Collection Tool	Meter Data Collection Tool is an information system which main functionality is to collect meter readings from electricity meters.	Calculate flexibility baseline Collect energy data
Sub-Meter Data Collection Tool	Sub-Meter Data Collection Tool is an information system which main functionality is to collect measurements from In-House Devices. Data is published to Sub-Meter Data Collection Tool, not requested by the tool.	Manage sub-meter data
System Operator SCADA	SCADA operated by a System Operator.	Exchange data between DERs and System Operators
System Operator Flexibility App	DEP-connected system used by System Operators to interact with Flexibility Platforms.	Aggregate energy data Transfer energy data Erase and rectify personal data Manage access permissions Anonymize energy data

These System Roles can be grouped in several categories of System Roles (e.g. platforms, metering systems, monitoring systems). Some of these System Roles are kinds of other System Roles (e.g. a Data Hub is a kind of Data Source). UML diagram in Figure 3 presents the relations of System Roles (the arrows between System Roles mean “is a kind of” relation).

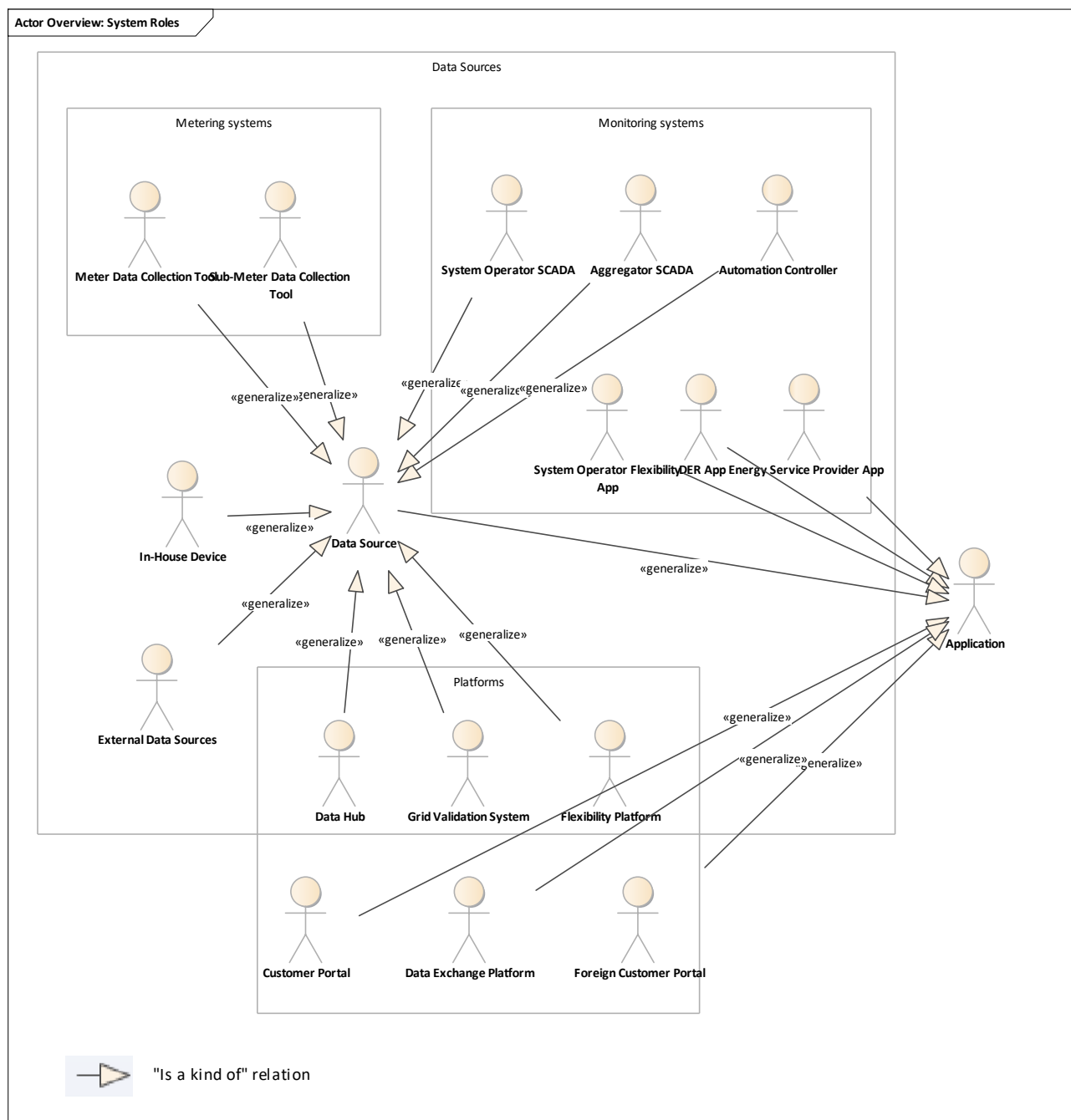


FIGURE 3: SYSTEM ROLES DIAGRAM

This diagram is useful to present already existing systems and new ones. It is generated from a UML model which enables the identification of the data exchange System Use Cases that must be applied for a given system and any systems related to it.

#### 4.3.3 BUSINESS ROLES

System Roles are used by Business Roles. Table 8 gives the list of Business Roles with their definitions and involved System Use Cases.

**TABLE 8: BUSINESS ROLES INVOLVED IN DATA EXCHANGE SYSTEM USE CASES**

Roles	Descriptions	SUCs
Aggregator	Aggregate and maximise value of portfolio(s) of resources (cf. definition in T3.3 deliverable).	Manage flexibility bids Predict flexibility availability Collect energy data Manage sub-meter data Manage flexibility activations Calculate flexibility baseline Provide list of suppliers and ESCOs
Authentication Service Provider	Trust authority. Verifies the identity of authenticating parties. Some countries will have their own authentication service provider. For countries which will not, there may be a more global and to be defined one.	Authenticate data users
Customer	Consumer, generator or storage facility owner.	Manage sub-meter data
Customer Portal Operator	Operates a Customer Portal.	Authenticate data users
Data Delegated Third party	Any natural person who has received representation rights from a data owner.	Authenticate data users
Data Hub Operator	Data hub operator owns and operates an information system which main functionality is to store and make available electricity (also gas, heat) metering data and associated master data. Can be : <ul style="list-style-type: none"> <li>Grid Data Hub Operator in the sphere of a System Operator</li> <li>Market Data Hub Operator in the sphere of a Market Operator</li> <li>Meter Data Hub Operator in the sphere of a Metered Data Operator</li> <li>Sub-meter Data Hub Operator in the sphere of an Energy Service Provider</li> </ul>	Erase and rectify personal data Verify and settle activated flexibilities Anonymize energy data Collect energy data Manage sub-meter data Aggregate energy data
Data Owner	Any person who owns data and can give authorization to other parties to access them. Can be, inter alia: <ul style="list-style-type: none"> <li>Flexibility Services Provider</li> <li>Market Operator</li> <li>Consumer</li> <li>Generator</li> </ul>	Erase and rectify personal data Manage data logs Authenticate data users Manage access permissions
Data User	Any person who uses data. Can be a Data Owner or a Data Delegated Third party.	Provide list of suppliers and ESCOs Transfer energy data
DEP Operator	Data exchange platform operator owns and operates a communication system which basic functionality is data transfer.	Erase and rectify personal data Verify and settle activated flexibilities Manage flexibility bids Predict flexibility availability Calculate flexibility baseline Provide list of suppliers and ESCOs Transfer energy data Aggregate energy data Manage sub-meter data Exchange data between DERs and System Operators Manage access permissions Authenticate data users Manage flexibility activations Anonymize energy data Manage data logs

Roles	Descriptions	SUCs
DER Operator	Operates a single DER unit. Distributed Energy Resources can consist of generation sources, energy storage facilities and facilities participating in Demand Response. Are mainly connected to distribution power grids but can also be connected to transmission power grids (e.g. Portugal). Can be an Asset Operator, a Generator or a Generation Asset Operator (cf. definitions in T3.3 deliverable).	Manage flexibility bids Predict flexibility availability Collect energy data Manage sub-meter data Manage flexibility activations Calculate flexibility baseline Manage sub-meter data Provide list of suppliers and ESCOs
Energy Service Provider	A party offering energy-related services to any other party (adapted from ENTSOE-EFET-ebIX harmonized role model). Energy service provider (ESCO – energy service company) is a market-based role which is responsible for delivering energy services to the customers (or to other parties of behalf of the customers). In case these services necessitate the access to customer's data, the consent of this customer is required. Examples of the executors of this role include aggregator, flexibility service provider, energy efficiency provider, energy monitoring provider. Can also be an Aggregator or a Generator (cf. definitions in T3.3 deliverable).	Manage sub-meter data Provide list of suppliers and ESCOs
Flexibility Service Provider	Can be a Distribution Network Flexibility Provider or a Transmission Network Flexibility Provider (cf. definitions in T3.3 deliverable). Similar to Flexibility Aggregator. Can be both aggregator and individual consumer/generator. Type of Energy Service Provider.	Manage flexibility bids Predict flexibility availability Collect energy data Manage sub-meter data Manage flexibility activations Calculate flexibility baseline Manage sub-meter data Provide list of suppliers and ESCOs
Foreign Customer Portal Operator	Customer Portal Operator in another country. Can also mean an operator of a separate customer portal in the same country.	Authenticate data users
Market Operator	A market operator is a party that provides a service whereby the offers to sell electricity are matched with bids to buy electricity (cf. ENTSOE-EFET-ebIX harmonized role model 2019). In EU-SysFlex project, a market operator not only trades electricity but also flexibility services. Organize auctions (continuous auctions, discrete auctions, calls for tender) between buyers and sellers of electricity-related products in the markets, and more generally publish the corresponding prices, for assets connected to power grid. Manage/operate the platform for trading (where bids and offers are collected). Clear the market and communicate results. (cf. definition in T3.3 deliverable)	Manage flexibility bids Calculate flexibility baseline Collect energy data
Optimisation Operator	Optimise and select the bids, where relevant in combination with switching measures; clear the market for auctions or select individual bids in the order book organised by the MO taking into account the grid data (constraints and sensitivities/topology if needed) provided by DS_O and TS_O ; communicate results (rewarded offers and prices) to the MO. The OO role can be carried out by a system operator, market operator or a third party. (cf. definition in T3.2 deliverable)	Manage flexibility bids Manage flexibility activations

Roles	Descriptions	SUCs
Primary System Operator	Initiates the call for tenders and initiates the activation of a flexibility. It also can operate the power grid on which a flexibility service unit is connected or this unit may otherwise impact its grid. In this case, it assesses the impact on its network of the flexibility to be procured because the activation of such flexibility may potentially cause congestion in its grid.	Manage flexibility bids Manage flexibility activations
Secondary System Operator	Operates the power grid on which a flexibility service unit is connected or this unit may otherwise impact its grid. Assesses the impact on its network of the flexibility to be procured because the activation of such flexibility may potentially cause congestion in its grid.	Manage flexibility bids Manage flexibility activations
System Operator	<p>System Operator means a natural or legal person responsible for operating, ensuring the maintenance of and, if necessary, developing the system in a given area and, where applicable, its interconnections with other systems, and for ensuring the long-term ability of the system to meet reasonable demands for the distribution or transmission of electricity (cf. ENTSOE-EFET-ebIX harmonized role model 2019).</p> <p>Can be:</p> <ul style="list-style-type: none"> <li>• A Transmission System Operator (cf. definition in T3.3 deliverable), for frequency control, congestion management and voltage control on transmission network,</li> <li>• A Distribution System Operator (cf. definition in T3.3 deliverable), for congestion management and voltage control on distribution network.</li> </ul> <p>NB: In some countries (e.g. Germany and Poland), the high voltage network is part of the distribution grid and in other countries (e. g. France and Italy) the high voltage network is part of the transmission grid.</p> <p>A System Operator can be:</p> <ul style="list-style-type: none"> <li>• A Primary System Operator,</li> <li>• A Secondary System Operator.</li> </ul>	Manage flexibility bids Collect energy data Verify and settle activated flexibilities Predict flexibility availability

These Business Roles can be grouped in several categories of Business Roles (e.g. System Operator roles, data oriented roles). Some of these Business Roles are kinds of other Business Roles (e.g. a Transmission System Operator is a kind of System Operator). UML diagram in Figure 4 presents the relations of Business Roles (the arrows between Business Roles mean “is a kind of” relation).



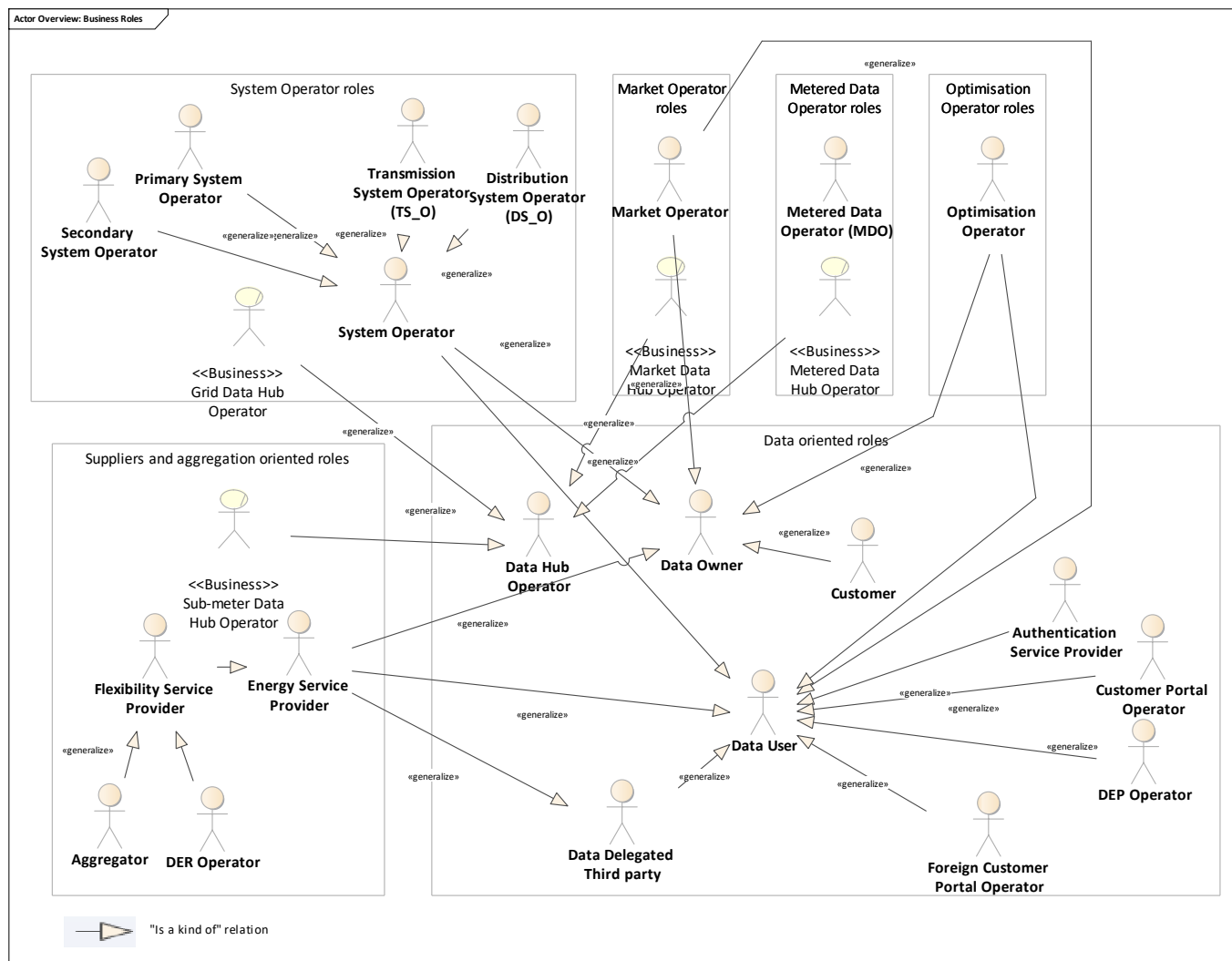


FIGURE 4: BUSINESS ROLES DIAGRAM

This diagram is useful to present already existing Business Roles and new ones analysed via Task 5.2 data exchange System Use Cases. It is generated from a UML model which enables the identification of Business Roles who use already existing systems and will use new ones. The UML model also facilitates the matching between system functionalities and Business Roles' responsibilities.

These Business Roles have been used as part of Task 5.1 to build a Business Role model. Most of them can be mapped to the Harmonized Electricity Market Role Model (HEMRM)<sup>9</sup>.

<sup>9</sup> <https://www.entsoe.eu/digital/cim/role-models/>; [https://www.ebix.org/artikel/role\\_model](https://www.ebix.org/artikel/role_model)

**4.3.4 CROSS-ANALYSIS OF ROLES AND SYSTEM USE CASES**

A cross-analysis on System Use Cases and involved Business Roles makes it easy to determine which System Use Cases are used by which Business Roles (Table 9).

**TABLE 9: MATRIX OF CORRESPONDENCE BETWEEN SYSTEM USE CASES AND BUSINESS ROLES**

SUCs	Aggregator	Authentication Service Provider	Customer	Customer Portal Operator	Data Delegated Third party	Data Hub Operator	Data Owner	Data User	DEP Operator	DER Operator	Energy Service Provider	Flexibility Service Provider	Market Operator	Optimisation Operator	Primary System Operator	Secondary System Operator	System Operator
Aggregate energy data						X			X								
Anonymize energy data						X			X								
Authenticate data users		X		X	X		X		X								
Calculate flexibility baseline	X								X	X		X	X				
Collect energy data	X					X			X	X		X	X				X
Erase and rectify personal data						X	X		X								
Exchange data between DERs and System Operators									X	X							
Manage access permissions							X		X								
Manage data logs							X		X								
Manage flexibility activations	X								X	X		X		X	X	X	
Manage flexibility bids	X								X	X		X	X	X	X	X	X
Manage sub-meter data	X		X			X			X	X	X	X					
Predict flexibility availability	X								X	X		X					X
Provide list of suppliers and ESCOs	X							X	X	X	X						
Transfer energy data								X	X								
Verify and settle activated flexibilities						X			X								X



Similarly, a cross-analysis establishing correspondences between System Use Cases and involved System Roles is useful to determine, for a given System Role (e.g. Data Hub), which System Use Cases have to be implemented and tested (Table 10). It reveals that Data Exchange Platform is the dominant system, followed by Flexibility Platform, Data Hub and (third party) application. While Flexibility Platform is there to support market processes the other three are core systems to organize data exchange from data provider (Data Hub) to data user (Application) via transport layer (Data Exchange Platform).

**TABLE 10: MATRIX OF CORRESPONDENCE BETWEEN SYSTEM USE CASES AND SYSTEM ROLES**

SUCs	Aggregator SCADA	Application	Automation Controller	Data Exchange Platform	Data Hub	Data Source	External Data Sources	Flexibility Platform	Foreign Customer Portal	In-House Device	Meter Data Collection Tool	Network Operator SCADA	Sub-Meter Data Collection Tool	System Operator SCADA
Authenticate data users				X										
Calculate flexibility baseline				X			X	X			X			
Collect energy data					X						X			
Exchange data between DERs and Network Operators	X			X								X		X
Manage authorizations		X		X		X								
Manage flexibility activations								X						
Manage flexibility bids								X						
Manage security logs		X		X	X				X					
Manage sub-meter data			X	X	X					X			X	
Predict flexibility availability				X				X						
Provide list of suppliers and ESCOs				X					X					
Transfer energy data		X		X		X								
Verify and settle activated flexibilities				X	X			X						

#### 4.3.5 BUSINESS OBJECTS

##### 4.3.5.1 EXCHANGED BUSINESS OBJECTS

The System Use Cases identify a list of exchanged data, i.e. Business Objects (Table 11).

**TABLE 11: TABLE OF CORRESPONDENCE BETWEEN SYSTEM USE CASES AND BUSINESS OBJECTS**

SUCs	Business Objects	SUCs	Business Objects
Authenticate data users	Authenticate Information Representation Rights	Manage flexibility bids - Alternative 1	Flexibility Need Flexibility Potential Congestion Matrix Network Restriction Flexibility Call for Tenders Flexibility Bid
Calculate flexibility baseline	Baseline Flexibility Bid	Manage flexibility bids - Alternative 2	Flexibility Potential Flexibility Call for Tenders Flexibility Bid
Collect energy data	Authenticate Information Metering Data Market Data Request on market data Congestion Matrix	Manage sub-meter data	Sub-Meter Data Request on Sub-Meter Data Customer Consent Control Signal
Exchange data between DERs and System Operators	DER Structural Data DER Real Time Data DER Activation	Predict flexibility availability	Flexibility Need Flexibility Potential
Manage access permissions	Authorization information Customer consent Authorization request	Provide list of suppliers and ESCOs	ESCO information Authenticate Information Aggregator information
Manage data logs	Data log request Data log	Transfer energy data	Authenticate Information
Manage flexibility activations - Alternative 1	Flexibility Activation Request Flexibility Bid Congestion Matrix Counter Action Activated Flexibility	Verify and settle activated flexibilities	Metering Data Baseline Activated Flexibility Flexibility Settlement
Manage flexibility activations - Alternative 2	Flexibility Bid Activated Flexibility		

##### 4.3.5.2 OVERALL VIEW OF EXCHANGED BUSINESS OBJECTS

These Business Objects can be clustered into several categories of Business Objects (e.g. Flexibilities, Network Monitoring). They can be represented with a UML diagram (Figure 5). This diagram reflects every Business Object mentioned in the System Use Cases. Further analysis on data standards, data models and formats will be done as part of Tasks 5.1 and 5.5.

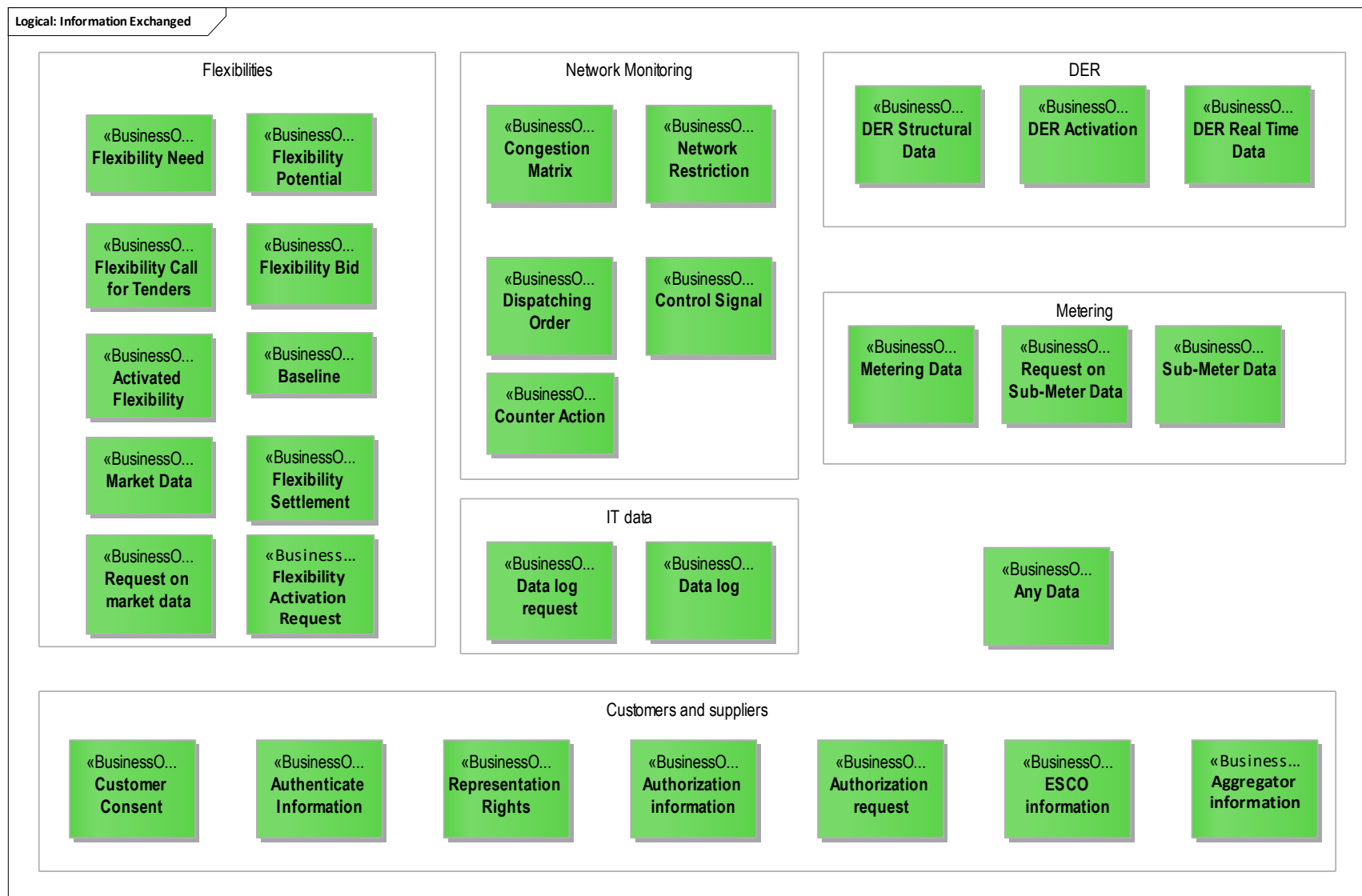


FIGURE 5: BUSINESS OBJECTS DIAGRAM



#### 4.3.6 COMPARISON OF ALTERNATIVE SYSTEM USE CASES

While most of the data exchange System Use Cases are fully agnostic to specific business processes there are few which cannot be fully separated from the underlying processes. In the EU-SysFlex context these are the ones related to specific aspects of flexibility market functioning – most notably ‘Manage flexibility bids’, ‘Manage flexibility activations’, ‘Verify and settle activated flexibilities’, ‘Predict flexibility availability’ and ‘Calculate flexibility baseline’. In these cases some assumptions need to be made in terms of market design though the impact of it should be minimized. While for some of these it was manageable then the two scenarios of ‘Manage flexibility bids’ – prequalification and bidding processes – and the process of ‘Manage flexibility activations’ turned out to be too sensitive to the choice of market design setup. Second, the value of using Data Exchange Platform for data exchanges may be debatable. Therefore, alternative approaches were developed for these System Use Cases to reflect quite different underlying business processes.

##### 4.3.6.1 ALTERNATIVES FOR “MANAGE FLEXIBILITY BIDS” DATA EXCHANGE SYSTEM USE CASE

###### **“Prequalification of the Flexibility Service Providers and their flexibilities” scenario**

Principles of Alternative 1:

- System Operator publishes flexibility need and Flexibility Service Provider publishes flexibility potential
- System Operator assesses grid impact of flexibility (based on offered flexibility potential) and sends result to Flexibility Platform for prequalification
- Flexibility Platform prequalifies Flexibility Service Providers and sets long-term restrictions
- Communication between system roles always via Data Exchange Platform

Principles of Alternative 2:

- Primary System Operator sets prequalification criteria
- Flexibility Service Provider sends flexibility potential
- Flexibility Platform publishes prequalification criteria and initiates prequalification of Flexibility Service Provider
- Grid prequalification is fulfilled by System Operator where flexibility is connected to (Secondary System Operator) and prequalification results are shared with relevant System Operators, but not with Flexibility Platform.
- Product prequalification is fulfilled by Flexibility Platform
- Communication between System Operators as well as between Flexibility Platform and System Operators is a direct communication (no platform in between since no added value expected)
- Communication between Flexibility Platform and Flexibility Service Providers is conducted via Data Exchange Platform

The main differences are summarized in Table 12.

**TABLE 12: ALTERNATIVES FOR “PREQUALIFICATION OF THE FLEXIBILITY SERVICE PROVIDERS AND THEIR FLEXIBILITIES” SCENARIO OF “MANAGE FLEXIBILITY BIDS” SYSTEM USE CASE**

Alternative 1	Alternative 2
Prequalification is conducted by Flexibility Platform and includes grid assessment by Primary and Secondary System Operator (results send to FP)	Product prequalification is conducted by Flexibility Platform. Grid prequalification is fulfilled by System Operator where flexibility is connected to (Secondary System Operator) and prequalification results are shared with relevant System Operators, but not with Flexibility Platform.
Communication between system roles always via Data Exchange Platform	Communication between System Operators and between Flexibility Platform and System Operators is a direct communication (no platform in between); communication between Flexibility Platform and Flexibility Service Providers is conducted via Data Exchange Platform

### **“Bidding process” scenario**

#### Principles of Alternative 1:

- Primary System Operator opens tenders and Flexibility Platform makes the information available to Flexibility Service Providers
- Flexibility Platform collects bids from Flexibility Service Providers
- Primary System Operator and Secondary System Operator asses grid impact
- Flexibility Platform collects results of grid assessments
- In case of congestion Flexibility Platform sets short-term restrictions
- Flexibility Platform ranks bids based on merit order principle

#### Principles of Alternative 2:

- Flexibility Platform collect bids and ranks bids after bids registration
- Secondary System Operator (System Operator where flexibility is connected) conducts grid assessment and sends information to Primary System Operator
- System Operators select bids, clustering mechanism possible, if agreed (Secondary System Operator clusters, Primary System Operator selects, Secondary System Operator declusters)
  - ➔ As the clustering mechanism needs to be based on a joint PSO/SSO agreement and there are different possible clustering mechanisms, the specific clustering mechanism can have different forms and be based on different criteria. The PSO and SSO can agree to base the clustering of bids on certain criteria such as an agreed span of prices in combination with the sensitivity of the bid to the coupling point. In this process, the SSO would cluster the bids and the PSO could only select such a clustered bid or a part of the maximum potential, informing the SSO which declusters and selects the bids most efficient for the SSO’s grid (highest efficiency for PSO is included in the PSO’s choice of bid cluster with one and the same effect on the PSO’s

grid). Such clustering of bids leads to lower limitations of flexibility bids, since the information of the feasibility of flexibility bids to the PSO needs to be available earlier than potentially flexibility providers must be informed about the selection, so that the SSO has manoeuvring space to react on changes in its grid (e.g. changed weather or demand forecasts). In general clustering mechanisms can reduce complexity in data exchange between PSO and SSO (especially for meshed grids with interdependencies), allows coordination based on flexibility potential from SSO grid and still allows short-term reaction towards changes of power flows.

- Communication between Flexibility Platform and Flexibility Service Providers is conducted via Data Exchange Platform; communication between Primary System Operator and Secondary System Operator as well as Flexibility Platform and System Operators is a direct communication

The main differences are summarized in Table 13.

**TABLE 13: ALTERNATIVES FOR “BIDDING PROCESS” SCENARIO OF “MANAGE FLEXIBILITY BIDS” SYSTEM USE CASE**

Alternative 1	Alternative 2
System Operators validate bids separately, Market Operator selects bids on a merit order principle including grid data	Market Operator collects/validates bids, System Operators jointly select bids based on agreed mechanisms
No clustering and declustering intended	Secondary System Operator clusters and declusters bids based on Primary System Operator/Secondary System Operator agreement to reduce complexity in data exchange and to reduce bid limitations
Communication between system roles always via Data Exchange Platform	Communication between System Operators and between Flexibility Platform and System Operators is a direct communication (no platform in between); communication between Flexibility Platform and Flexibility Service Providers is conducted via Data Exchange Platform

#### 4.3.6.2 ALTERNATIVES FOR “MANAGE FLEXIBILITY ACTIVATION” DATA EXCHANGE SYSTEM USE CASE

Principles of Alternative 1:

- Primary System Operator requests flexibility activation
- Flexibility Platform registers requests for activation
- Secondary System Operator assesses grid impact
- Iterative process in case of congestion or imbalance → Flexibility Platform selects next bid in merit order
- Resulting request is sent to Flexibility Service Provider via Data Exchange Platform
- Activation confirmation is sent to Flexibility Platform via Data Exchange Platform



#### Principles of Alternative 2:

- Primary System Operator requests flexibility activation, Secondary System Operator assesses grid impact
- Iterative process of Primary System Operator requesting flexibility activation and Secondary System Operator assessing grid impact (loop only needed in case of limitations, e.g. congestion)
- Secondary System Operator declusters bids (in accordance to clustering based on Primary System Operator and Secondary System Operator agreement in bid selection)
- Flexibility Platform collects the resulting requests of the SO and sends activation request via Data Exchange Platform to Flexibility Service Provider
- Primary System Operator, Secondary System Operator and Flexibility Platform receive activation confirmation from Flexibility Service Provider via Data Exchange Platform

The main differences can be summarized with the following table:

**TABLE 14: ALTERNATIVES FOR “MANAGE FLEXIBILITY ACTIVATION” SYSTEM USE CASE**

Alternative 1	Alternative 2
Iterative process between Flexibility Platform and System Operators in case of congestion and/or imbalance → Flexibility Platform selects next bid in merit order	Iterative process between Primary System Operator (requesting flexibility activation) and Secondary System Operator (assessing grid impact) in case of limitations, e.g. congestion
No clustering and declustering intended	Secondary System Operator declusters bids (in accordance to clustering based on Primary System Operator and Secondary System Operator agreement in bid selection)
Communication between system roles always via Data Exchange Platform	Communication between System Operators and between Flexibility Platform and System Operators is a direct communication (no platform in between); communication between Flexibility Platform and Flexibility Service Providers is conducted via Data Exchange Platform

#### 4.3.7 PERSONAL DATA MANAGEMENT

The management of personal data owned by EU individuals must be compliant with GDPR. It is described in System Use Cases where personal data is exchanged and in particular in “Erase and rectify personal data” and “Manage access permissions” System Use Cases. The use cases go beyond personal data to address all private data, i.e. both personal and commercially sensitive data.

More precisely, the System Use Cases determine:

- How privacy is dealt with,
- How private data are identified and separated from other data,
- How to fulfill the new citizen rights allocated by the GDPR to data owners.

Practically, personal data management requirements deal with several citizen rights (Table 15). These citizen rights are integrated in the UML model as requirements associated with SUCs.

**TABLE 15: CITIZEN RIGHTS**

Rights	Descriptions	SUCs
Informed	Right to be informed of any personal data held, of how it is used or processed, of any breach, and of any disclosure/usage to third parties	Manage data logs
Consent	Right to withdraw consent or restrict the processing or sharing their data. Explicit and unambiguous informed consent must be obtained	Manage access permissions
Access	Right to secure direct access of own personal data and to any processing, storage or sharing details	Authenticate data users Manage data logs Transfer energy data
Correct	Right to rectify data if inaccurate or incomplete	Erase and rectify personal data
Forget	Right to request the deletion or removal of personal data where there is no compelling reason for its continued processing	Erase and rectify personal data
Portable	A copy of the data held may be requested by the individual in a portable format	Transfer energy data
Breach	Right to be informed of any data breach that risks a person's rights and freedoms within 72 hours	Manage data logs

## 5. COMPARISON OF DATA EXCHANGE SYSTEM USE CASES WITH EU-SYSFLEX DEMONSTRATORS' SPECIFICATIONS

Despite the efforts to bridge the mismatches found between Task 5.2 data exchange System Use Cases and Work Packages 6, 7 & 8 demonstrators' specifications, some differences remained.

An analysis was carried out as part of Task 5.2 with the objective of comparing Work Packages 6, 7 & 8 demonstrators with Task 5.2 data exchange System Use Cases. The analysis was extended to Work Packages 9 demonstrators. This analysis consisted in:

- Identifying corresponding topics,
- Identifying differences: business or IT needs covered in Task 5.2, neither objected nor needed by Work Packages 6, 7 & 8 demonstrators and to be demonstrated in Work Package 9 demonstrators.

It was based on the following documents provided by the demonstrators:

- "Demonstrators' system use cases description" (D6.1),
- "General description of processes and data transfer within three EU-SysFlex demonstrators" (D6.4),
- "System uses cases and requirements: centralized and decentralized flexibility resources" (D7.1),
- "Overall architectures for the VPP and Flexibility Hub (WP7)" (D7.2),
- "WP8 Demonstration Specification for Field Testing: Aggregation Approaches for Multi-services Provision from a Portfolio of Distributed Resources" (D8.1),
- "9.1 Affordable tool" (information provided by Task 9.1 leader),
- "Application: TSO DSO flexibility data exchange – Flexibility Platform" (information provided by Task 9.2 leader),
- "Estfeed Research Environment" (information provided by Task 9.3 leader),
- "Architectural Design and Business Use Cases of Data Exchange Demonstrations" (MS17 report).

The analysis resulted in the identification of differences as depicted in Table 16. Cells in blue show data exchange activities tested like explained in Task 5.2 data exchange System Use Cases. Cells in purple show data exchange activities tested in the demonstrators but with a different approach. Cells in grey show data exchange activities not in the scope of the demonstrators.

This table shows that, on the basis of Task 5.2 data exchange System Use Cases, Work Packages 6, 7 & 8 demonstrators are different from each other. The table also shows that the alternatives of "Manage flexibility bids" and "Manage flexibility activation" data exchange System Use Cases have been tested in the German demonstrator. It also shows that some functional specifications can be found in Task 5.2 data exchange System Use Cases (e.g. personal data management) and not in Work Packages 6, 7 & 8 demonstrators' documents.

**TABLE 16: DIFFERENCES BETWEEN DATA EXCHANGE SYSTEM USE CASES AND EU-SYSFLEX DEMONSTRATORS**

T5.2 SUCs vs demos	WP6 Germany	WP6 Italy	WP6 Finland	WP7 Portugal VPP	WP7 Portugal FlexHub	WP8 France	WP9
Aggregate energy data							
Anonymize energy data							
Authenticate data users							
Calculate flexibility baseline							
Collect energy data							
Erase and rectify personal data							
Exchange data between DERs and System Operators							
Manage access permissions							
Manage flexibility activations	Alt 2						Alt 1
Manage flexibility bids / Prequalification process	Alt 2						Alt 1
Manage flexibility bids / Bidding process	Alt 2						Alt 1
Manage data logs							
Manage sub-meter data							
Predict flexibility availability							
Provide list of suppliers and ESCOs							
Transfer energy data							
Verify and settle activated flexibilities							

	<b>Data exchange activity tested like explained in WP5 data exchange SUC</b>
	<b>Data exchange activity tested in the demo but with a different approach</b>
	<b>Data exchange activity not in scope of the demo</b>

Task 5.2 data exchange System Use Cases were used as specifications for Work Package 9 demonstrators, as shown in Table 17. Cells in blue show data exchange activities tested like explained in Task 5.2 data exchange System Use Cases and name the tools implementing them. Cells in grey show data exchange activities not in scope of the demonstrators. Apart from the Grid Validation System and the Foreign Customer Portal, all of the systems described in Task 5.2 data exchange System Use Cases are implemented in Work Package 9 demonstrators.

TABLE 17: SYSTEMS IDENTIFIED AND AS IMPLEMENTED IN DATA MANAGEMENT DEMONSTRATORS

System Roles	Task 9.1 Affordable Tool for smaller DSR units	Task 9.2 Application for TSO-DSO flexibility data exchange	Task 9.3 Cross-border data exchange
Data Exchange Platform	Elering's Esfeed	Elering's Esfeed	Elering's Esfeed / ENTSO-E's ECCo SP
Data Hub	Affordable Tool	Elering's data hub	Elering's Data Hub
Grid Validation System			
Flexibility Platform		Flexibility Platform	
System Operator SCADA		TSO/DSO IT System (SO Simulator)	
Aggregator SCADA	Affordable tool	Affordable tool (FSP Simulator)	
Automation Controller	Affordable Tool		
Customer Portal	Customer interface of Affordable Tool		e-Elering
Foreign Customer Portal			
In-House Device	In-house devices used by Affordable Tool		
Meter Data Collection Tool	Affordable Tool		
Sub-Meter Data Collection Tool	Affordable Tool		
External Data Source			Estonian Building Registry /Cybernetica's Sharemind (providing baselines)

## 6. CONCLUSION

This deliverable describes the specifications of 16 data exchange System Use Cases for the EU-SysFlex project. Each data exchange System Use Case describes how systems and Business Roles interact to perform a Smart Grid Function required to enable / facilitate the business processes described in Business Use Cases.

The focus was on data exchange System Use Cases that have an impact on the feasibility of scaling up flexibility services (from an IT perspective) and are useful for data management demonstrations in Work Package 9.

System Use Cases are agnostic to related business processes, most of these address more than one category of Business Use Cases. It means that it is possible to have universal data management processes, i.e. to have efficiency gains in energy sector and also across sectors.

The modelling of System Use Cases highlighted some main lessons:

- It is not always fully possible to define data exchanges without making assumptions on business processes. Therefore, assumptions need to be made and, for some data exchange System Use Cases, there were multiple alternatives with different business processes underlying, in order to avoid looking only at one possible option.
- The assumptions made for the business processes are not to be understood as recommendations. It is merely the basis to be able to describe data exchanges between systems as assumptions, considering there are different options for this business process.
- Some System Roles are expected to play a key role in data exchanges. It would be notably the case for Data Exchange Platforms and Data Hubs, which are used in most of the data exchange System Uses Cases.
- The cross-border effect has been studied and it results in prerequisites and a foreign Customer Portal System Role, in particular for storing and exchanging foreign customer consents.

A cross-analysis establishing correspondences between System Use Cases and involved System Roles reveals that Data Exchange Platform is a core system, followed by Flexibility Platform, Data Hub and (third party) application. While Flexibility Platform is there to support market processes the other three are core systems to organize data exchange from data provider (Data Hub) to data user (Application) via transport layer (Data Exchange Platform). Flexibility platforms as intermediaries between buyers and sellers must be able to manage data also.

Most of the involved Business Roles can be mapped to the Harmonized Electricity Market Role Model (HEMRM).

Task 5.2 data exchange System Use Cases were described according to IEC 62559 method and were written with Modсарus, a freeware plugin for Sparx Enterprise Architect UML tool and provided by EDF.

They were compared with Work Packages 6, 7 & 8 demonstrators' specifications, so that investigated subjects and differences could be pointed out. These differences are due to business or IT needs covered in Task 5.2, not objected nor needed by Work Packages 6, 7 & 8 demonstrators and to be demonstrated in Work Package 9.

Task 5.2 data exchange System Use Cases have been used by Work Package 9 demonstrators as specifications for data management solutions to be demonstrated for flexibility services. Apart from the Grid Validation System and the Foreign Customer Portal, all of the systems described in Task 5.2 data exchange System Use Cases have been implemented in Work Package 9 demonstrators.

## 7. COPYRIGHT

Copyright © EU-SysFlex, all rights reserved. This document may not be copied, reproduced, or modified in whole or in part for any purpose. In addition, an acknowledgement of the authors of the document and all applicable portions of the copyright notice must be clearly referenced.

This document as well any changes in this document will be notified to and approved by PMB.

The EC / Innovation and Networks Executive Agency is not responsible for any use that may be made of the information it contains.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under EC-GA No 773505.



## 8. BIBLIOGRAPHY

[ISO/IEC 42010:2007] Systems and software engineering — Recommended practice for architectural description of software-intensive systems

[IEC/TS62913-1] Generic smart grid requirements - Part 1: Specific application of the Use Case methodology for defining generic smart grid requirements according to the IEC systems approach

[IEC 62559-2] Use case methodology – Part 2: Definition of the templates for use cases, actor list and requirements list

[HEMRM] The Harmonized Electricity Market Role Model version 2019-01<sup>10</sup>

---

<sup>10</sup> [https://eepublicdownloads.blob.core.windows.net/public-cdn-container/clean-documents/EDI/Library/HRM/Harmonised\\_Role\\_Model\\_2019-01.pdf](https://eepublicdownloads.blob.core.windows.net/public-cdn-container/clean-documents/EDI/Library/HRM/Harmonised_Role_Model_2019-01.pdf)

## 9. ANNEX

As explained above, data exchange System Use Cases are elaborated with a UML model. This model is used to generate, with Modсарus, Word documents compliant to IEC 62559 use case methodology.

The following chapters contain the Word documents generated for each data exchange System Use Case.

### 9.1 AGGREGATE ENERGY DATA

## Aggregate energy data

Based on IEC 62559-2 edition 1  
Generated from UML Use Case Repository with Modсарus® (EDF R&D Tool)

### 1. Description of the use case

#### 1. Name of use case

Use case identification		
ID	Area(s)/Domain(s)/Zone(s)	Name of use case
	Access to data,Balance management,Market for flexibilities,Operational planning and forecasting,Services related to end customers	Aggregate energy data

#### 2. Version management

Version management				
Version No.	Date	Name of author(s)	Changes	Approval status
1	2018-04-12	Kalle Kuk (Elering)		
2	2018-10-03	Ricardo Jover (EDF)	UML model	
3	2018-10-04	Eric Suignard (EDF)	Version post WP5&9 physical meeting in Tallinn	
4	2018-10-11	Ricardo Jover (EDF)	Assumptions concerning users of the Application	
5	2019-05-07	Eric Suignard (EDF)	WP6-7-8 demos alignment and miscellaneous changes	
6	2020-06-16	Eric Suignard (EDF)	innogy's and Elering's review	

#### 3. Scope and objectives of use case

Scope and objectives of use case	
Scope	Aggregation of different types of data made available through data exchange platform
Objective(s)	Making private data available to other parties without authorization (permission) requirement.: Making different types of data available for reporting and statistics
Related business case(s)	

#### 4. Narrative of Use Case

<i>Narrative of use case</i>	
<b>Short description</b>	
Data Exchange Platforms can support data aggregation by transporting aggregated data from a data source to an application. Aggregation itself takes place at data source. Aggregated data may be useful for different applications (services) – e.g. related to benchmarking, national statistics, imbalance reporting. Also, aggregated data would not require consent (permission rights) for personal data or commercially sensitive data.	
<b>Complete description</b>	
<p style="text-align: center;"><u>Summary of use case</u></p> <ul style="list-style-type: none"> <li>• <b>Request aggregated data</b>  <u>Description:</u> <ul style="list-style-type: none"> <li>▪ Aggregates data  <u>Description:</u></li> <li>▪ Forwards aggregated data  <u>Description:</u></li> <li>▪ Forwards aggregated data  <u>Description:</u></li> <li>▪ Forwards aggregated data request  <u>Description:</u></li> <li>▪ Forwards aggregated data request  <u>Description:</u></li> <li>▪ Requests aggregated data  <u>Description:</u></li> <li>▪ Sends aggregated data  <u>Description:</u></li> </ul> </li> </ul>	

#### 5. Key performance indicators (KPI)

#### 6. Use case conditions

<i>Use case conditions</i>	
<i>Assumptions</i>	
1	Same aggregation method could be applied for data sets in different countries to ensure the comparability in case requested by a party.
2	Application and Data Hub have a prior agreement to exchange aggregated data or there is legal requirement for Data Hub to make certain aggregated data available
3	Some roles like Energy Service Provider and Data user can use the Application to request aggregated data
<i>Prerequisites</i>	
1	Aggregation method used shall not enable the identification of the individual behind the personal data or organization behind the commercially sensitive data
2	Aggregation tool is necessary in this use case
3	Standard aggregation rules

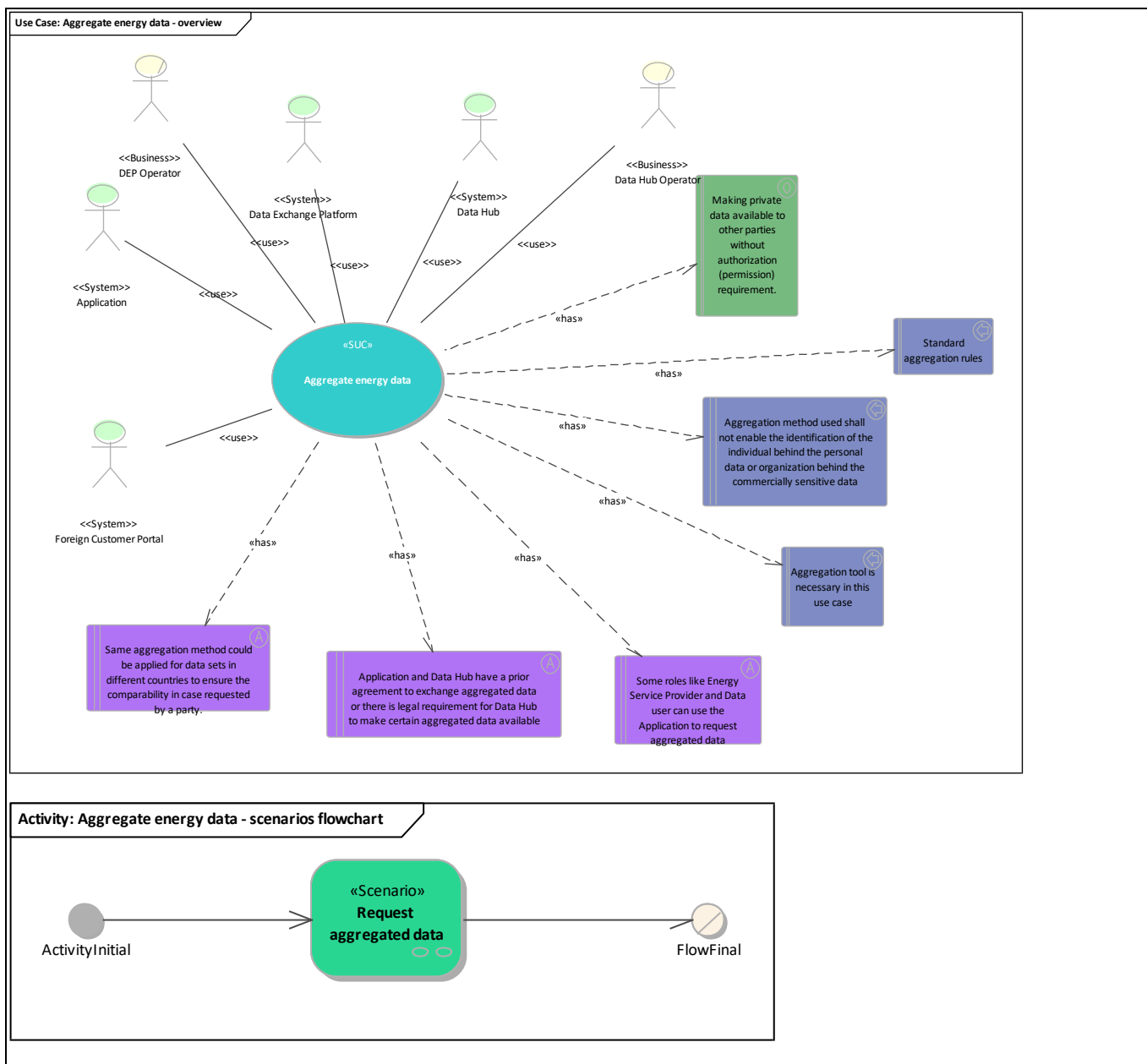
## 7. Further information to the use case for classification/mapping

<i>Classification information</i>
<i>Relation to other use cases</i>
<i>Level of depth</i>
<i>Prioritisation</i>
<i>Generic, regional or national relation</i>
<i>Nature of the use case</i>
SUC
<i>Further keywords for classification</i>

## 8. General remarks

### 2. Diagrams of use case

<i>Diagram(s) of use case</i>
-------------------------------



### 3. Technical details

#### 1. Actors

Actors			
Grouping (e.g. domains, zones)		Group description	
Actor name	Actor type	Actor description	Further information specific to this use case
Application	System	Any kind of system connected to a Data Exchange Platform and used by a market participant who wishes to receive data.	

Data Exchange Platform	System	Data exchange platform (DEP) is a communication platform the basic functionality of which is to secure data transfer (routing) from data providers (e.g. data hubs, flexibility service providers, TSOs, DSOs) to the data users (e.g. TSOs, DSOs, consumers, suppliers, energy service providers). DEP stores data related to its services (e.g. cryptographic hash of the data requested). The DEP does not store core energy data (e.g. meter data, grid data, market data) while these data can be stored by data hubs. Several DEPs may exist in different countries and inside one country.	
Data Hub	System	Data Hub is an information system which main functionality is to store and make available measurements (e.g. meter data, operational data) and associated master data. Data Hubs are not necessarily centralized in a country or in a region.	
Foreign Customer Portal	System	Customer Portal for another country. Can also mean a separate portal in the same country.	
Data Hub Operator	Business	Data hub operator owns and operates an information system which main functionality is to store and make available electricity (also gas, heat) metering data and associated master data. Can be : <ul style="list-style-type: none"> <li>• Grid Data Hub Operator in the sphere of a System Operator</li> <li>• Market Data Hub Operator in the sphere of a Market Operator</li> <li>• Meter Data Hub Operator in the sphere of a Metered Data Operator</li> <li>• Sub-meter Data Hub Operator in the sphere of an Energy Service Provider</li> </ul>	
DEP Operator	Business	Data exchange platform operator owns and operates a communication system which basic functionality is data transfer.	

## 2. References

### 4. Step by step analysis of use case

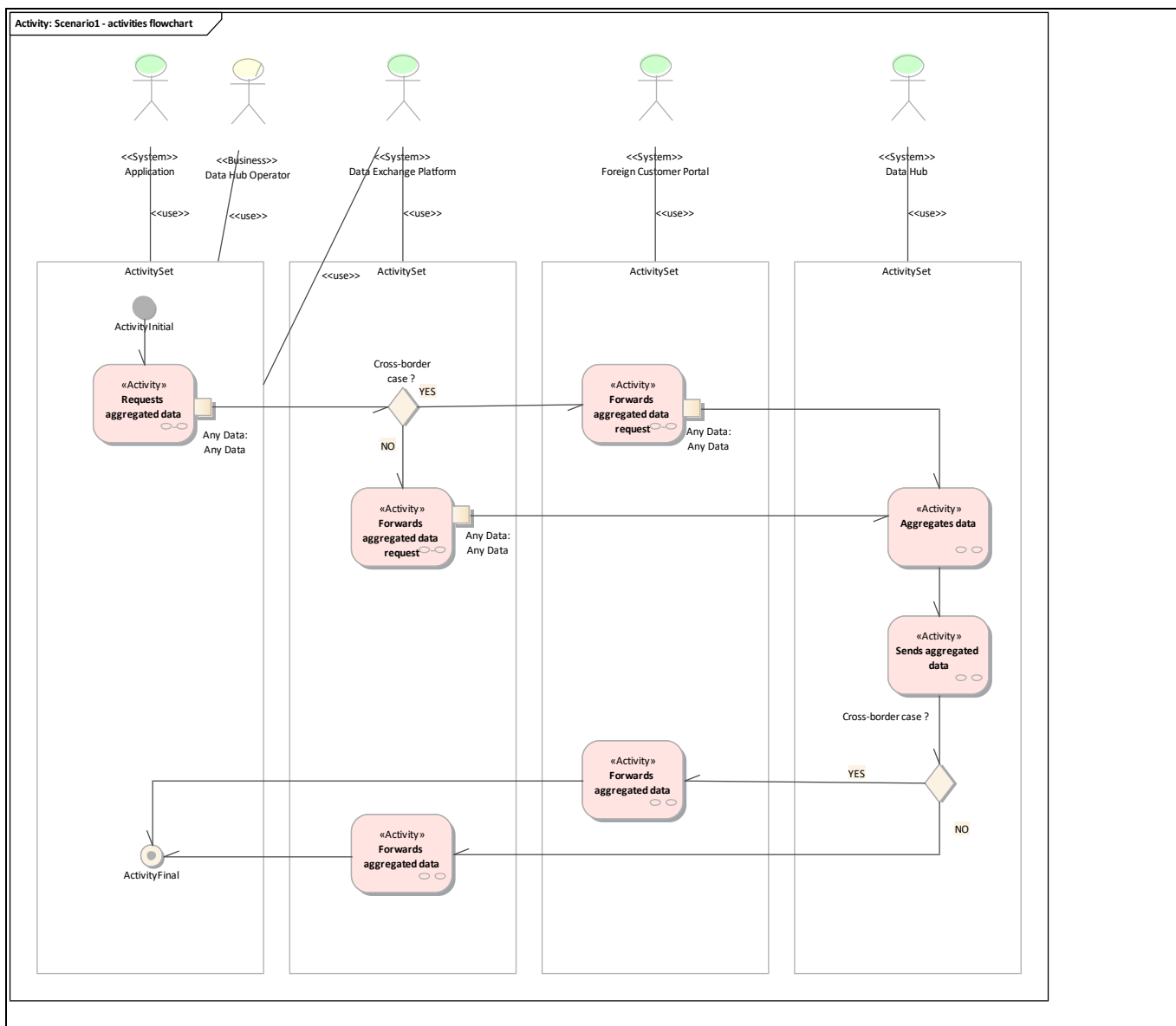
#### 1. Overview of scenarios

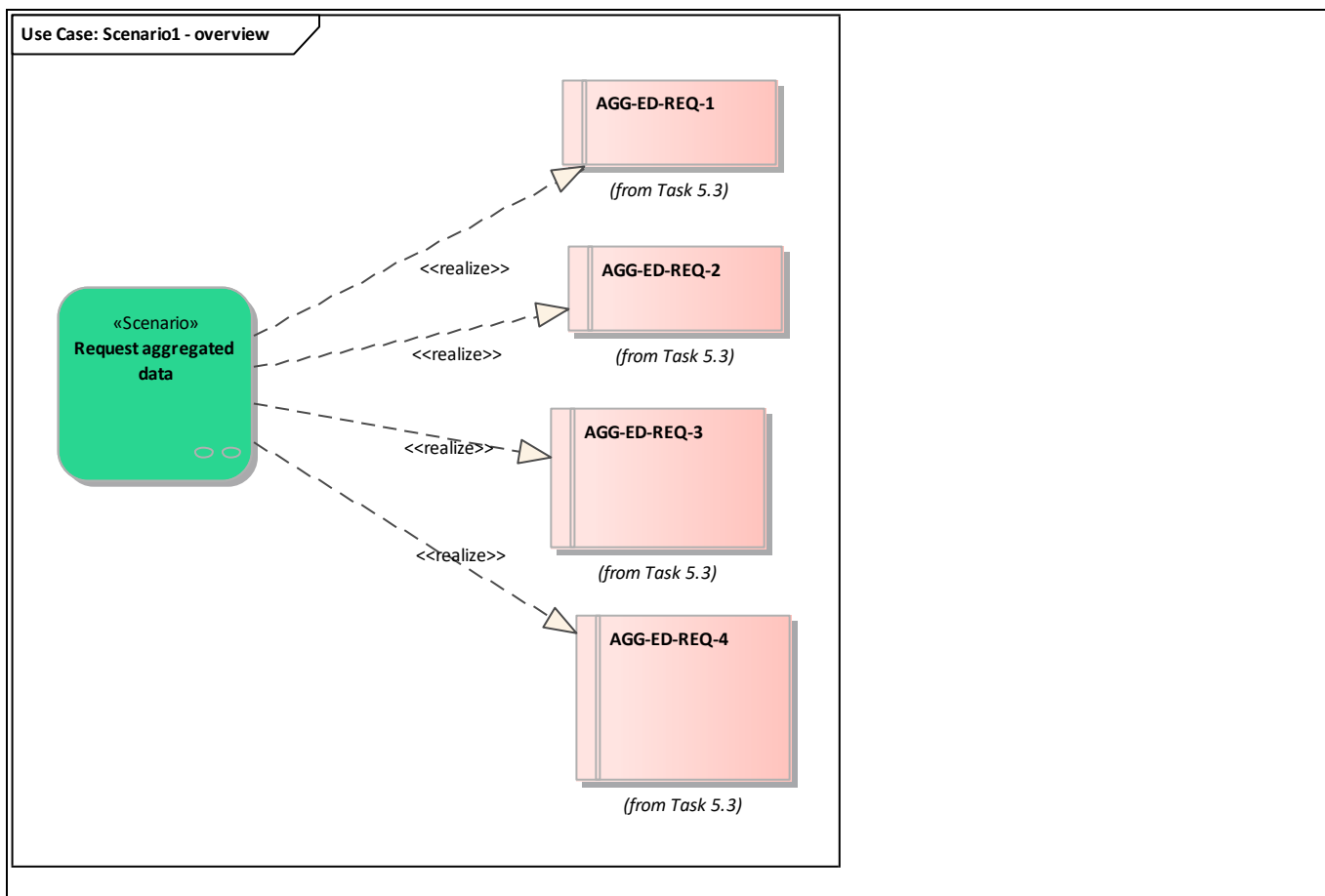
Scenario conditions						
No.	Scenario name	Scenario description	Primary actor	Triggering event	Pre-condition	Post-condition
1	Request aggregated data					

#### 2. Steps - Scenarios

- Request aggregated data

Requirement list (refer to "Requirement" section for more information)	
Requirement R-ID	Requirement name
Cat1.Reg1	AGG-ED-REQ-3
Cat1.Reg2	AGG-ED-REQ-4
Cat1.Reg3	AGG-ED-REQ-2
Cat1.Reg4	AGG-ED-REQ-1





### Scenario step by step analysis

Scenario								
Scenario name		Request aggregated data						
Step No	Event	Name of process/activity	Description of process/activity	Service	Information producer (actor)	Information receiver (actor)	Information exchanged (IDs)	Requirement, R-IDs
1.1		Aggregates data			Data Hub			
1.2		Forwards aggregated data			Foreign Customer Portal			
1.3		Forwards aggregated data			Data Exchange Platform			
1.4		Forwards aggregated data request			Data Exchange Platform	Data Hub	Info1-Any Data	
1.5		Forwards aggregated data request			Foreign Customer Portal	Data Hub	Info1-Any Data	
1.6		Requests aggregated data			Application	Data Exchange Platform, Foreign	Info1-Any Data	



						Customer Portal		
1.7		Sends aggregated data			Data Hub			

- 1.4. Forwards aggregated data request

**Business section: Request aggregated data/Forwards aggregated data request**

Information sent:

Business object	Instance name	Instance description
Any Data	Any Data	

- 1.5. Forwards aggregated data request

**Business section: Request aggregated data/Forwards aggregated data request**

Information sent:

Business object	Instance name	Instance description
Any Data	Any Data	

- 1.6. Requests aggregated data

**Business section: Request aggregated data/Requests aggregated data**

Information sent:

Business object	Instance name	Instance description
Any Data	Any Data	

## 5. Information exchanged

Information exchanged			
Information exchanged, ID	Name of information	Description of information exchanged	Requirement, R-IDs
Info1	Any Data		

## 6. Requirements (optional)

Requirements (optional)		
Categories ID	Category name for requirements	Category description
Cat1	Task 5.3	Requirements integrated from Task 5.3.
Requirement R-ID	Requirement name	Requirement description
Req1	AGG-ED-REQ-3	Data source (e.g. meter data hub) ability to aggregate data
Req2	AGG-ED-REQ-4	DEP ability to forward aggregated data from a data source to a data user
Req3	AGG-ED-REQ-2	Standard rules to aggregate data in order to ensure the comparability of aggregated data sets

Req4	AGG-ED-REQ-1	Standard rules to aggregate data in order not to enable the identification of persons behind data
------	--------------	---

## 7. Common terms and definitions

## 8. Custom information (optional)

### 9.2 ANONYMIZE ENERGY DATA

# Anonymize energy data

Based on IEC 62559-2 edition 1  
Generated from UML Use Case Repository with Modsarus® (EDF R&D Tool)

## 1. Description of the use case

### 1. Name of use case

Use case identification		
ID	Area(s)/Domain(s)/Zone(s)	Name of use case
	Access to data,Market for flexibilities,Services related to end customers	Anonymize energy data

### 2. Version management

Version management				
Version No.	Date	Name of author(s)	Changes	Approval status
1	2018-04-12	Kalle Kuk (Elering)		
2	2018-10-03	Ricardo Jover (EDF)	UML model	
3	2018-10-04	Eric Suignard (EDF)	Version post WP5&9 physical meeting in Tallinn	
4	2018-10-11	Ricardo Jover (EDF)	Assumptions concerning users of the Application	
5	2019-05-07	Eric Suignard (EDF)	WP6-7-8 demos alignment and miscellaneous changes	
6	2020-06-16	Eric Suignard (EDF)	innogy's and Elering's review	

### 3. Scope and objectives of use case

Scope and objectives of use case	
Scope	Anonymization of personally identifiable data.
Objective(s)	Making private data available to other parties without authorization (permission) using anonymization techniques
Related business case(s)	

#### 4. Narrative of Use Case

<i>Narrative of use case</i>	
<b>Short description</b>	
Private data without identifying the person behind may be useful for some applications and services – e.g. for academic studies, benchmarking, reporting, etc. Using techniques to anonymize data makes access to data easier for these parties as no consent is needed from every individual consumer.	
<b>Complete description</b>	
<p style="text-align: center;"><u>Summary of use case</u></p> <ul style="list-style-type: none"> <li> <b>Anonymize private data</b>  <u>Description:</u> <ul style="list-style-type: none"> <li>Anonymizes data <u>Description:</u></li> <li>Forwards anonymized data <u>Description:</u></li> <li>Forwards anonymized data <u>Description:</u></li> <li>Forwards anonymized data request <u>Description:</u></li> <li>Forwards anonymized data request <u>Description:</u></li> <li>Requests anonymized data <u>Description:</u></li> <li>Sends anonymized data <u>Description:</u></li> </ul> </li> </ul>	

#### 5. Key performance indicators (KPI)

#### 6. Use case conditions

<i>Use case conditions</i>	
<i>Assumptions</i>	
1	Application and Data Hub have a prior agreement to exchange anonymized data or there is legal requirement for Data Hub to make certain anonymized data available
2	Same anonymization technique could be applied for data sets in different countries to ensure the comparability in case requested by a party.
3	Some roles like Energy Service Provider and Data user can use the Application to request anonymized data
<i>Prerequisites</i>	
1	Standard anonymization technique
2	Anonymization tool is necessary in this use case
3	Anonymization technique used shall not enable the identification of the individual behind the data
4	The use of data for anonymized purposes needs to comply with GDPR (General Data Protection Regulation) and CEP (Clean Energy Package) requirements.

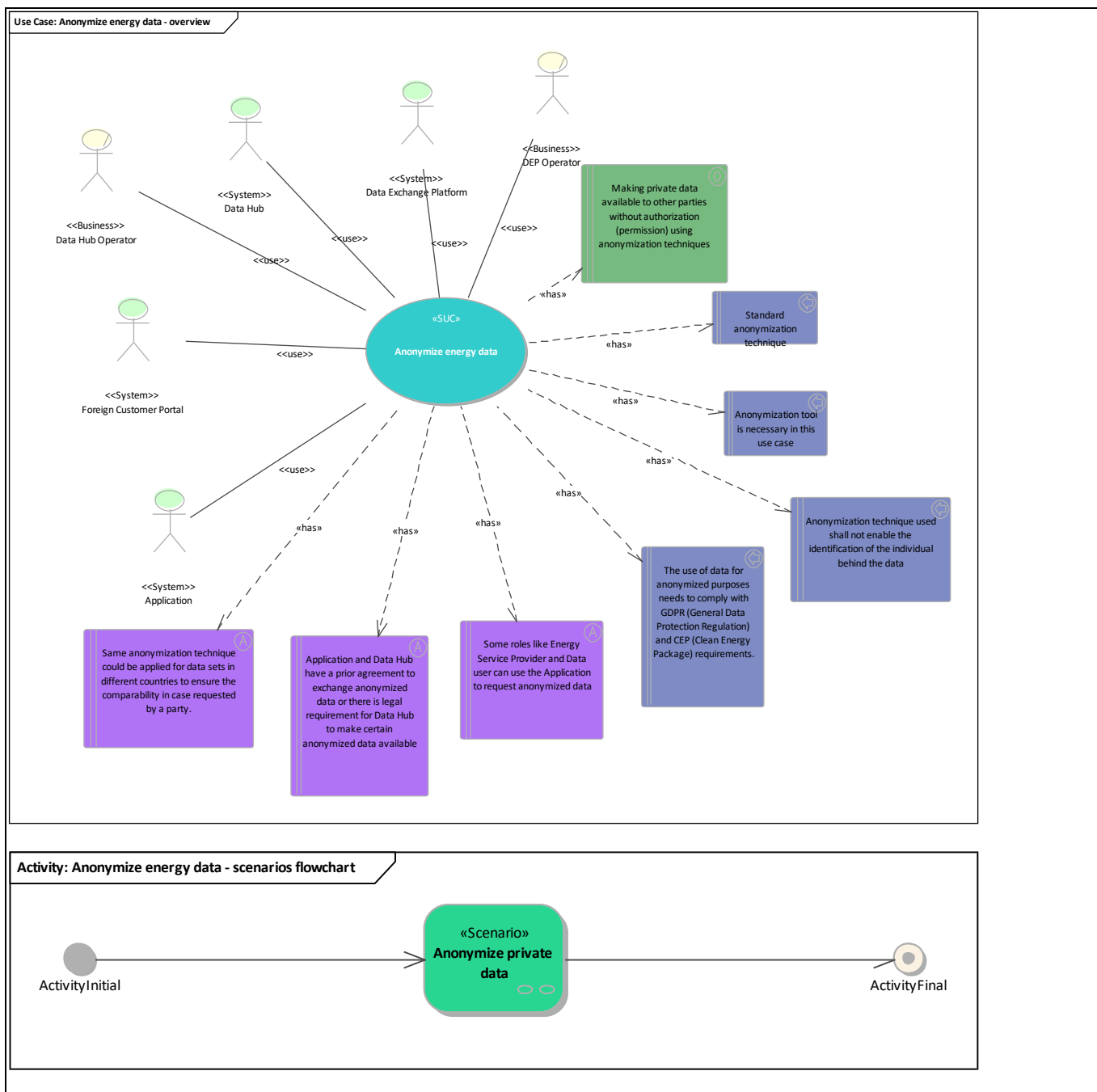
## 7. Further information to the use case for classification/mapping

<i>Classification information</i>
<i>Relation to other use cases</i>
<i>Level of depth</i>
<i>Prioritisation</i>
<i>Generic, regional or national relation</i>
<i>Nature of the use case</i>
SUC
<i>Further keywords for classification</i>

## 8. General remarks

### 2. Diagrams of use case

<i>Diagram(s) of use case</i>
-------------------------------



### 3. Technical details

#### 1. Actors

Actors			
Grouping (e.g. domains, zones)		Group description	
Actor name	Actor type	Actor description	Further information specific to this use case

Data Exchange Platform	System	Data exchange platform (DEP) is a communication platform the basic functionality of which is to secure data transfer (routing) from data providers (e.g. data hubs, flexibility service providers, TSOs, DSOs) to the data users (e.g. TSOs, DSOs, consumers, suppliers, energy service providers). DEP stores data related to its services (e.g. cryptographic hash of the data requested). The DEP does not store core energy data (e.g. meter data, grid data, market data) while these data can be stored by data hubs. Several DEPs may exist in different countries and inside one country.	
Data Hub	System	Data Hub is an information system which main functionality is to store and make available measurements (e.g. meter data, operational data) and associated master data. Data Hubs are not necessarily centralized in a country or in a region.	
Foreign Customer Portal	System	Customer Portal for another country. Can also mean a separate portal in the same country.	
Application	System	Any kind of system connected to a Data Exchange Platform and used by a market participant who wishes to receive data.	
Data Hub Operator	Business	Data hub operator owns and operates an information system which main functionality is to store and make available electricity (also gas, heat) metering data and associated master data. Can be : <ul style="list-style-type: none"> <li>• Grid Data Hub Operator in the sphere of a System Operator</li> <li>• Market Data Hub Operator in the sphere of a Market Operator</li> <li>• Meter Data Hub Operator in the sphere of a Metered Data Operator</li> <li>• Sub-meter Data Hub Operator in the sphere of an Energy Service Provider</li> </ul>	
DEP Operator	Business	Data exchange platform operator owns and operates a communication system which basic functionality is data transfer.	

## 2. References

### 4. Step by step analysis of use case

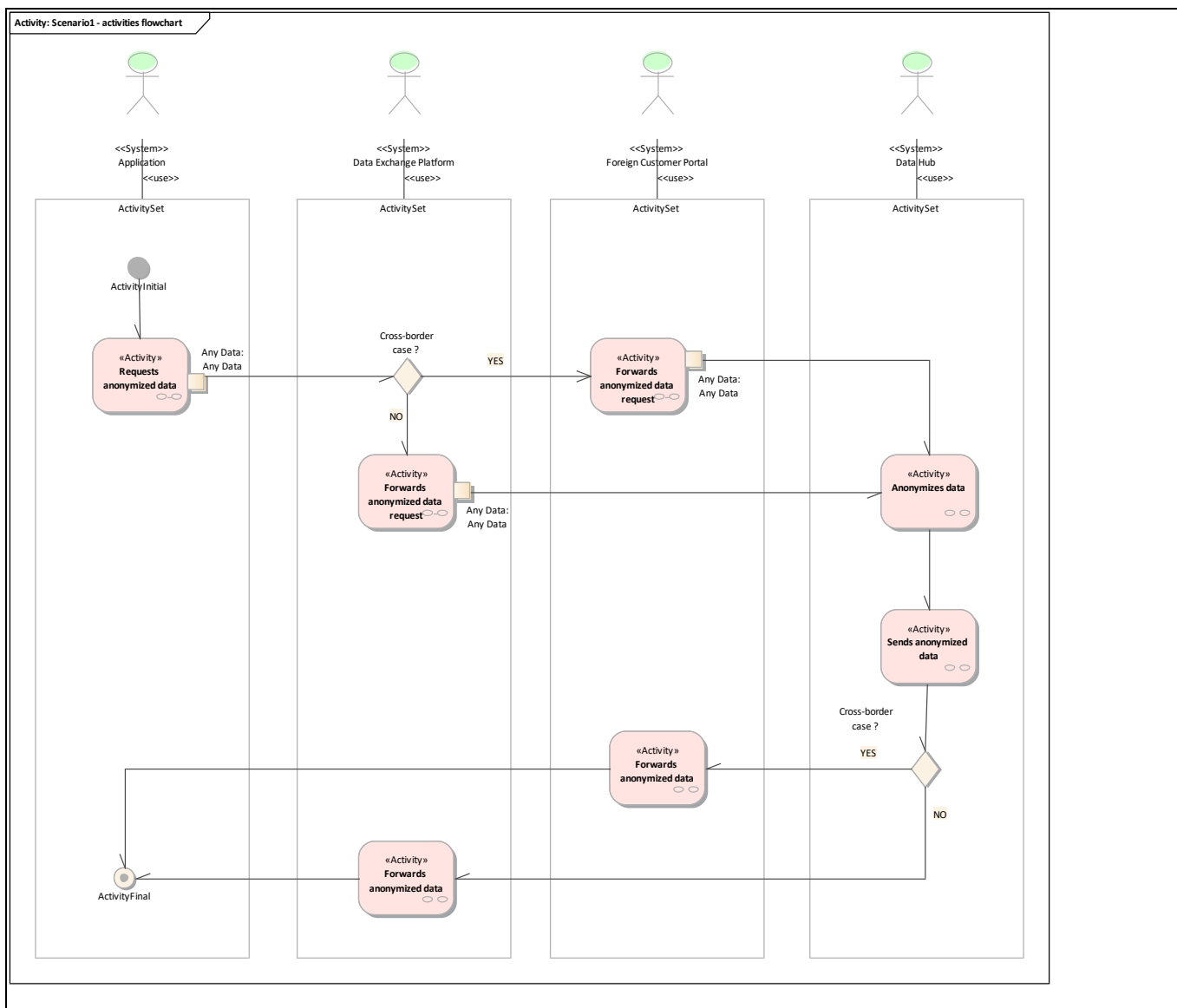
#### 1. Overview of scenarios

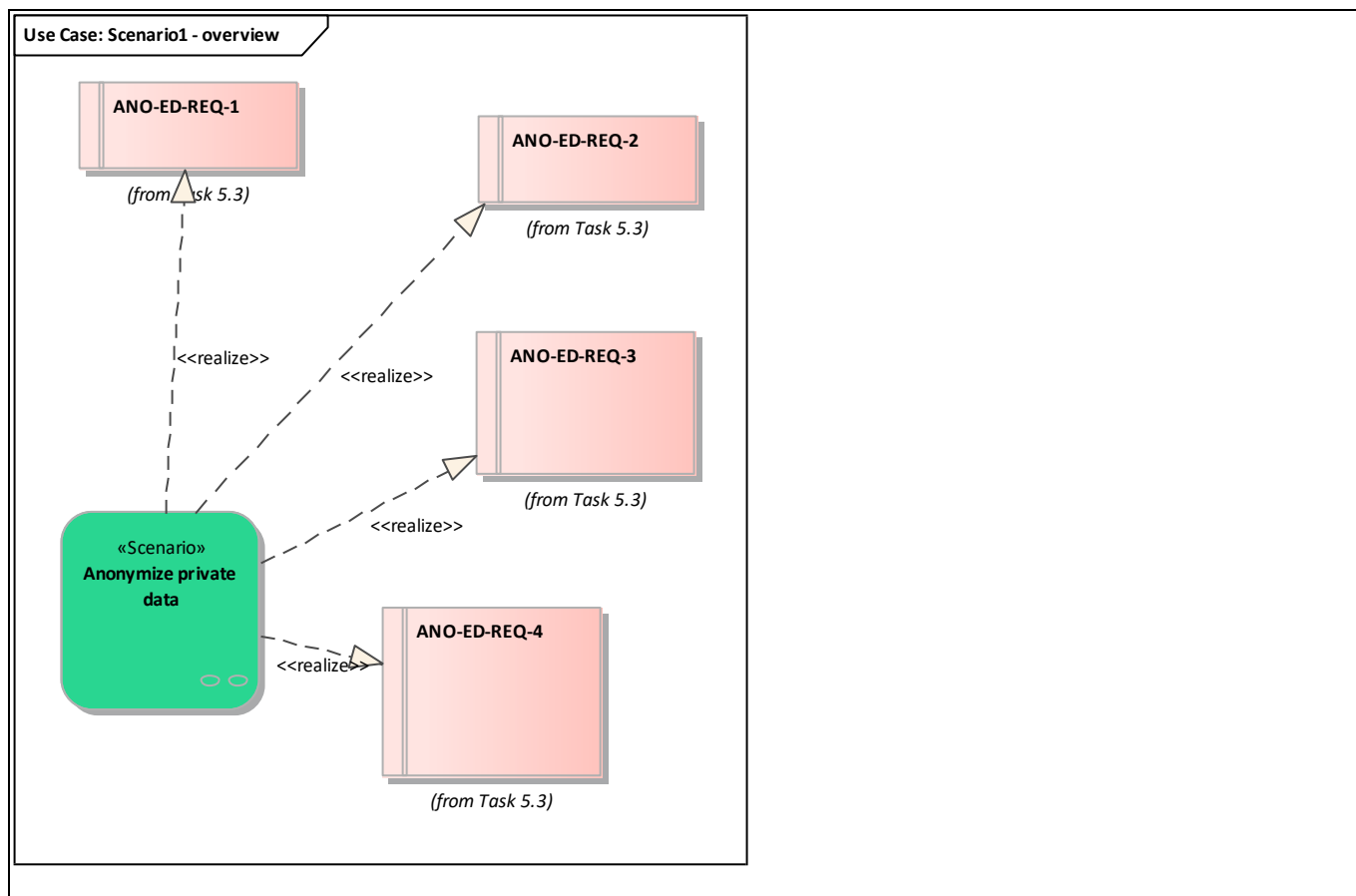
Scenario conditions						
No.	Scenario name	Scenario description	Primary actor	Triggering event	Pre-condition	Post-condition
1	Anonymize private data					

#### 2. Steps - Scenarios

- Anonymize private data

Requirement list (refer to "Requirement" section for more information)	
Requirement R-ID	Requirement name
Cat1.Reg1	ANO-ED-REQ-3
Cat1.Reg2	ANO-ED-REQ-4
Cat1.Reg3	ANO-ED-REQ-1
Cat1.Reg4	ANO-ED-REQ-2





### Scenario step by step analysis

Scenario								
Scenario name		Anonymize private data						
Step No	Event	Name of process/activity	Description of process/activity	Service	Information producer (actor)	Information receiver (actor)	Information exchanged (IDs)	Requirement, R-IDs
1.1		Anonymizes data			<u>Data Hub</u>			
1.2		Forwards anonymized data			<u>Foreign Customer Portal</u>			
1.3		Forwards anonymized data			<u>Data Exchange Platform</u>			
1.4		Forwards anonymized data request			<u>Foreign Customer Portal</u>	<u>Data Hub</u>	Info1-Any Data	
1.5		Forwards anonymized data request			<u>Data Exchange Platform</u>	<u>Data Hub</u>	Info1-Any Data	
1.6		Requests anonymized data			<u>Application</u>	<u>Foreign Customer Portal, Data Exchange Platform</u>	Info1-Any Data	



1.7		Sends anonymized data			Data Hub			
-----	--	-----------------------	--	--	----------	--	--	--

- 1.4. Forwards anonymized data request

**Business section: Anonymize private data/Forwards anonymized data request**

Information sent:

Business object	Instance name	Instance description
Any Data	Any Data	

- 1.5. Forwards anonymized data request

**Business section: Anonymize private data/Forwards anonymized data request**

Information sent:

Business object	Instance name	Instance description
Any Data	Any Data	

- 1.6. Requests anonymized data

**Business section: Anonymize private data/Requests anonymized data**

Information sent:

Business object	Instance name	Instance description
Any Data	Any Data	

## 5. Information exchanged

Information exchanged			
Information exchanged, ID	Name of information	Description of information exchanged	Requirement, R-IDs
Info1	Any Data		

## 6. Requirements (optional)

Requirements (optional)		
Categories ID	Category name for requirements	Category description
Cat1	Task 5.3	Requirements integrated from Task 5.3.
Requirement R-ID	Requirement name	Requirement description
Req1	ANO-ED-REQ-3	Data source (e.g. meter data hub) ability to anonymize data
Req2	ANO-ED-REQ-4	DEP ability to forward anonymized data from a data source to a data user
Req3	ANO-ED-REQ-1	Standard rules to anonymize data not to enable the identification of persons behind data
Req4	ANO-ED-REQ-2	Standard rules to anonymize data in order to ensure the comparability of anonymized data sets

## 7. Common terms and definitions

## 8. Custom information (optional)

### 9.3 AUTHENTICATE DATA USERS

## Authenticate data users

Based on IEC 62559-2 edition 1

Generated from UML Use Case Repository with Modsarus® (EDF R&D Tool)

### 1. Description of the use case

#### 1. Name of use case

Use case identification		
ID	Area(s)/Domain(s)/Zone(s)	Name of use case
	Access to data,Market for flexibilities,Operational planning and forecasting,Services related to end customers,Balance management	Authenticate data users

#### 2. Version management

Version management				
Version No.	Date	Name of author(s)	Changes	Approval status
1	2018-04-12	Kalle Kukk (Elering)		
2	2018-06-01	Kalle Kukk (Elering), Georg Rute (Elering)		
3	2018-06-28	Ricardo Jover (EDF), Eric Suignard (EDF)		
4	2018-07-02	Ricardo Jover (EDF), Eric Suignard (EDF)		
5	2018-08-10	Ricardo Jover (EDF), Eric Suignard (EDF)		
6	2018-08-19	Ricardo Jover (EDF), Eric Suignard (EDF)	"Delegated Authentication" changed into "Representation Rights"	
7	2018-08-02	Eric Suignard (EDF)		
8	2018-09-21	Eric Suignard (EDF), Ricardo Jover (EDF)	Remarks from Innogy, Elering (Automatic process for DEP, without Operator) and EirGrid.	
9	2018-10-04	Eric Suignard (EDF)	Version post WP5&9 physical meeting in Tallinn	
10	2018-10-17	Eric Suignard (EDF)	Version reviewed by WP5&9 partners	
11	2019-05-07	Eric Suignard (EDF)	WP6-7-8 demos alignment and miscellaneous changes	
12	2020-06-16	Eric Suignard (EDF)	innogy's and Elering's review	

#### 3. Scope and objectives of use case

Scope and objectives of use case
----------------------------------

<b>Scope</b>	Access to private data and other information with restricted access through a Customer Portal and a Data Exchange Platform only to authorized users
<b>Objective(s)</b>	Support easy but secure access to data
<b>Related business case(s)</b>	

#### 4. Narrative of Use Case

<b>Narrative of use case</b>	
<b>Short description</b>	
All data users need to be authenticated to a Customer Portal before having access to a Data Exchange Platform (DEP), for the exchange of individual metering data (private data) or any other information with restricted access.	
<b>Complete description</b>	
<p style="text-align: center;"><u>Summary of use case</u></p> <ul style="list-style-type: none"> <li> <b>Authentication process and representation rights delegation</b>  <u>Description:</u> Any person needing access to personal or commercial data needs to be authenticated to a Customer Portal for having access to the data via a DEP – either logging in through a Customer Portal or through third party application connected to a DEP.             This may involve:           <ul style="list-style-type: none"> <li>Consumer's/generator's access to own consumption/generation data;</li> <li>Access to a person's data by another person who has received representation rights from data owner.</li> </ul> <p>After authenticating himself/herself, the data owner (e.g. electricity consumer is the owner of its consumption data) can give representation rights to any other person who can then act on behalf of the data owner.</p> <p>Customer Portal operator checks the validity of the representation rights. If a representation right is given to a person in another country, then the Customer Portal operators of the involved countries share the information about representation rights between themselves.</p> <p>After authenticating himself/herself, the person who has received the representation rights can see who is he/she representing and act on behalf of data owner.</p> <ul style="list-style-type: none"> <li> <b>Authenticate</b>  <u>Description:</u> Authentication means may include ID-card, mobile-ID or bank link. Information associated to authentication process may include name, surname and ID-code of individual customers; company name and registry code of corporate customers as well as name, surname and ID-code of their representatives.         </li> <li> <b>Verify Logging Identification</b>  <u>Description:</u> </li> <li> <b>Verify Identity</b>  <u>Description:</u> Verifies the identity of authenticating parties.         </li> <li> <b>Give access to data</b>  <u>Description:</u> </li> <li> <b>Access to Own Data</b>  <u>Description:</u> </li> </ul> </li> </ul>	

- Delegate Representation Rights  
Description: A data owner gives representation rights for data per consumption/generation point. He/she can also select types of data (e.g. historical consumption/generation data, sub-meter data, operational data) for which he/she gives representation rights. He/she selects the persons to whom he/she gives representation rights.
- Register Representation Rights  
Description:
- Verify Representation Rights  
Description: Customer Portal operator checks the validity of the representation rights.
- Verify Representation Rights in a Foreign Country  
Description: If the representation right is given to a person in another country, then the Customer Portal operators of the involved countries share the information about representation rights between themselves.
- Notify Representation Rights  
Description:
- Authenticate  
Description:
- Access to Delegated Data  
Description:

## 5. Key performance indicators (KPI)

## 6. Use case conditions

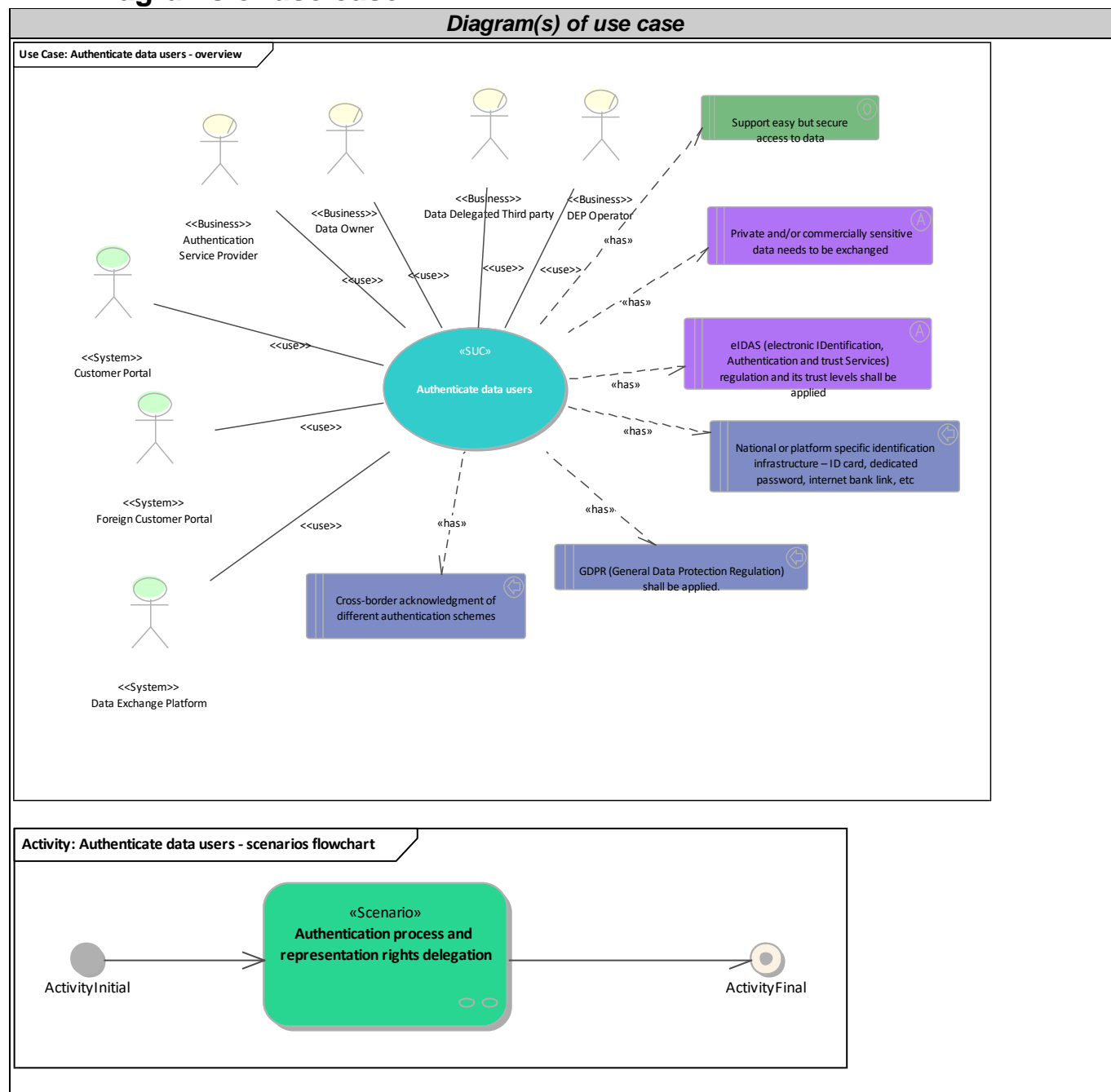
Use case conditions	
Assumptions	
1	eIDAS (electronic IDentification, Authentication and trust Services) regulation and its trust levels shall be applied
2	Private and/or commercially sensitive data needs to be exchanged
Prerequisites	
1	National or platform specific identification infrastructure – ID card, dedicated password, internet bank link, etc
2	Cross-border acknowledgment of different authentication schemes
3	GDPR (General Data Protection Regulation) shall be applied.

## 7. Further information to the use case for classification/mapping

Classification information
Relation to other use cases
Level of depth
Prioritisation
Generic, regional or national relation
Nature of the use case
SUC
Further keywords for classification

## 8. General remarks

### 2. Diagrams of use case



### 3. Technical details

#### 1. Actors

Actors	
Grouping (e.g. domains, zones)	Group description

<b>Actor name</b>	<b>Actor type</b>	<b>Actor description</b>	<b>Further information specific to this use case</b>
Customer Portal Operator	Business	Operates a Customer Portal.	
Authentication Service Provider	Business	Trust authority. Verifies the identity of authenticating parties. Some countries will have their own authentication service provider. For countries which will not, there may be a more global and to be defined one.	
Data Owner	Business	Any person who owns data and can give authorization to other parties to access them. Can be, inter alia: <ul style="list-style-type: none"> <li>• Flexibility Services Provider</li> <li>• Market Operator</li> <li>• Consumer</li> <li>• Generator</li> </ul>	
Data Delegated Third party	Business	Any natural person who has received representation rights from a data owner.	
Foreign Customer Portal	System	Customer Portal for another country. Can also mean a separate portal in the same country.	
Customer Portal	System	Customer Portal manages data users' authentication, access permissions and data logs. Customer Portals store data related to its services (e.g. authentication information, representation rights, access permissions, data logs).	
Data Exchange Platform	System	Data exchange platform (DEP) is a communication platform the basic functionality of which is to secure data transfer (routing) from data providers (e.g. data hubs, flexibility service providers, TSOs, DSOs) to the data users (e.g. TSOs, DSOs, consumers, suppliers, energy service providers). DEP stores data related to its services (e.g. cryptographic hash of the data requested). The DEP does not store core energy data (e.g. meter data, grid data, market data) while these data can be stored by data hubs. Several DEPs may exist in different countries and inside one country.	
DEP Operator	Business	Data exchange platform operator owns and operates a communication system which basic functionality is data transfer.	

## 2. References

### 4. Step by step analysis of use case

#### 1. Overview of scenarios

<b>Scenario conditions</b>						
<b>No.</b>	<b>Scenario name</b>	<b>Scenario description</b>	<b>Primary actor</b>	<b>Triggering event</b>	<b>Pre-condition</b>	<b>Post-condition</b>
1	Authentication process and representation rights delegation	Any person needing access to personal or commercial data needs to be authenticated to a Customer Portal for having access to the data via a DEP – either logging in through a Customer Portal or through third party application connected to a DEP.				

		<p>This may involve:</p> <ul style="list-style-type: none"> <li>• Consumer's/generator's access to own consumption/generation data;</li> <li>• Access to a person's data by another person who has received representation rights from data owner.</li> </ul> <p>After authenticating himself/herself, the data owner (e.g. electricity consumer is the owner of its consumption data) can give representation rights to any other person who can then act on behalf of the data owner.</p> <p>Customer Portal operator checks the validity of the representation rights. If a representation right is given to a person in another country, then the Customer Portal operators of the involved countries share the information about representation rights between themselves.</p> <p>After authenticating himself/herself, the person who has received the representation rights can see who is he/she representing and act on behalf of data owner.</p>				
--	--	--	--	--	--	--

## 2. Steps - Scenarios

### 1. Authentication process and representation rights delegation

Any person needing access to personal or commercial data needs to be authenticated to a Customer Portal for having access to the data via a DEP – either logging in through a Customer Portal or through third party application connected to a DEP.

This may involve:

- Consumer's/generator's access to own consumption/generation data;
- Access to a person's data by another person who has received representation rights from data owner.

After authenticating himself/herself, the data owner (e.g. electricity consumer is the owner of its consumption data) can give representation rights to any other person who can then act on behalf of the data owner.

Customer Portal operator checks the validity of the representation rights. If a representation right is given to a person in another country, then the Customer Portal operators of the involved countries share the information about representation rights between themselves.

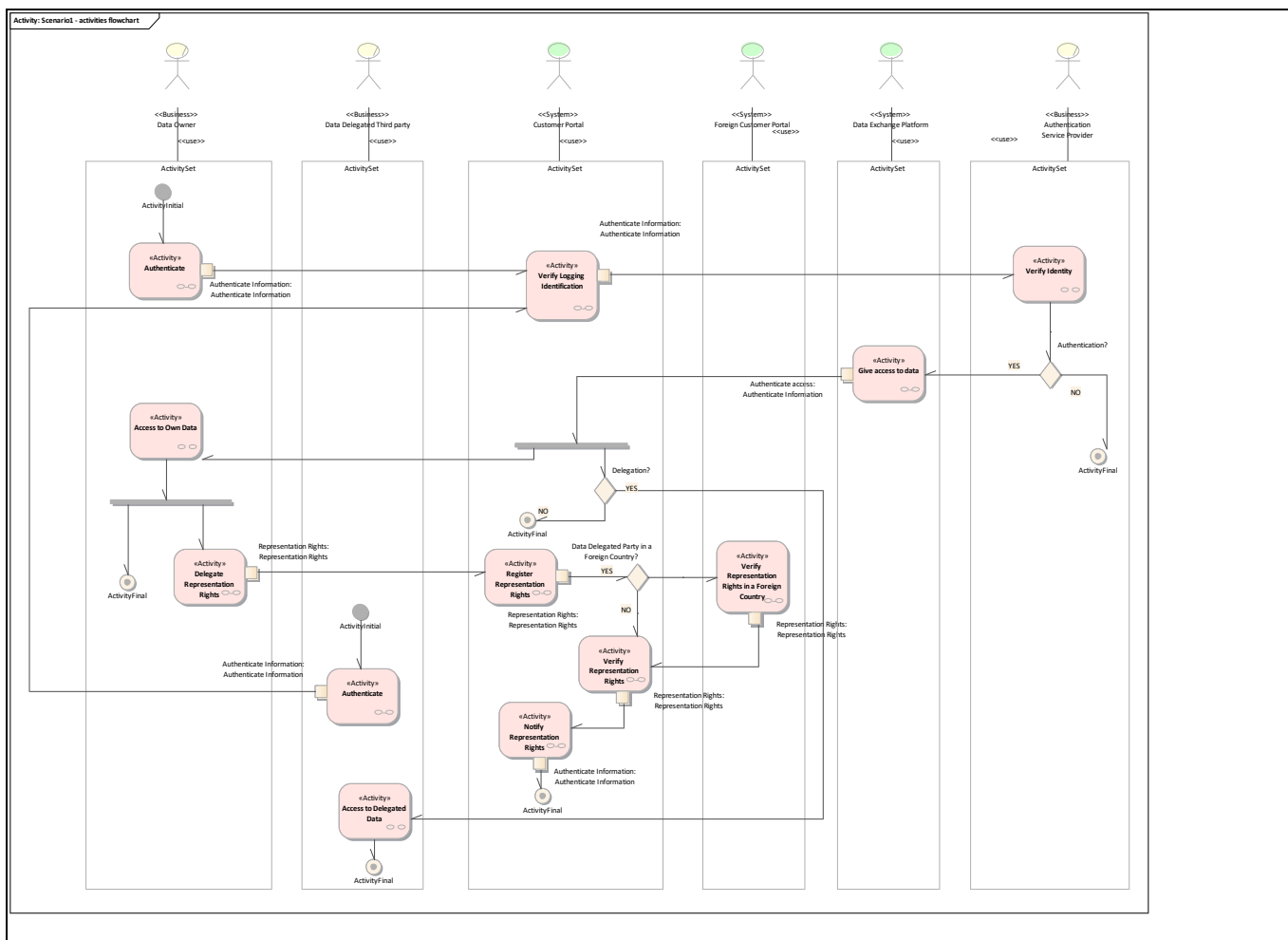
After authenticating himself/herself, the person who has received the representation rights can see who is he/she representing and act on behalf of data owner.

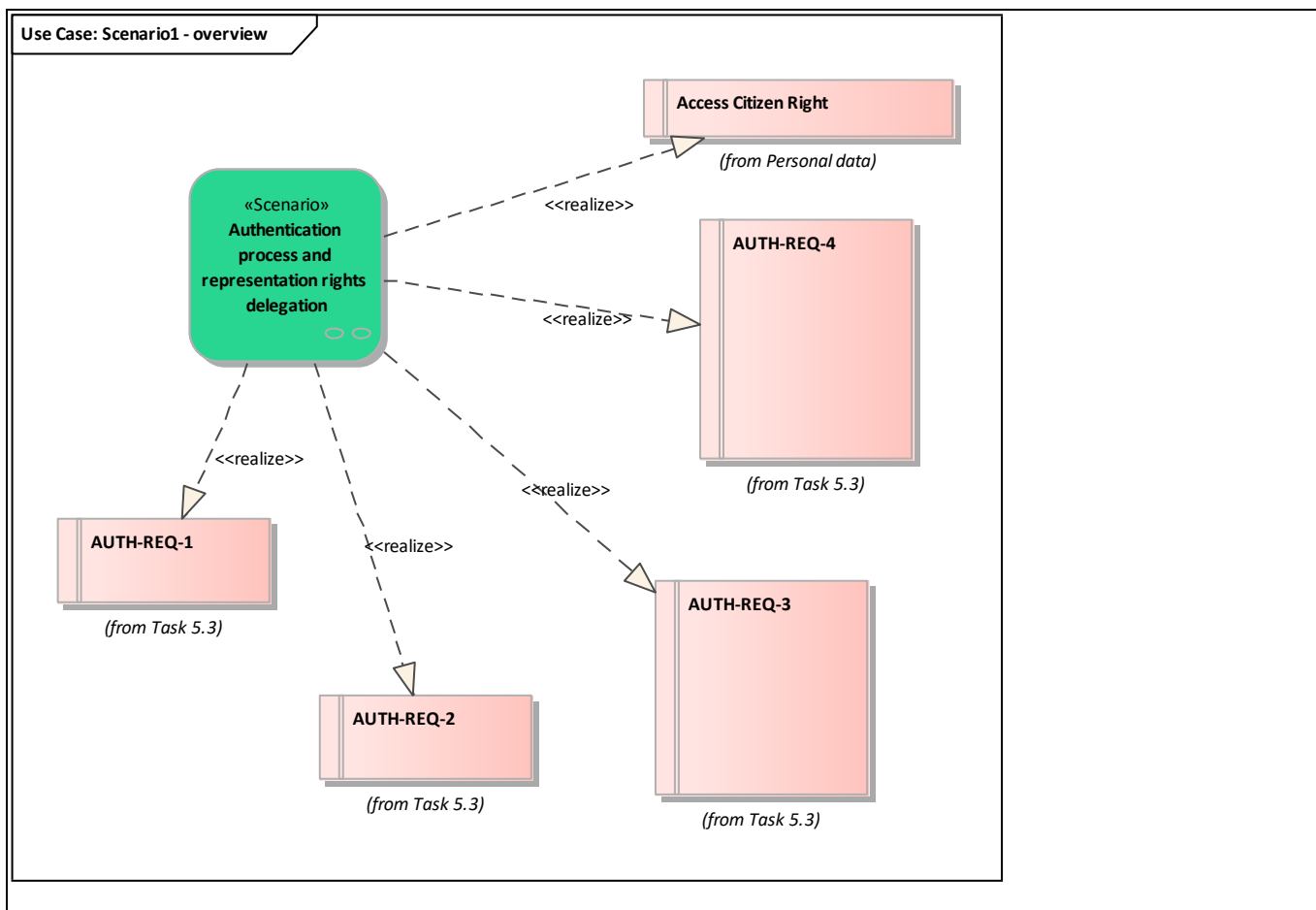
**Requirement list (refer to "Requirement" section for more information)**

Requirement R-ID	Requirement name
Cat1.Reg1	Access Citizen Right
Cat2.Reg2	AUTH-REQ-3

Cat2.Reg3	AUTH-REQ-4
Cat2.Reg4	AUTH-REQ-2
Cat2.Reg5	AUTH-REQ-1







### Scenario step by step analysis

Scenario								
Scenario name		Authentication process and representation rights delegation						
Step No	Event	Name of process/activity	Description of process/activity	Service	Information producer (actor)	Information receiver (actor)	Information exchanged (IDs)	Requirement, R-IDs
1.1		Authenticate	Authentication means may include ID-card, mobile-ID or bank link. Information associated to authentication process may include name, surname and ID-code of individual customers; company name and registry code of corporate customers as well as name, surname and ID-code of their representatives.		Data Owner	Customer Portal	Logging Identification Data-Authenticate Information	Cat3.Req6
1.2		Verify Logging Identification			Customer Portal	Authentication Service Provider	Logging Identification Data-	

							Authenticate Information	
1.3		Verify Identity	Verifies the identity of authenticating parties.		<u>Authentication Service Provider</u>			
1.4		Give access to data			<u>Data Exchange Platform</u>	<u>Data Owner, Customer Portal, Data Delegated Third party</u>	Logging Identification Data-Authenticate Information	
1.5		Access to Own Data			<u>Data Owner</u>			
1.6		Delegate Representation Rights	A data owner gives representation rights for data per consumption/generation point. He/she can also select types of data (e.g. historical consumption/generation data, sub-meter data, operational data) for which he/she gives representation rights. He/she selects the persons to whom he/she gives representation rights.		<u>Data Owner</u>	<u>Customer Portal</u>	Representation Rights-Representation Rights	
1.7		Register Representation Rights			<u>Customer Portal</u>	<u>Customer Portal, Foreign Customer Portal</u>	Representation Rights-Representation Rights	
1.8		Verify Representation Rights	Customer Portal operator checks the validity of the representation rights.		<u>Customer Portal</u>	<u>Customer Portal</u>	Representation Rights-Representation Rights	
1.9		Verify Representation Rights in a Foreign Country	If the representation right is given to a person in another country, then the Customer Portal operators of the involved countries share the information about representation rights between themselves.		<u>Foreign Customer Portal</u>	<u>Customer Portal</u>	Representation Rights-Representation Rights	
1.10		Notify Representation Rights			<u>Customer Portal</u>	<u>Customer Portal</u>	Logging Identification Data-Authenticate Information	
1.11		Authenticate			<u>Data Delegated Third party</u>	<u>Customer Portal</u>	Logging Identification Data-	<u>Cat3.Reg6</u>

							Authenticate Information	
1.12		Access to Delegated Data			<u>Data</u> <u>Delegated</u> <u>Third party</u>			

- 1.1. Authenticate

**Business section: Authentication process and representation rights delegation/Authenticate**

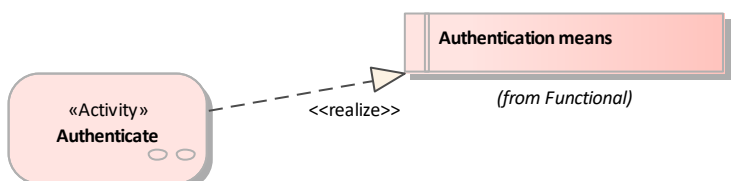
Authentication means may include ID-card, mobile-ID or bank link.

Information associated to authentication process may include name, surname and ID-code of individual customers; company name and registry code of corporate customers as well as name, surname and ID-code of their representatives.

**Requirement list (refer to "Requirement" section for more information)**

Requirement R-ID	Requirement name
Cat3.Req6	Authentication means

Information sent:

Business object	Instance name	Instance description
<u>Authenticate Information</u>	Authenticate Information	
<div> <div>Use Case: Activity1 - overview</div>  </div>		

- 1.2. Verify Logging Identification

**Business section: Authentication process and representation rights delegation/Verify Logging Identification**

Information sent:

Business object	Instance name	Instance description
<u>Authenticate Information</u>	Authenticate Information	

- 1.4. Give access to data

**Business section: Authentication process and representation rights delegation/Give access to data**

Information sent:

Business object	Instance name	Instance description
<u>Authenticate Information</u>	Authenticate access	

- 1.6. Delegate Representation Rights

**Business section: Authentication process and representation rights delegation/Delegate Representation Rights**

A data owner gives representation rights for data per consumption/generation point.  
 He/she can also select types of data (e.g. historical consumption/generation data, sub-meter data, operational data) for which he/she gives representation rights.  
 He/she selects the persons to whom he/she gives representation rights.  
Information sent:

<b><i>Business object</i></b>	<b><i>Instance name</i></b>	<b><i>Instance description</i></b>
Representation Rights	Representation Rights	

- 1.7. Register Representation Rights

**Business section: Authentication process and representation rights delegation/Register Representation Rights**

Information sent:

<b><i>Business object</i></b>	<b><i>Instance name</i></b>	<b><i>Instance description</i></b>
Representation Rights	Representation Rights	

- 1.8. Verify Representation Rights

**Business section: Authentication process and representation rights delegation/Verify Representation Rights**

Customer Portal operator checks the validity of the representation rights.  
Information sent:

<b><i>Business object</i></b>	<b><i>Instance name</i></b>	<b><i>Instance description</i></b>
Representation Rights	Representation Rights	

- 1.9. Verify Representation Rights in a Foreign Country

**Business section: Authentication process and representation rights delegation/Verify Representation Rights in a Foreign Country**

If the representation right is given to a person in another country, then the Customer Portal operators of the involved countries share the information about representation rights between themselves.  
Information sent:

<b><i>Business object</i></b>	<b><i>Instance name</i></b>	<b><i>Instance description</i></b>
Representation Rights	Representation Rights	

- 1.10. Notify Representation Rights

**Business section: Authentication process and representation rights delegation/Notify Representation Rights**

Information sent:

<b><i>Business object</i></b>	<b><i>Instance name</i></b>	<b><i>Instance description</i></b>
Authenticate Information	Authenticate Information	

- 1.11. Authenticate

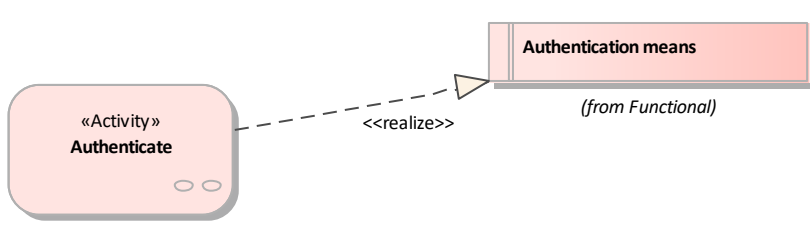
**Business section: Authentication process and representation rights delegation/Authenticate**

Requirement list (refer to "Requirement" section for more information)	
Requirement R-ID	Requirement name
Cat3.Req6	Authentication means

Information sent:

Business object	Instance name	Instance description
Authenticate Information	Authenticate Information	

Use Case: Activity1 - overview



## 5. Information exchanged

Information exchanged			
Information exchanged, ID	Name of information	Description of information exchanged	Requirement, R-IDs
Logging Identification Data	Authenticate Information		
Representation Rights	Representation Rights		

## 6. Requirements (optional)

Requirements (optional)		
Categories ID	Category name for requirements	Category description
Cat1	Personal data	
Requirement R-ID	Requirement name	Requirement description
Req1	Access Citizen Right	Right to secure direct access of own personal data and to any processing, storage or sharing details
Requirements (optional)		
Categories ID	Category name for requirements	Category description
Cat2	Task 5.3	Requirements integrated from Task 5.3.
Requirement R-ID	Requirement name	Requirement description
Req2	AUTH-REQ-3	Ability to share information related to representation rights between data users and concerned Customer Portals

Req3	AUTH-REQ-4	Ability to share authentication information between data users, Customer Portal and Authentication Service Provider
Req4	AUTH-REQ-2	Authentication tools
Req5	AUTH-REQ-1	Right to access own data
<b>Requirements (optional)</b>		
<b>Categories ID</b>	<b>Category name for requirements</b>	<b>Category description</b>
Cat3	Functional	Functional requirements
<b>Requirement R-ID</b>	<b>Requirement name</b>	<b>Requirement description</b>
Req6	Authentication means	Authentication means may include ID-card, mobile-ID or bank link. Information associated to authentication process may include name, surname and ID-code of individual customers; company name and registry code of corporate customers as well as name, surname and ID-code of their representatives.

## 7. Common terms and definitions

## 8. Custom information (optional)

### 9.4 CALCULATE FLEXIBILITY BASELINE

## Calculate flexibility baseline

Based on IEC 62559-2 edition 1  
Generated from UML Use Case Repository with Modsarus® (EDF R&D Tool)

### 1. Description of the use case

#### 1. Name of use case

<b>Use case identification</b>		
<b>ID</b>	<b>Area(s)/Domain(s)/Zone(s)</b>	<b>Name of use case</b>
	Market for flexibilities	Calculate flexibility baseline

#### 2. Version management

<b>Version management</b>				
<b>Version No.</b>	<b>Date</b>	<b>Name of author(s)</b>	<b>Changes</b>	<b>Approval status</b>
1	2018-04-10	Marco Pietrucci (Terna), Karin Lehtmetts (Elering)		
2	2018-05-28	Karin Lehtmetts (Elering), Kalle Kukk (Elering)		
3	2018-06-28	Florentin Dam (AKKA)	UML Modeling	
4	2018-07-09	Florentin Dam (AKKA)	Modification on diagrams	

5	2018-07-20	Florentin Dam (AKKA)	Added some systems, Major changes in option 2	
6	2018-08-02	Eric Suignard (EDF)		
7	2018-09-21	Florentin Dam (AKKA)	T5.2 partners' remarks.	
8	2018-10-04	Eric Suignard (EDF)	Version post WP5&9 physical meeting in Tallinn	
9	2018-10-17	Eric Suignard (EDF)	Version reviewed by WP5&9 partners	
10	2019-05-07	Eric Suignard (EDF)	WP6-7-8 demos alignment and miscellaneous changes	
11	2019-06-05	Ricardo Jover (EDF), Eric Suignard (EDF)	Changes following WP5&9 workshop in Chatou	
12	2019-06-13	Eric Suignard (EDF)	Elering review	
13	2019-07-26	Eric Suignard (EDF)	Elering review	
14	2020-06-16	Eric Suignard (EDF)	innogy's and Elering's review	

### 3. Scope and objectives of use case

Scope and objectives of use case	
<b>Scope</b>	Define the power schedule/baseline of a given Flexibility Service Provider (FSP), which participates in the flexibility market
<b>Objective(s)</b>	Encourage the participation in the flexibility market of new resources, including Demand Side Resources (DSR) and variable (intermittent) Renewable Energy Sources (RES).
<b>Related business case(s)</b>	

### 4. Narrative of Use Case

Narrative of use case
<b>Short description</b> <p>If a market participant bids flexibility in the flexibility market, the baseline consumption/generation of such market participant needs to be identified for the verification and settlement processes (see SUC 'Verify and settle activated flexibilities'). There are two options for this:</p> <ol style="list-style-type: none"> <li>1. Market participant has to declare its power schedule (baseline) <i>ex ante</i> in such a way to permit the System Operator (SO) to implement the settlement processes. Such player (FSP) usually declares directly the baseline, but the SO could provide specific tools to help market participants in the baseline definition, promoting market participation.</li> <li>2. Market operator (TSO or DSO or Flexibility Platform Operator) itself calculates the baseline <i>ex post</i> based on meter data. The methodology to calculate baseline is transparent and public.</li> </ol> <p>The baseline cannot be measured directly, so it must be calculated based on other available measured data, using an agreed, robust methodology. When choosing the suitable baseline methodology it is crucial to understand the most important baseline characteristics: these are accuracy, simplicity, integrity and alignment, meaning that additionally to the accuracy of the methodology it is important at the same time that it would be simple enough for all stakeholders to calculate and understand. Additionally to that, suitable methodology should minimize the availability of data manipulation as well as minimize unintended consequences.</p> <p>Several types of baseline can exist and may be needed, depending on the type of service/product provided, depending on the reserve origin (consumption, production, storage) and depending on the consumer's group who offered the flexibility (residential, offices, industrial consumers, etc).</p> <p>Data from sub-meters could be used besides data from 'certified' meters when calculating the baseline.</p>
<b>Complete description</b>



### Summary of use case

- **FSP calculates the baseline**

Description: Generates a schedule in front and presented with the bid to the market operator.

- Choose the services/products for which it intends to make a bid  
Description:
- Define the baseline  
Description: definition of the baseline, through specific 'baseline tool' (owned by the FSP or provided by the TSO or DSO or flexibility platform operator) depending on the services/products chosen and the topology of the resources aggregated
- Submit the baseline (schedule) and declare it for settlement purpose  
Description: Declaration of the baseline (for a single consumer/producer or aggregator bid/portfolio, or BRP's portfolio) for settlement purposes.

An upload is then done to 'baseline tool'.

- Forward the baseline  
Description:
- Record the baseline  
Description:

- **Market Operator calculates the baseline**

Description: Calculated after the activation in settlement phase by market operator.

- Select bid for calculation  
Description: the type of service/product of activated bids is reviewed to calculate the baseline after the activation.
- Send external data  
Description:
- Send meter data  
Description:
- Facilitate secure data exchange  
Description:
- Calculate the baseline  
Description:
- Calculate the baseline (in the settlement process)  
Description: Declaration of the baseline (for a single consumer/producer or aggregator bid/portfolio, or BRP's portfolio) for settlement purposes.

Real-time data are used for the calculation.

- Record the baseline  
Description:

## 5. Key performance indicators (KPI)

## 6. Use case conditions

<i>Use case conditions</i>	
<i>Assumptions</i>	
1	1. FSPs who are presenting their baseline as schedule before the activation must be able to declare (independently or with the help of any tools made available by the TSO) the baseline together with its bid.
2	2. For all other FSPs the baseline should be calculated after the activation in settlement phase based on metered data. : The close to real time meter data (1 hour to 15 minutes data from 'certified' meters, 1 second to 1 minute data from sub-meters) should be available for TSO and all other relevant parties by the time the baseline needs to be by calculated for the settlement.
<i>Prerequisites</i>	
1	Data used for baseline calculation: The historical and statistical data used for calculation come from metered data.
2	Clear definition of baseline is in place: This assumes access by energy service provider of one country to sub-meter devices in another country.
3	The FSP and TSO (maybe also BRP, depends how transparent solution we want) must have access (either directly or through third-party archives) to historical and statistical data of each aggregated sources to calculate the baseline

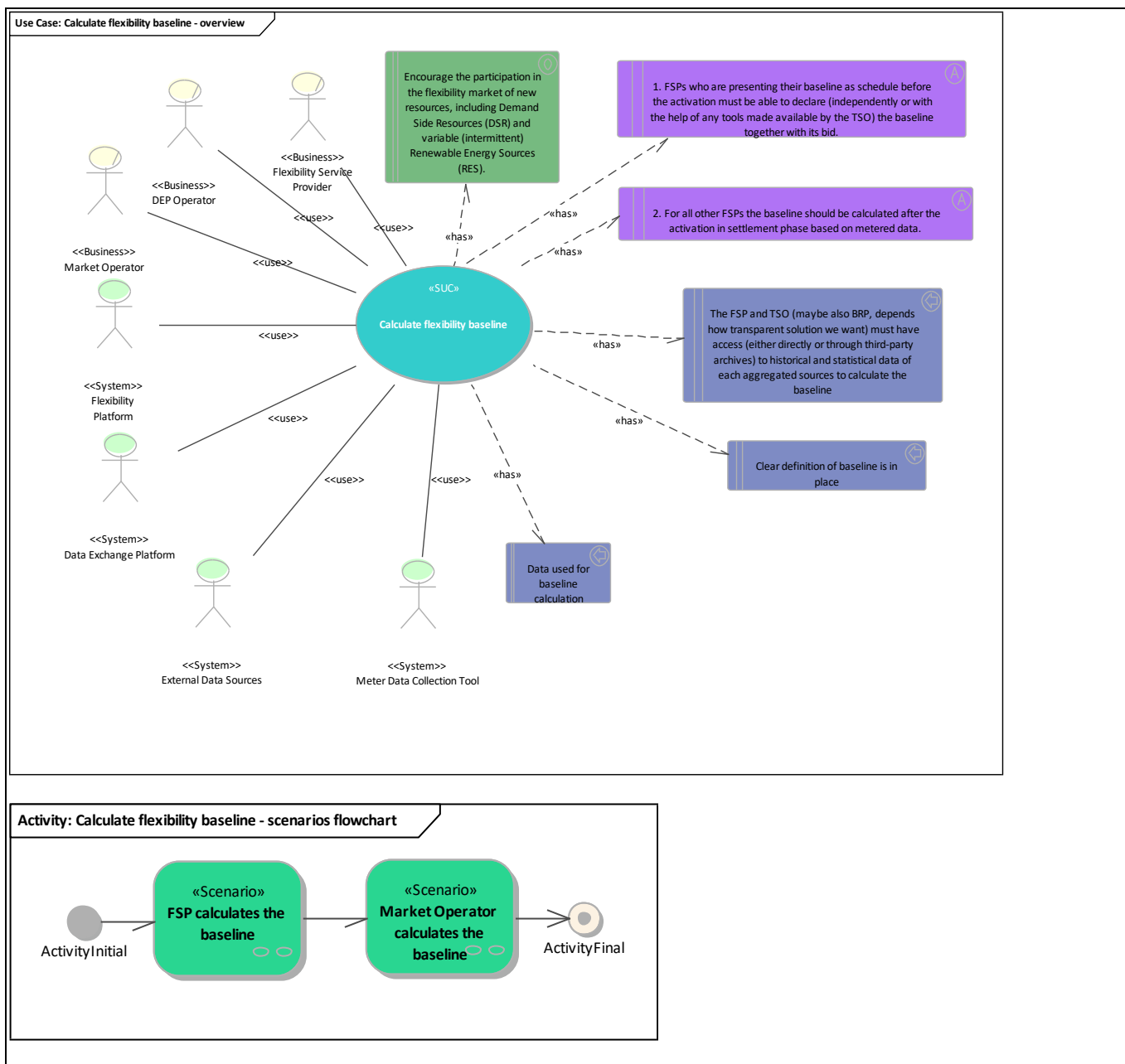
## 7. Further information to the use case for classification/mapping

<i>Classification information</i>
<i>Relation to other use cases</i>
<i>Level of depth</i>
<i>Prioritisation</i>
<i>Generic, regional or national relation</i>
<i>Nature of the use case</i>
SUC
<i>Further keywords for classification</i>

## 8. General remarks

### 2. Diagrams of use case

<i>Diagram(s) of use case</i>
-------------------------------



### 3. Technical details

#### 1. Actors

Actors			
Grouping (e.g. domains, zones)		Group description	
Actor name	Actor type	Actor description	Further information specific to this use case
External Data Sources	System	Contains external data such as weather information.	

Flexibility Service Provider	Business	Can be a Distribution Network Flexibility Provider or a Transmission Network Flexibility Provider (cf. definitions in T3.3 deliverable). Similar to Flexibility Aggregator. Can be both aggregator and individual consumer/generator. Type of Energy Service Provider.	
Meter Data Collection Tool	System	Meter Data Collection Tool is an information system which main functionality is to collect meter readings from electricity meters.	
Flexibility Platform	System	Flexibility Platform (FP) for System Operators and Flexibility Service Providers that enables the trading of different flexibility products and services. A FP is operated by a Market Operator.  Available to System Operators and Flexibility Services Providers. It is used to support the prequalification, the bidding, the activation and the verification processes, ensuring coordination between activities undertaken by several operators using the same flexible resources. Several national and regional FPs may exist.	
DEP Operator	Business	Data exchange platform operator owns and operates a communication system which basic functionality is data transfer.	
Market Operator	Business	A market operator is a party that provides a service whereby the offers to sell electricity are matched with bids to buy electricity (cf. ENTSOE-EFET-eBIX harmonized role model 2019). In EU-SysFlex project, a market operator not only trades electricity but also flexibility services. Organize auctions (continuous auctions, discrete auctions, calls for tender) between buyers and sellers of electricity-related products in the markets, and more generally publish the corresponding prices, for assets connected to power grid. Manage/operate the platform for trading (where bids and offers are collected). Clear the market and communicate results. (cf. definition in T3.3 deliverable)	In the scenario where MO calculates the baseline, it can be either the TSO, the DSO or the Flexibility Platform Operator
Data Exchange Platform	System	Data exchange platform (DEP) is a communication platform the basic functionality of which is to secure data transfer (routing) from data providers (e.g. data hubs, flexibility service providers, TSOs, DSOs) to the data users (e.g. TSOs, DSOs, consumers, suppliers, energy service providers). DEP stores data related to its services (e.g. cryptographic hash of the data requested). The DEP does not store core energy data (e.g. meter data, grid data, market data) while these data can be stored by data hubs. Several DEPs may exist in different countries and inside one country.	Data exchange platform to share meter data

## 2. References

### 4. Step by step analysis of use case

#### 1. Overview of scenarios

Scenario conditions						
No.	Scenario name	Scenario description	Primary actor	Triggering event	Pre-condition	Post-condition
1	FSP calculates the baseline	Generates a schedule in front and presented with the bid to the market operator.				

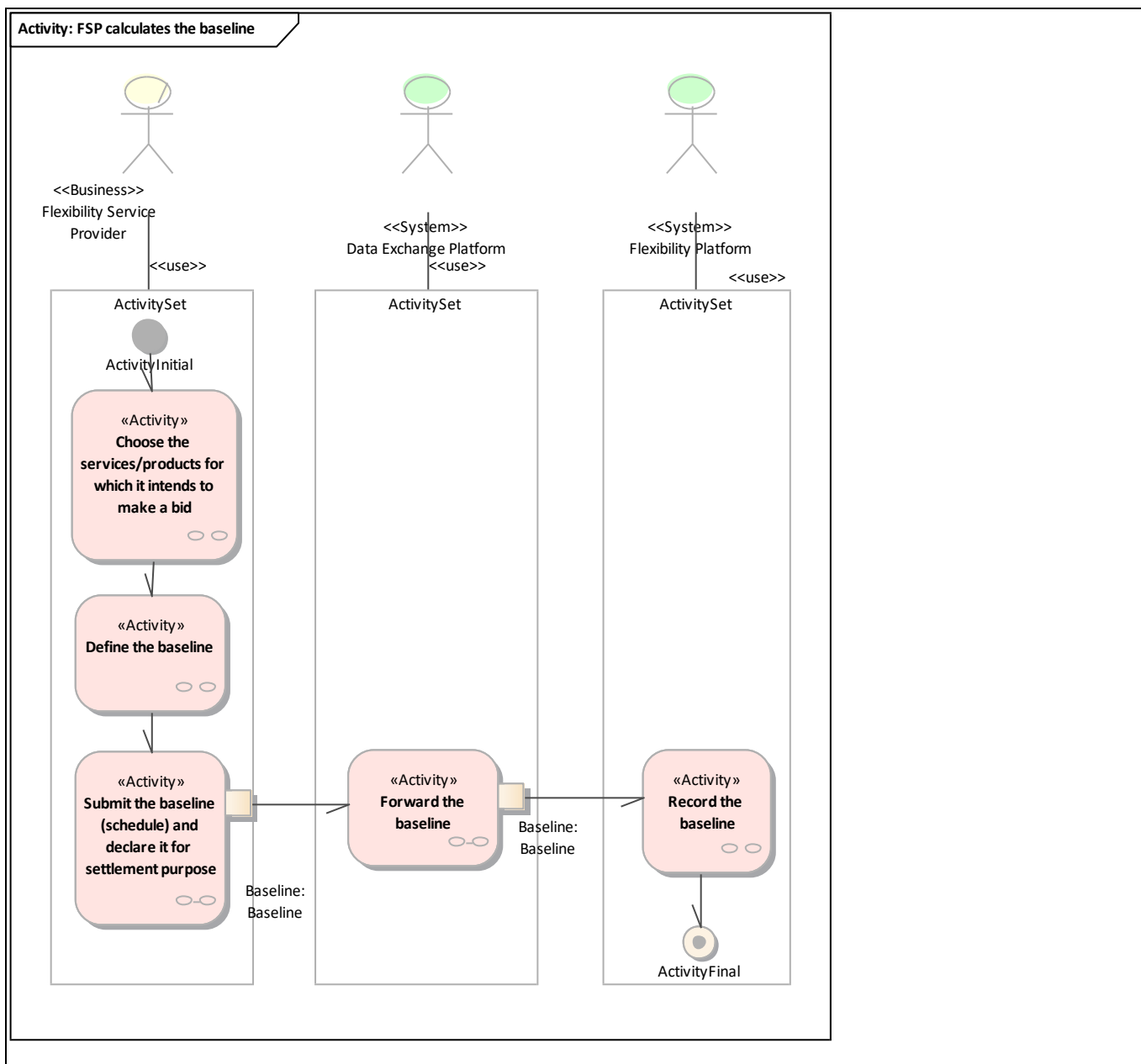
2	Market Operator calculates the baseline	Calculated after the activation in settlement phase by market operator.				
---	---	---	--	--	--	--

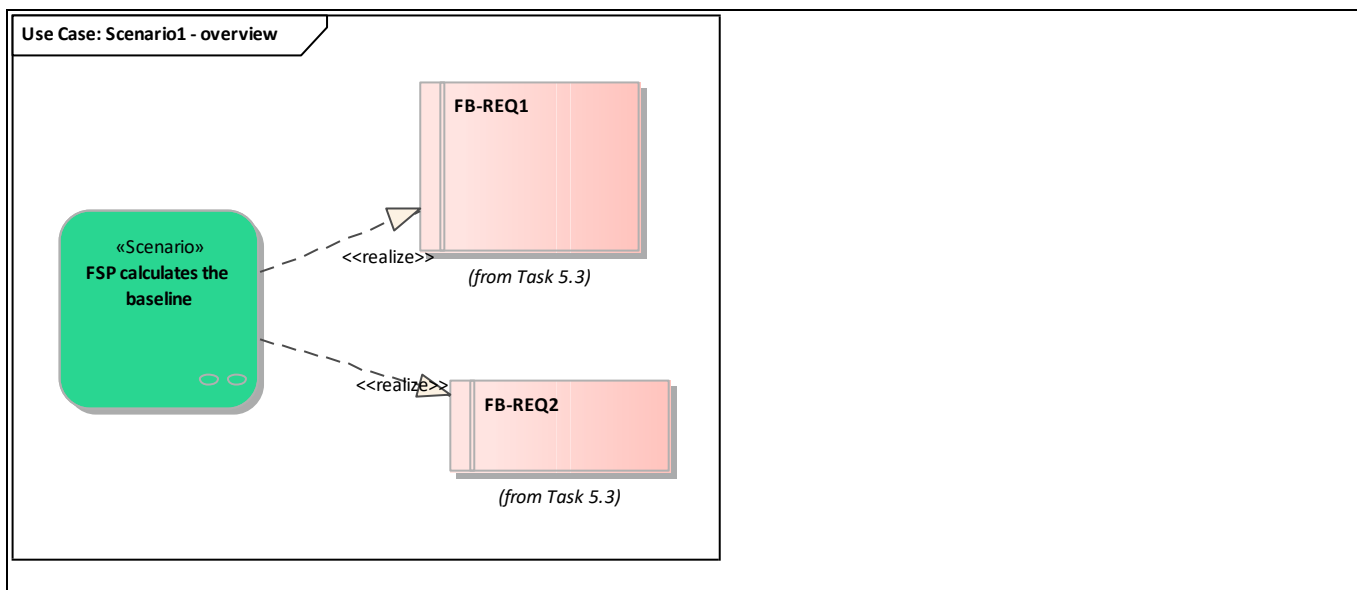
## 2. Steps - Scenarios

- FSP calculates the baseline

Generates a schedule in front and presented with the bid to the market operator.

<i>Requirement list (refer to "Requirement" section for more information)</i>	
<i>Requirement R-ID</i>	<i>Requirement name</i>
Cat1.Req1	FB-REQ1
Cat1.Req2	FB-REQ2





## Scenario step by step analysis

Scenario								
Scenario name		FSP calculates the baseline						
Step No	Event	Name of process/activity	Description of process/activity	Service	Information producer (actor)	Information receiver (actor)	Information exchanged (IDs)	Requirement, R-IDs
1.1		Choose the services/products for which it intends to make a bid			Flexibility Service Provider			
1.2		Define the baseline	definition of the baseline, through specific 'baseline tool' (owned by the FSP or provided by the TSO or DSO or flexibility platform operator) depending on the services/products chosen and the topology of the resources aggregated		Flexibility Service Provider			
1.3		Submit the baseline (schedule) and declare it for settlement purpose	Declaration of the baseline (for a single consumer/producer or aggregator bid/portfolio, or BRP's portfolio) for settlement purposes.  An upload is then		Flexibility Service Provider	Data Exchange Platform	Info1-Baseline	

			done to 'baseline tool'.					
1.4		Forward the baseline			<u>Data Exchange Platform</u>	<u>Flexibility Platform</u>	Info1-Baseline	
1.5		Record the baseline			<u>Flexibility Platform</u>			

- 1.3. Submit the baseline (schedule) and declare it for settlement purpose

**Business section: FSP calculates the baseline/Submit the baseline (schedule) and declare it for settlement purpose**

Declaration of the baseline (for a single consumer/producer or aggregator bid/portfolio, or BRP's portfolio) for settlement purposes.

An upload is then done to 'baseline tool'.

Information sent:

<b><i>Business object</i></b>	<b><i>Instance name</i></b>	<b><i>Instance description</i></b>
<u>Baseline</u>	Baseline	

- 1.4. Forward the baseline

**Business section: FSP calculates the baseline/Forward the baseline**

Information sent:

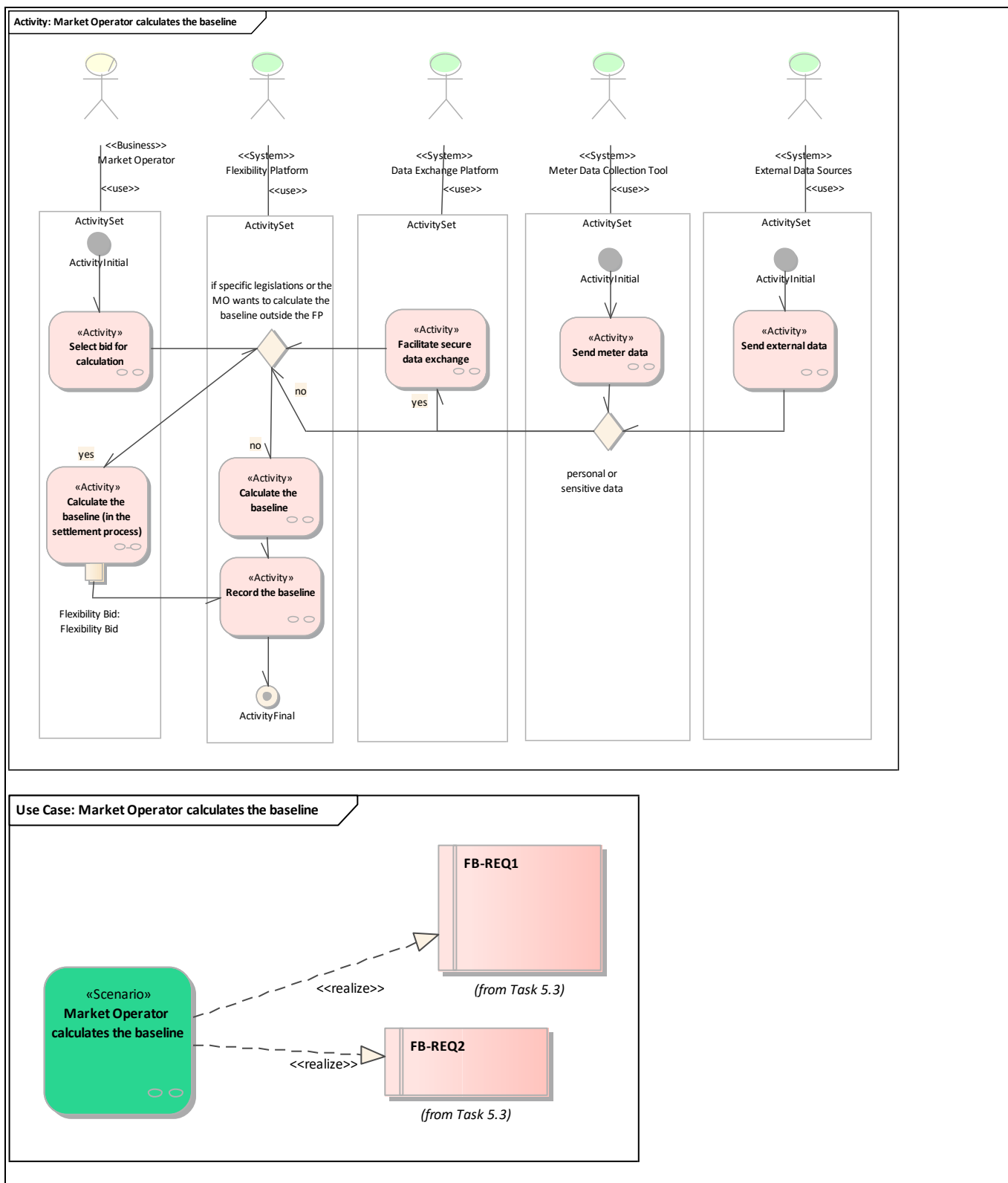
<b><i>Business object</i></b>	<b><i>Instance name</i></b>	<b><i>Instance description</i></b>
<u>Baseline</u>	Baseline	

- **Market Operator calculates the baseline**

Calculated after the activation in settlement phase by market operator.

<b><i>Requirement list (refer to "Requirement" section for more information)</i></b>	
<b><i>Requirement R-ID</i></b>	<b><i>Requirement name</i></b>
<u>Cat1.Reg1</u>	FB-REQ1
<u>Cat1.Reg2</u>	FB-REQ2





## Scenario step by step analysis

Scenario	
Scenario name	Market Operator calculates the baseline

Step No	Event	Name of process/activity	Description of process/activity	Service	Information producer (actor)	Information receiver (actor)	Information exchanged (IDs)	Requirement, R-IDs
2.1		Select bid for calculation	the type of service/product of activated bids is reviewed to calculate the baseline after the activation.		Market Operator			
2.2		Send external data			External Data Sources			
2.3		Send meter data			Meter Data Collection Tool			
2.4		Facilitate secure data exchange			Data Exchange Platform			
2.5		Calculate the baseline			Flexibility Platform			
2.6		Calculate the baseline (in the settlement process)	Declaration of the baseline (for a single consumer/producer or aggregator bid/portfolio, or BRP's portfolio) for settlement purposes.  Real-time data are used for the calculation.		Market Operator	Flexibility Platform	Info2-Flexibility Bid	
2.7		Record the baseline			Flexibility Platform			

- 2.6. Calculate the baseline (in the settlement process)

**Business section: Market Operator calculates the baseline/Calculate the baseline (in the settlement process)**

Declaration of the baseline (for a single consumer/producer or aggregator bid/portfolio, or BRP's portfolio) for settlement purposes.

Real-time data are used for the calculation.

Information sent:

Business object	Instance name	Instance description
Flexibility Bid	Flexibility Bid	

## 5. Information exchanged

Information exchanged
-----------------------

Information exchanged, ID	Name of information	Description of information exchanged	Requirement, R-IDs
Info1	Baseline		
Info2	Flexibility Bid		

## 6. Requirements (optional)

Requirements (optional)		
Categories ID	Category name for requirements	Category description
Cat1	Task 5.3	Requirements integrated from Task 5.3.
Requirement R-ID	Requirement name	Requirement description
Req1	FB-REQ1	Ability of flexibility platform to collect input for baseline calculation, incl. through DEP
Req2	FB-REQ2	Ability of flexibility platform to compute baseline

## 7. Common terms and definitions

## 8. Custom information (optional)

### 9.5 COLLECT ENERGY DATA

# Collect energy data

Based on IEC 62559-2 edition 1  
Generated from UML Use Case Repository with Modsarus® (EDF R&D Tool)

## 1. Description of the use case

### 1. Name of use case

Use case identification		
ID	Area(s)/Domain(s)/Zone(s)	Name of use case
	Access to data,Market for flexibilities,Operational planning and forecasting,Services related to end customers,Balance management	Collect energy data

### 2. Version management

Version management				
Version No.	Date	Name of author(s)	Changes	Approval status
1	2018-04-12	Kalle Kuk (Elering)		
2	2018-07-07	Ricardo Jover (EDF), Eric Suignard (EDF)		
3	2018-07-19	Ricardo Jover (EDF), Eric Suignard (EDF)	“Collect public market data” and “Collect individual market data” scenarios merged into a	

			"Collect market data" scenario, No DEP involved anymore.	
4	2018-08-02	Eric Suignard (EDF)		
5	2018-09-21	Eric Suignard (EDF), Ricardo Jover (EDF)	Remarks from Innogy and Elering.	
6	2018-10-04	Eric Suignard (EDF)	Version post WP5&9 physical meeting in Tallinn	
7	2018-10-17	Eric Suignard (EDF)	Version reviewed by WP5&9 partners	
8	2018-10-30	Eric Suignard (EDF)	Description of Grid data	
9	2019-05-07	Eric Suignard (EDF)	WP6-7-8 demos alignment and miscellaneous changes	
10	2020-06-16	Eric Suignard (EDF)	innogy's and Elering's review	

### 3. Scope and objectives of use case

Scope and objectives of use case	
<b>Scope</b>	Collection of different types of energy related data from data providers to data hubs
<b>Objective(s)</b>	Collection of data which can be shared.
<b>Related business case(s)</b>	

### 4. Narrative of Use Case

Narrative of use case	
<b>Short description</b>	
Collection of different types of meter, market and grid data to be made available through a data exchange platform to interested parties. Users of data exchange platform can receive data directly from data provider (data source) or from a data hub which collects (and stores) data. This use case focuses on data necessary for flexibility trading. See separate use case description for sub-meter data (because the involved systems are different).	
<b>Complete description</b>	
<p style="text-align: center;"><u>Summary of use case</u></p> <ul style="list-style-type: none"> <li> <u>Collect data from certified meters</u>  <u>Description:</u> Metered Data Operators can collect data from electricity meters at transmission or distribution levels and store them in the Data Hub.           <ul style="list-style-type: none"> <li>               Send data collection's request  <u>Description:</u> </li> <li>               Receive request and authenticate user  <u>Description:</u> </li> <li>               Send meter data  <u>Description:</u> </li> <li>               Transmit meter data  <u>Description:</u> </li> <li>               Store meter data  <u>Description:</u> </li> </ul> </li> <li> <u>Collect market data</u>  <u>Description:</u> A Market Operator collects individual data from FSPs. Individual data can be flexibility bids or schedules.                Market Operator can also generate some market data itself (either public or with restricted             </li> </ul>	

access) and store them in the Market Data Hub. Market data can be used for balancing and congestion management.

- Send market data

Description:

- Collect market data

Description: A Market Operator collects with its Flexibility Platform individual data from FSPs (i.e. bids and schedules).

- Generate market data

Description: A Market Operator generates public market data (i.e. flexibility prices and volumes).

- Store generated market data

Description: Store generated data in a Market Data Hub.

- Collect grid data

Description: A System Operator collects and generates, in the Grid Data Hub, grid data related to its grid.

Grid data can be power grid descriptions or power grid congestion data used for balancing and congestion management.

- Collect grid data

Description:

- Generate grid data

Description:

- Store grid data

Description:

## 5. Key performance indicators (KPI)

## 6. Use case conditions

<i>Use case conditions</i>	
<i>Assumptions</i>	
1	Data should be simultaneously available to all authorized stakeholders to ensure level playing field (cf. SUC dealing with authorizations).
2	Every individual and organization has the right to make the decisions regarding their meter data, incl. easy access to these data by themselves and granting access to third parties: Granting access can be representation rights for users (cf. "Authentication" SUC) or authorizations for applications (cf. "Authorization" SUC).
3	Rules for data protection are in place (authentication of users, consent management)
<i>Prerequisites</i>	
1	Cross border effect: It should be allowed and enabled to store data in one country from a data provider in another country – e.g. collect meter data in one country and store them in a data hub in a foreign country.
2	Standardized/harmonized rules for communication (cf. SUC dealing with data transfer)

## 7. Further information to the use case for classification/mapping

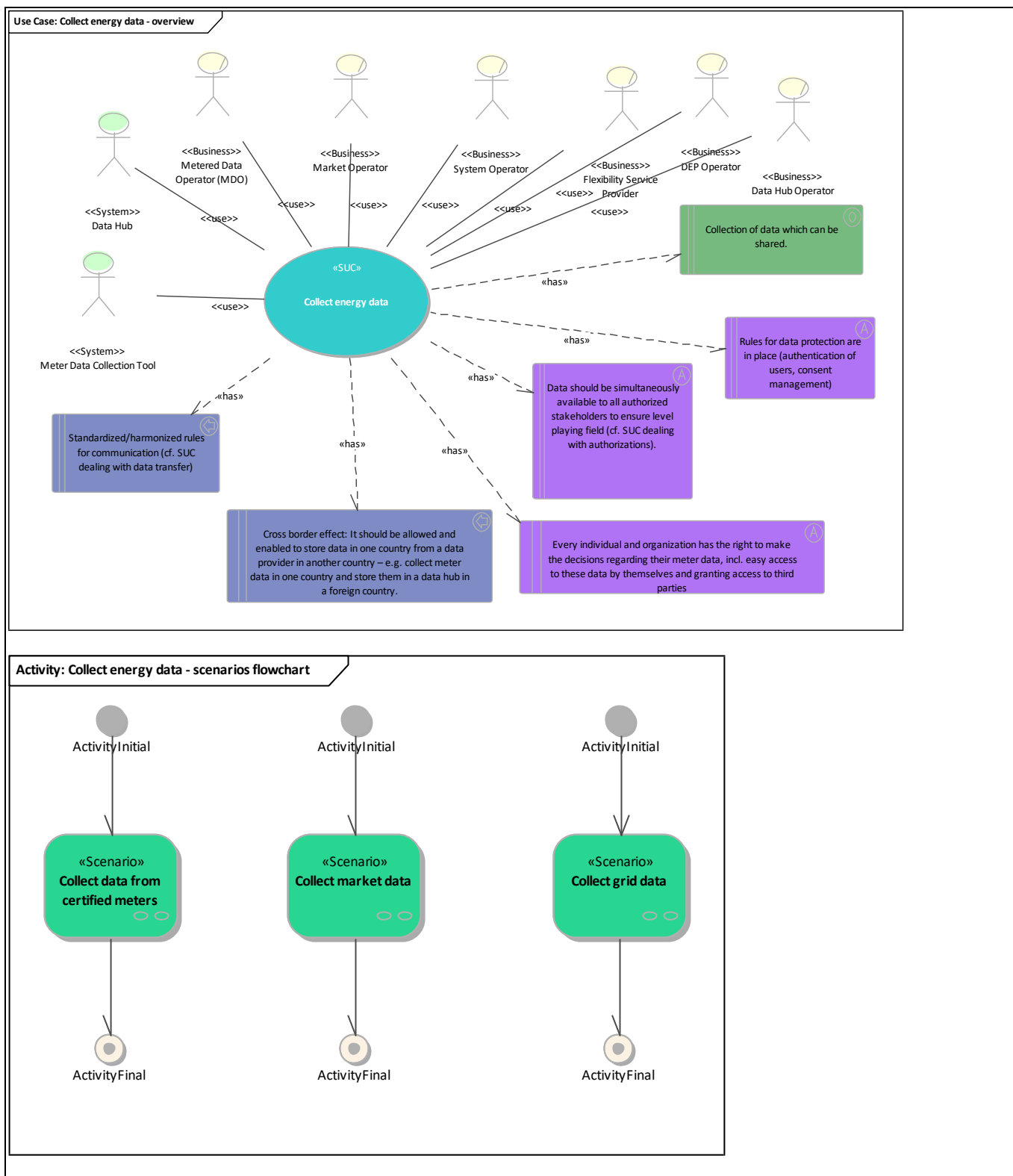
<i>Classification information</i>
<i>Relation to other use cases</i>
<i>Level of depth</i>
<i>Prioritisation</i>

<b><i>Generic, regional or national relation</i></b>
<b><i>Nature of the use case</i></b>
SUC
<b><i>Further keywords for classification</i></b>

## 8. General remarks

### 2. Diagrams of use case

<b><i>Diagram(s) of use case</i></b>
--------------------------------------



### 3. Technical details

#### 1. Actors

#### Actors

Grouping (e.g. domains, zones)		Group description	
Actor name	Actor type	Actor description	Further information specific to this use case
Data Hub	System	Data Hub is an information system which main functionality is to store and make available measurements (e.g. meter data, operational data) and associated master data. Data Hubs are not necessarily centralized in a country or in a region.	
Metered Data Operator (MDO)	Business	Provide metered data to authorized users in a transparent and non-discriminatory manner	
Meter Data Collection Tool	System	Meter Data Collection Tool is an information system which main functionality is to collect meter readings from electricity meters.	
System Operator	Business	<p>System Operator means a natural or legal person responsible for operating, ensuring the maintenance of and, if necessary, developing the system in a given area and, where applicable, its interconnections with other systems, and for ensuring the long-term ability of the system to meet reasonable demands for the distribution or transmission of electricity (cf. ENTSOE-EFET-ebIX harmonized role model 2019). Can be:</p> <ul style="list-style-type: none"> <li>• A Transmission System Operator (cf. definition in T3.3 deliverable), for frequency control, congestion management and voltage control on transmission network,</li> <li>• A Distribution System Operator (cf. definition in T3.3 deliverable), for congestion management and voltage control on distribution network.</li> </ul> <p>NB: In some countries (e.g. Germany and Poland), the high voltage network is part of the distribution grid and in other countries (e. g. France and Italy) the high voltage network is part of the transmission grid.</p> <p>A System Operator can be:</p> <ul style="list-style-type: none"> <li>• A Primary System Operator,</li> <li>• A Secondary System Operator.</li> </ul>	
Market Operator	Business	<p>A market operator is a party that provides a service whereby the offers to sell electricity are matched with bids to buy electricity (cf. ENTSOE-EFET-ebIX harmonized role model 2019). In EU-SysFlex project, a market operator not only trades electricity but also flexibility services.</p> <p>Organize auctions (continuous auctions, discrete auctions, calls for tender) between buyers and sellers of electricity-related products in the markets, and more generally publish the corresponding prices, for assets connected to power grid.</p> <p>Manage/operate the platform for trading (where bids and offers are collected).</p> <p>Clear the market and communicate results. (cf. definition in T3.3 deliverable)</p>	



Flexibility Service Provider	Business	Can be a Distribution Network Flexibility Provider or a Transmission Network Flexibility Provider (cf. definitions in T3.3 deliverable). Similar to Flexibility Aggregator. Can be both aggregator and individual consumer/generator. Type of Energy Service Provider.	
Data Hub Operator	Business	Data hub operator owns and operates an information system which main functionality is to store and make available electricity (also gas, heat) metering data and associated master data. Can be : <ul style="list-style-type: none"> <li>• Grid Data Hub Operator in the sphere of a System Operator</li> <li>• Market Data Hub Operator in the sphere of a Market Operator</li> <li>• Meter Data Hub Operator in the sphere of a Metered Data Operator</li> <li>• Sub-meter Data Hub Operator in the sphere of an Energy Service Provider</li> </ul>	
DEP Operator	Business	Data exchange platform operator owns and operates a communication system which basic functionality is data transfer.	

## 2. References

### 4. Step by step analysis of use case

#### 1. Overview of scenarios

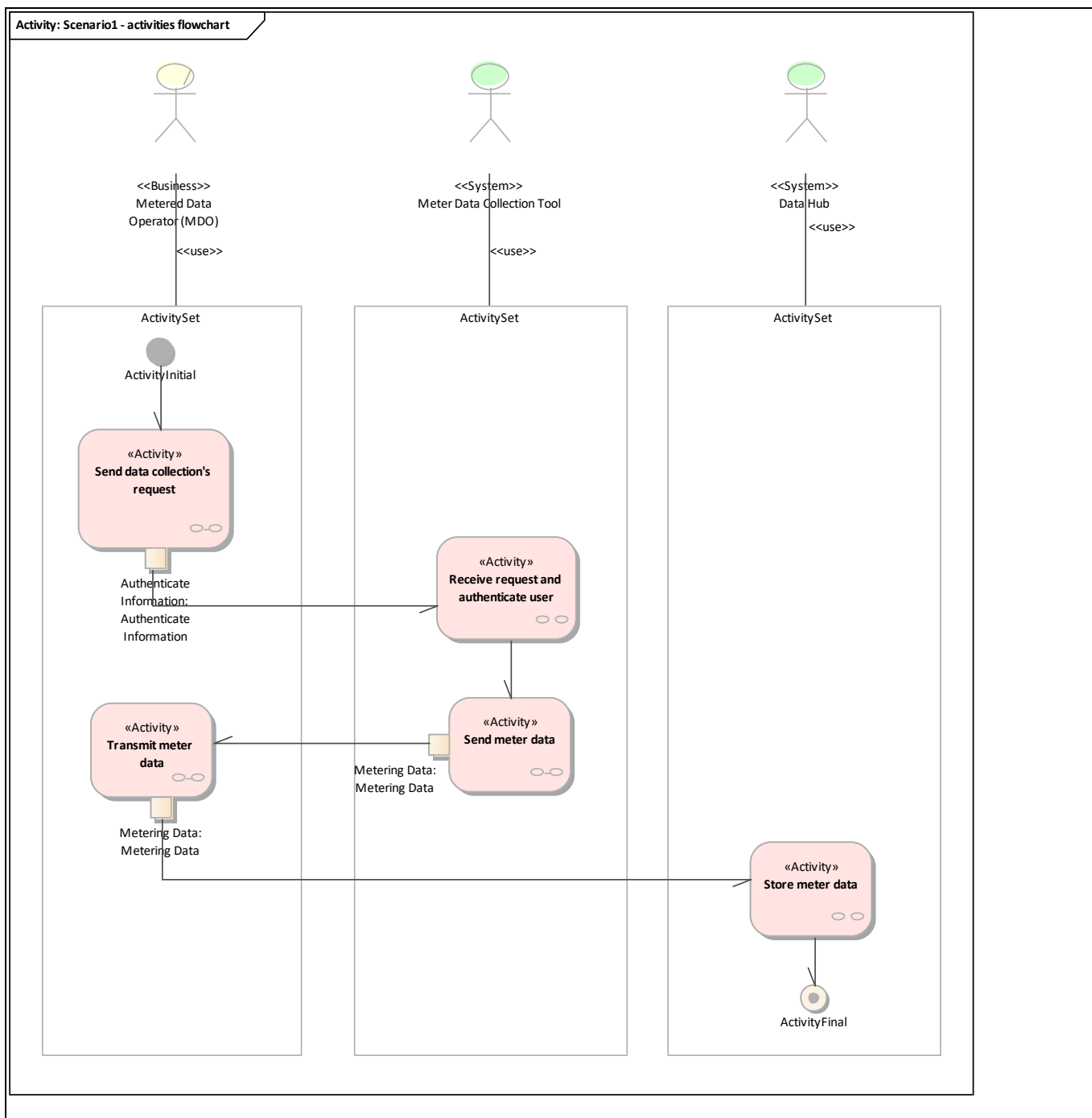
Scenario conditions						
No.	Scenario name	Scenario description	Primary actor	Triggering event	Pre-condition	Post-condition
1	Collect data from certified meters	Metered Data Operators can collect data from electricity meters at transmission or distribution levels and store them in the Data Hub.				
2	Collect market data	A Market Operator collects individual data from FSPs. Individual data can be flexibility bids or schedules. Market Operator can also generate some market data itself (either public or with restricted access) and store them in the Market Data Hub. Market data can be used for balancing and congestion management.				
3	Collect grid data	A System Operator collects and generates, in the Grid Data Hub, grid data related to its grid. Grid data can be power grid descriptions or power grid congestion data used for balancing and congestion management.				

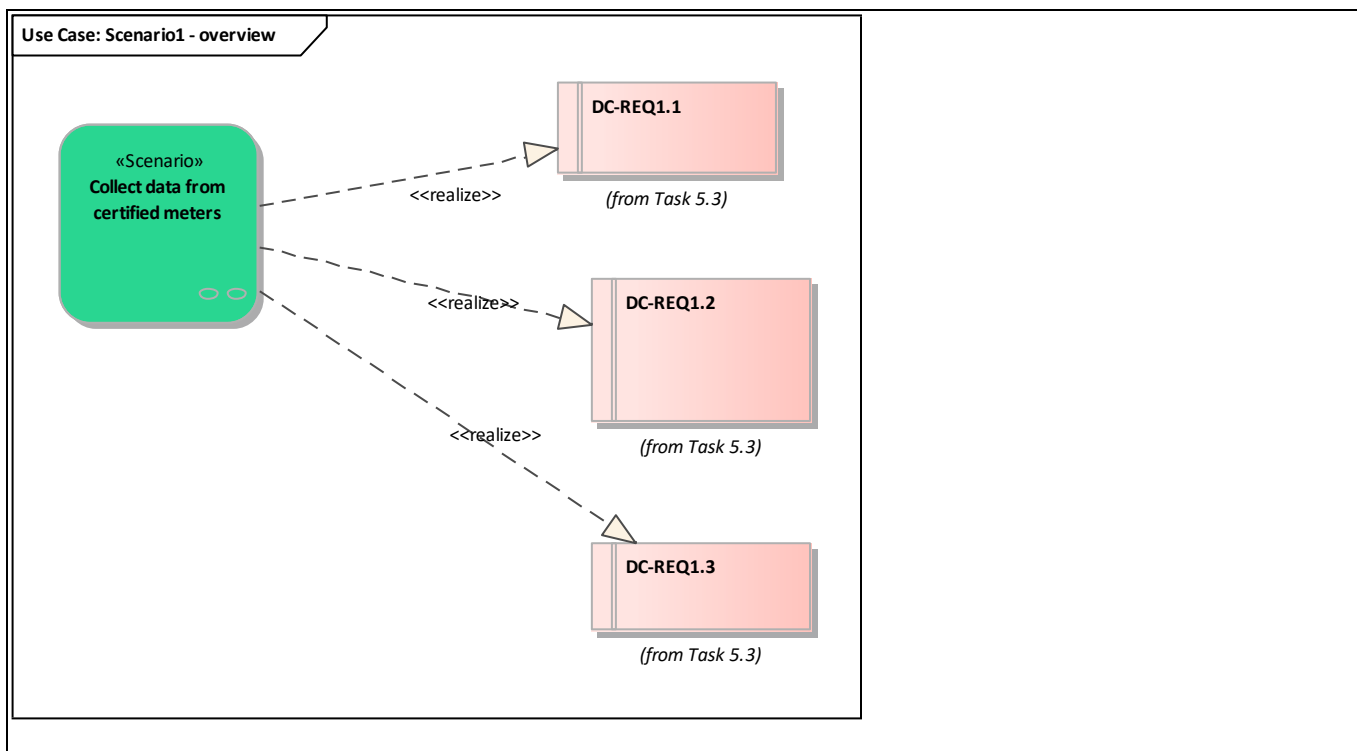
## 2. Steps - Scenarios

### ▪ Collect data from certified meters

Metered Data Operators can collect data from electricity meters at transmission or distribution levels and store them in the Data Hub.

Requirement list (refer to "Requirement" section for more information)	
Requirement R-ID	Requirement name
Cat1.Reg1	DC-REQ1.1
Cat1.Reg2	DC-REQ1.2
Cat1.Reg3	DC-REQ1.3





### Scenario step by step analysis

Scenario								
Scenario name		Collect data from certified meters						
Step No	Event	Name of process/activity	Description of process/activity	Service	Information producer (actor)	Information receiver (actor)	Information exchanged (IDs)	Requirement, R-IDs
1.1		Send data collection's request			Metered Data Operator (MDO)	Meter Data Collection Tool	Info1-Authenticate Information	
1.2		Receive request and authenticate user			Meter Data Collection Tool			
1.3		Send meter data			Meter Data Collection Tool	Metered Data Operator (MDO)	Info2-Metering Data	
1.4		Transmit meter data			Metered Data Operator (MDO)	Data Hub	Info2-Metering Data	
1.5		Store meter data			Data Hub			

- 1.1. Send data collection's request

**Business section: Collect data from certified meters /Send data collection's request**

Information sent:

<b>Business object</b>	<b>Instance name</b>	<b>Instance description</b>
<u>Authenticate Information</u>	Authenticate Information	

- 1.3. Send meter data

**Business section: Collect data from certified meters /Send meter data**

Information sent:

<b>Business object</b>	<b>Instance name</b>	<b>Instance description</b>
<u>Metering Data</u>	Metering Data	

- 1.4. Transmit meter data

**Business section: Collect data from certified meters /Transmit meter data**

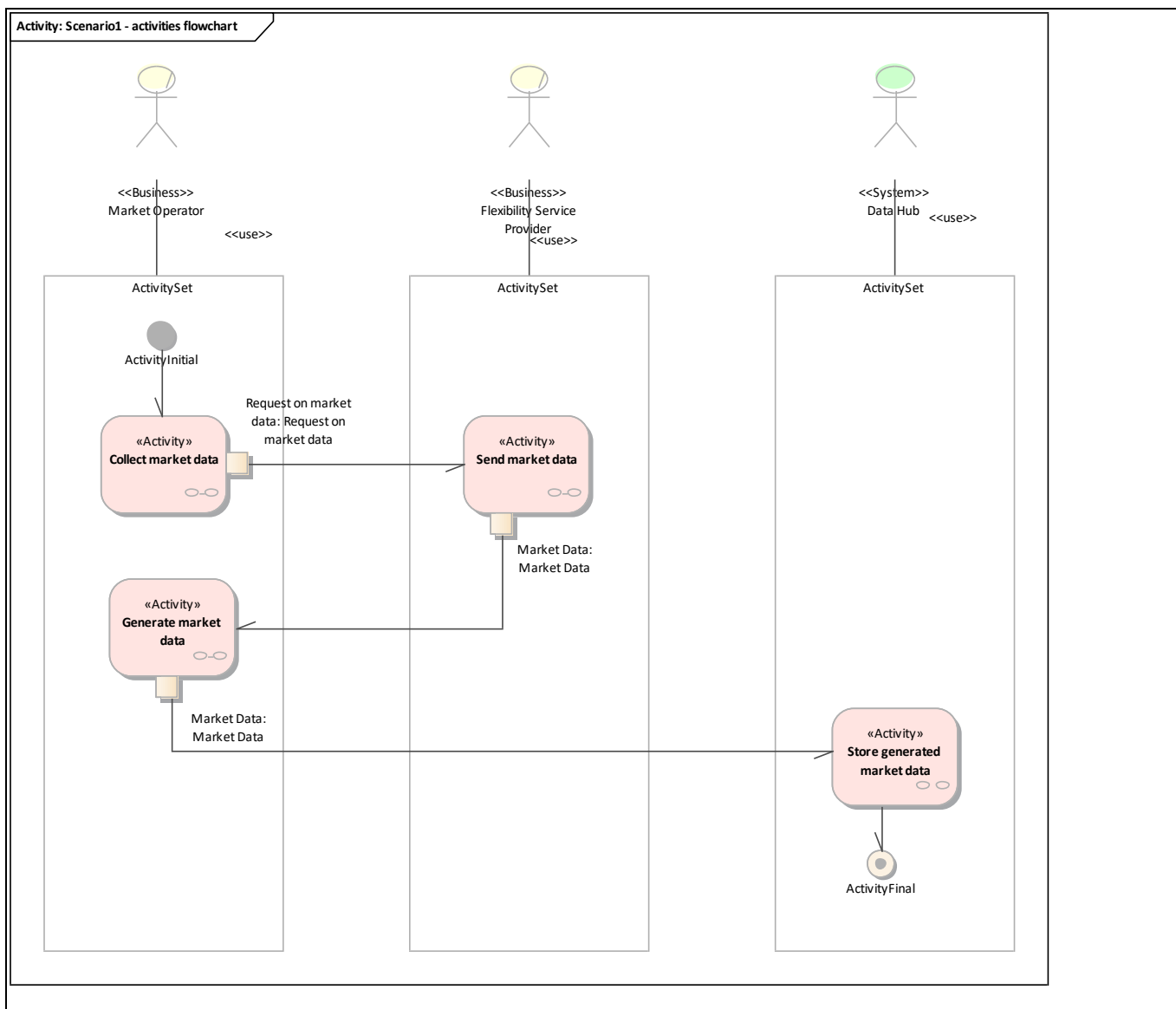
Information sent:

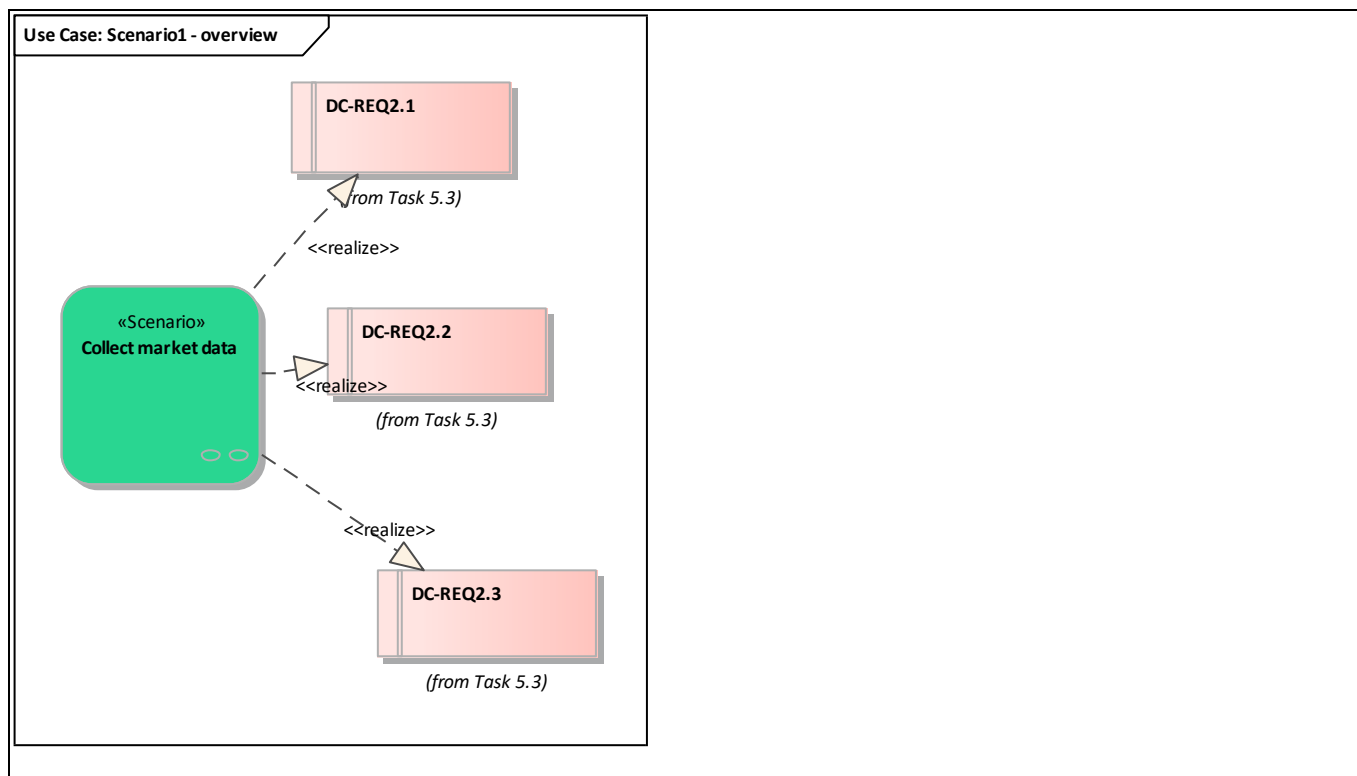
<b>Business object</b>	<b>Instance name</b>	<b>Instance description</b>
<u>Metering Data</u>	Metering Data	

- **Collect market data**

A Market Operator collects individual data from FSPs. Individual data can be flexibility bids or schedules. Market Operator can also generate some market data itself (either public or with restricted access) and store them in the Market Data Hub. Market data can be used for balancing and congestion management.

<b>Requirement list (refer to "Requirement" section for more information)</b>	
<b>Requirement R-ID</b>	<b>Requirement name</b>
<u>Cat1.Reg4</u>	DC-REQ2.1
<u>Cat1.Reg5</u>	DC-REQ2.2
<u>Cat1.Reg6</u>	DC-REQ2.3





## Scenario step by step analysis

Scenario								
Scenario name		Collect market data						
Step No	Event	Name of process/activity	Description of process/activity	Service	Information producer (actor)	Information receiver (actor)	Information exchanged (IDs)	Requirement, R-IDs
2.1		Send market data			Flexibility Service Provider	Market Operator	Info3-Market Data	
2.2		Collect market data	A Market Operator collects with its Flexibility Platform individual data from FSPs (i.e. bids and schedules).		Market Operator	Flexibility Service Provider	Info4-Request on market data	
2.3		Generate market data	A Market Operator generates public market data (i.e. flexibility prices and volumes).		Market Operator	Data Hub	Info3-Market Data	
2.4		Store generated market data	Store generated data in a Market Data Hub.		Data Hub			

### 5. 2.1. Send market data

### **Business section: Collect market data /Send market data**

Information sent:

<b><i>Business object</i></b>	<b><i>Instance name</i></b>	<b><i>Instance description</i></b>
Market Data	Market Data	

## 6. 2.2. Collect market data

### **Business section: Collect market data /Collect market data**

A Market Operator collects with its Flexibility Platform individual data from FSPs (i.e. bids and schedules).

Information sent:

<b><i>Business object</i></b>	<b><i>Instance name</i></b>	<b><i>Instance description</i></b>
Request on market data	Request on market data	

## 7. 2.3. Generate market data

### **Business section: Collect market data /Generate market data**

A Market Operator generates public market data (i.e. flexibility prices and volumes).

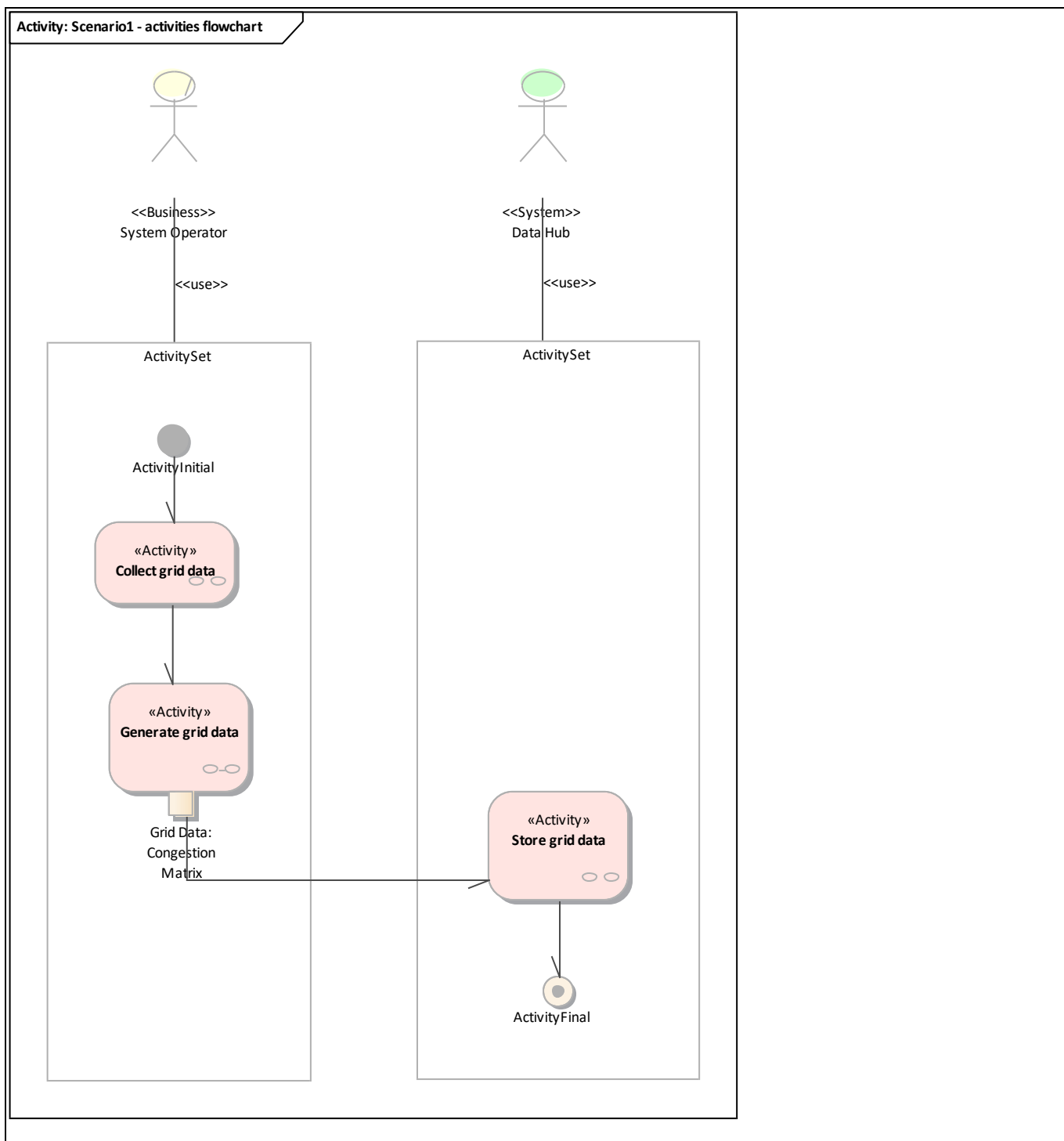
Information sent:

<b><i>Business object</i></b>	<b><i>Instance name</i></b>	<b><i>Instance description</i></b>
Market Data	Market Data	

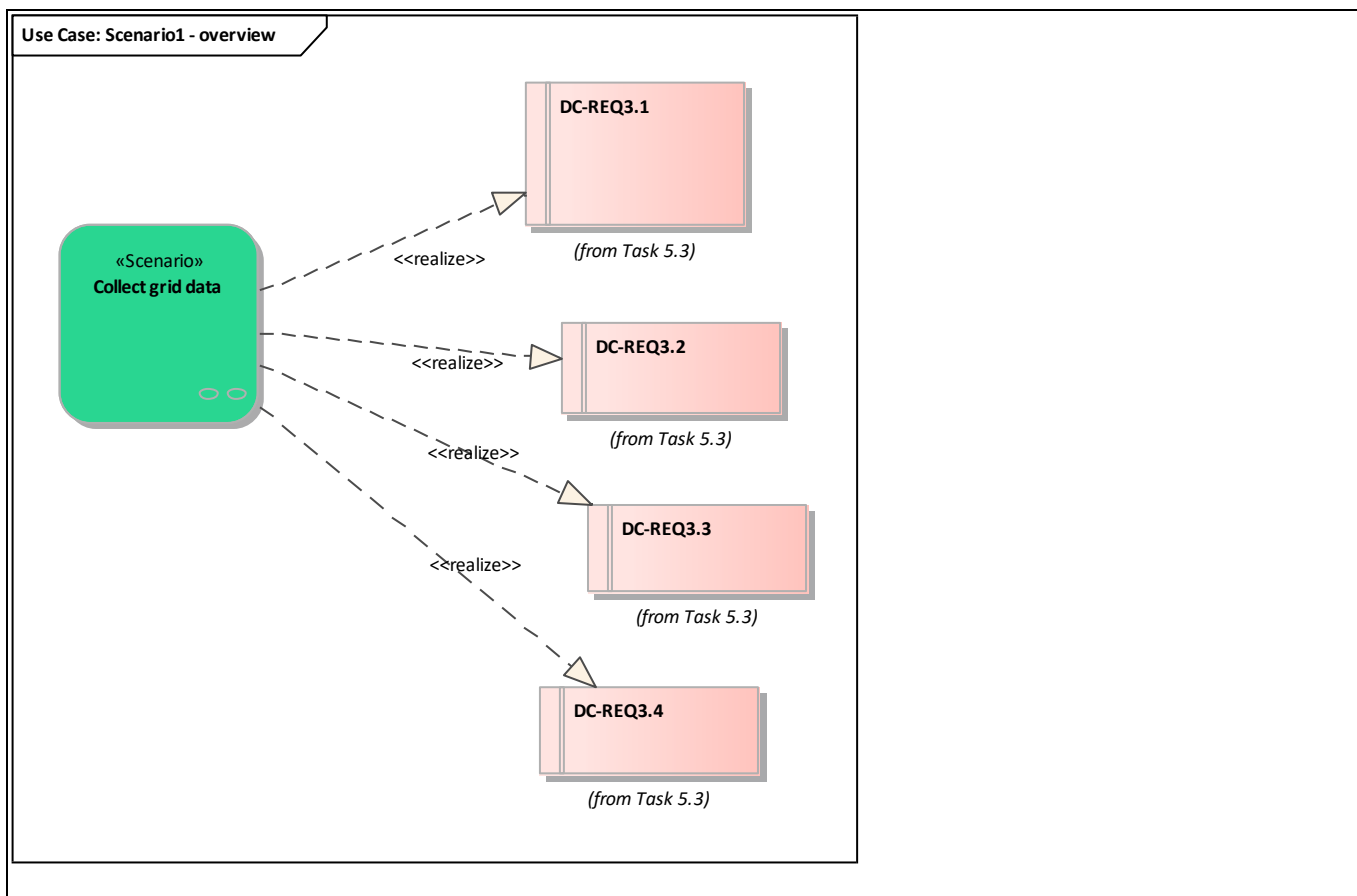
### ▪ **Collect grid data**

A System Operator collects and generates, in the Grid Data Hub, grid data related to its grid. Grid data can be power grid descriptions or power grid congestion data used for balancing and congestion management.

<b><i>Requirement list (refer to "Requirement" section for more information)</i></b>	
<b><i>Requirement R-ID</i></b>	<b><i>Requirement name</i></b>
Cat1.Reg7	DC-REQ3.1
Cat1.Reg8	DC-REQ3.2
Cat1.Reg9	DC-REQ3.3
Cat1.Reg10	DC-REQ3.4







## Scenario step by step analysis

Scenario								
Scenario name		Collect grid data						
Step No	Event	Name of process/activity	Description of process/activity	Service	Information producer (actor)	Information receiver (actor)	Information exchanged (IDs)	Requirement, R-IDs
3.1		Collect grid data			System Operator			
3.2		Generate grid data			System Operator	Data Hub	Info5-Congestion Matrix	
3.3		Store grid data			Data Hub			

### 3.2. Generate grid data

#### Business section: Collect grid data /Generate grid data

Information sent:

Business object	Instance name	Instance description
Congestion Matrix	Grid Data	Necessary for flexibility services from their respective grids (DSO / TSO). Grid data can be power grid descriptions or power grid congestion data used for congestion management

## 5. Information exchanged

<i>Information exchanged</i>			
<i>Information exchanged, ID</i>	<i>Name of information</i>	<i>Description of information exchanged</i>	<i>Requirement, R-IDs</i>
Info1	Authenticate Information		
Info2	Metering Data		
Info3	Market Data		
Info4	Request on market data		
Info5	Congestion Matrix	Congestion matrices are provided by System Operators and stored in Flexibility Platforms. It consists in a matrix based on grid models. Flexibility bids are inserted into the matrix, in order to check whether congestions would occur.	

## 6. Requirements (optional)

<i>Requirements (optional)</i>		
<i>Categories ID</i>	<i>Category name for requirements</i>	<i>Category description</i>
Cat1	Task 5.3	Requirements integrated from Task 5.3.
<i>Requirement R-ID</i>	<i>Requirement name</i>	<i>Requirement description</i>
Req1	DC-REQ1.1	Get near-real-time data (up to 1 hour) from meters
Req2	DC-REQ1.2	Get historical data (monthly) from conventional meters
Req3	DC-REQ1.3	Store data in a meter data hub
Req4	DC-REQ2.1	Get near-real-time (up to 1 hour) data from market
Req5	DC-REQ2.2	Get historical data from market
Req6	DC-REQ2.3	Store data in a market data hub
Req7	DC-REQ3.1	Get very-near-real-time (up to 1 minute) data from grid
Req8	DC-REQ3.2	Get near-real-time (up to 1 hour) data from grid
Req9	DC-REQ3.3	Get historical data from grid
Req10	DC-REQ3.4	Store data in a grid data hub

## 7. Common terms and definitions

## 8. Custom information (optional)

### 9.6 ERASE AND RECTIFY PERSONAL DATA

## Erase and rectify personal data

Based on IEC 62559-2 edition 1  
 Generated from UML Use Case Repository with Modsarus® (EDF R&D Tool)

## 1. Description of the use case

### 1. Name of use case

Use case identification		
ID	Area(s)/Domain(s)/Zone(s)	Name of use case
	Access to data,Balance management,Market for flexibilities,Operational planning and forecasting,Services related to end customers	Erase and rectify personal data

### 2. Version management

Version management				
Version No.	Date	Name of author(s)	Changes	Approval status
1	2018-04-12	Kalle Kukk (Elering)		
2	2018-08-27	Mandimby Ranaivo R. (AKKA)		
3	2018-09-21	Eric Suignard (EDF)		
4	2018-10-04	Eric Suignard (EDF)	Version post WP5&9 physical meeting in Tallinn	
5	2018-10-17	Eric Suignard (EDF)	Version reviewed by WP5&9 partners	
6	2019-05-07	Eric Suignard (EDF)	WP6-7-8 demos alignment and miscellaneous changes	
7	2020-06-16	Eric Suignard (EDF)	innogy's and Elering's review	

### 3. Scope and objectives of use case

Scope and objectives of use case	
Scope	Erasure and rectification of personally identifiable data.
Objective(s)	Safeguard the rights of every individual to have control over their own data.
Related business case(s)	

### 4. Narrative of Use Case

Narrative of use case
<b>Short description</b>
According to data protection rules (GDPR), one has the right (unless otherwise stated in the laws) to execute control over one's data, in particular to delete or rectify them.
<b>Complete description</b>
<p>The management of personal data must be in line with the GDPR guidelines. In particular, any Individual Data Owner (a physical person) has the right to delete their data or rectify them if they are inaccurate or incomplete. Personal data include consumption/generation information, meter point and master data.</p> <p>Via the Data Exchange Platform (DEP), an Individual Data Owner can request the deletion or the rectification of their personal data. The DEP identifies the concerned Applications or Data Hub and forwards the request. The Application or the Data Hub checks the legitimacy of the rectification or the deletion before proceeding. Finally the Individual Data Owner is notified about the success or the failure of the operations. Moreover, proof of deletion can be provided through deletion logs.</p>
<u>Summary of use case</u>

- An Individual data owner deletes their personal data

Description:

- The individual data owner requests the deletion of only a part of their personal data or the whole of them.
- The DEP forwards the deletion request to any concerned application or the data hub.
- The applications or the data hub check the legitimacy of the deletion before proceeding. They log the operations and notify the DEP.
- The DEP notifies the individual data owner about the deletion.
- Delete data  
Description: The data hub proceeds to the deletion.
- Delete data  
Description: The application proceeds to the deletion.
- Forward data deletion request  
Description: The DEP forwards the deletion request to any concerned application or the data hub.
- Notify data deletion status  
Description: The DEP notifies the individual data owner about the success or the failure of the deletion process.
- Request data deletion  
Description: The individual data owner requests the deletion of only a part or the whole of their personal data.

- An individual data owner rectifies their personal data

Description:

- The individual data owner selects their personal data to rectify and provide the new content to the DEP.
- The DEP forwards the rectification request to the concerned applications or the data hub.
- The applications or the data hub check the legitimacy of the rectification before proceeding.
- The DEP notifies the individual data owner about the rectification.
- Forward rectification request  
Description: The DEP forwards the rectification request to any concerned application.
- Notify rectification status  
Description: The DEP notifies the individual data owner about the success or the failure of the rectification process.
- Rectify data  
Description: The application proceeds to the rectification.
- Rectify data  
Description: The data hub proceeds to the rectification.
- Request data rectification  
Description: The individual data owner requests the rectification of their personal data by providing updated data.  
The objective is to correct inaccurate data or to complete data if they are incomplete.

## 5. Key performance indicators (KPI)

## 6. Use case conditions

### Use case conditions

<b>Assumptions</b>	
1	The communication channel is protected
2	Cross-border effect: The personal data may be located in another country.
3	All operations are logged: The log content may be used as proof of deletion in this particular case.
<b>Prerequisites</b>	
1	The individual data owner has successfully logged in to the DEP
2	Personal data have been given or made available by their owners

## 7. Further information to the use case for classification/mapping

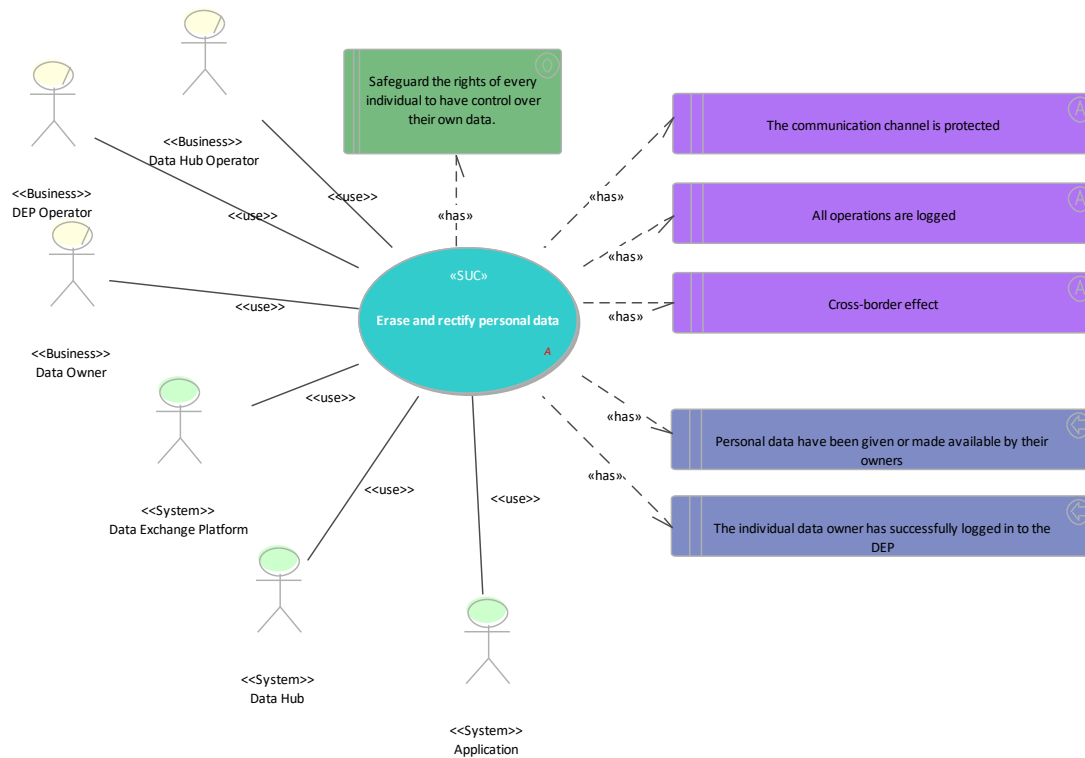
<b>Classification information</b>
<b>Relation to other use cases</b>
<b>Level of depth</b>
<b>Prioritisation</b>
<b>Generic, regional or national relation</b>
<b>Nature of the use case</b>
SUC
<b>Further keywords for classification</b>

## 8. General remarks

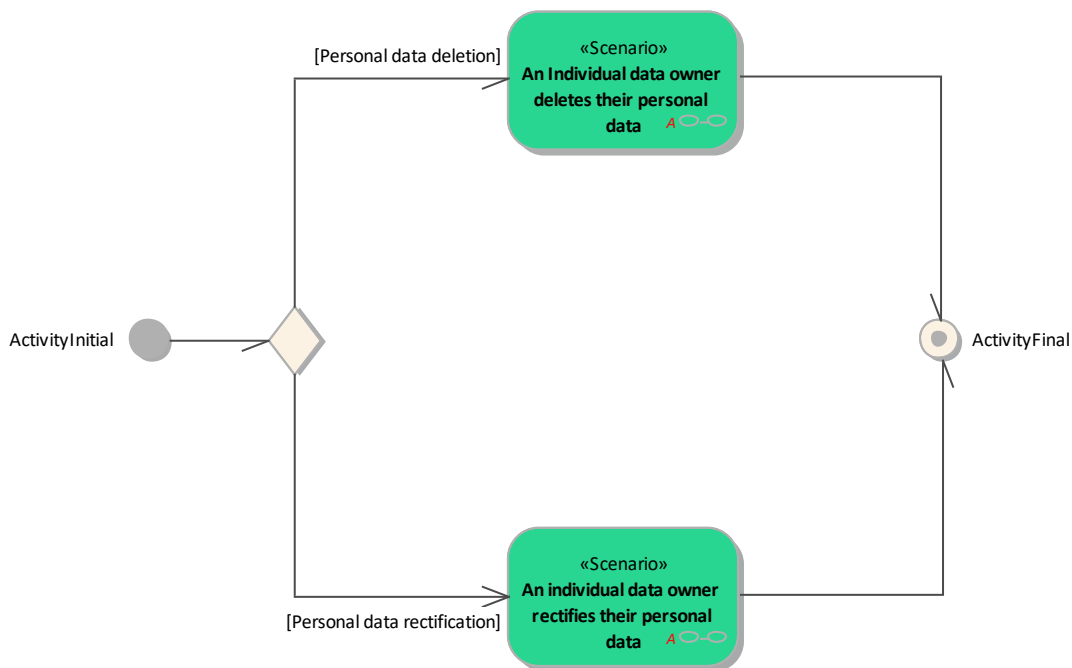
### 2. Diagrams of use case

<b>Diagram(s) of use case</b>
-------------------------------

Use Case: Erase and rectify personal data - overview



Activity: Erase and rectify personal data - scenarios flowchart



### 3. Technical details

#### 1. Actors

<b>Actors</b>			
<b>Grouping (e.g. domains, zones)</b>		<b>Group description</b>	
<b>Actor name</b>	<b>Actor type</b>	<b>Actor description</b>	<b>Further information specific to this use case</b>
Data Exchange Platform	System	Data exchange platform (DEP) is a communication platform the basic functionality of which is to secure data transfer (routing) from data providers (e.g. data hubs, flexibility service providers, TSOs, DSOs) to the data users (e.g. TSOs, DSOs, consumers, suppliers, energy service providers). DEP stores data related to its services (e.g. cryptographic hash of the data requested). The DEP does not store core energy data (e.g. meter data, grid data, market data) while these data can be stored by data hubs. Several DEPs may exist in different countries and inside one country.	
Application	System	Any kind of system connected to a Data Exchange Platform and used by a market participant who wishes to receive data.	
Data Hub	System	Data Hub is an information system which main functionality is to store and make available measurements (e.g. meter data, operational data) and associated master data. Data Hubs are not necessarily centralized in a country or in a region.	
Data Owner	Business	Any person who owns data and can give authorization to other parties to access them. Can be, inter alia: <ul style="list-style-type: none"> <li>• Flexibility Services Provider</li> <li>• Market Operator</li> <li>• Consumer</li> <li>• Generator</li> </ul>	
Data Hub Operator	Business	Data hub operator owns and operates an information system which main functionality is to store and make available electricity (also gas, heat) metering data and associated master data. Can be : <ul style="list-style-type: none"> <li>• Grid Data Hub Operator in the sphere of a System Operator</li> <li>• Market Data Hub Operator in the sphere of a Market Operator</li> <li>• Meter Data Hub Operator in the sphere of a Metered Data Operator</li> <li>• Sub-meter Data Hub Operator in the sphere of an Energy Service Provider</li> </ul>	
DEP Operator	Business	Data exchange platform operator owns and operates a communication system which basic functionality is data transfer.	

#### 2. References

### 4. Step by step analysis of use case

#### 1. Overview of scenarios

#### Scenario conditions

No.	Scenario name	Scenario description	Primary actor	Triggering event	Pre-condition	Post-condition
1	An Individual data owner deletes their personal data	<ul style="list-style-type: none"> <li>The individual data owner requests the deletion of only a part of their personal data or the whole of them.</li> <li>The DEP forwards the deletion request to any concerned application or the data hub.</li> <li>The applications or the data hub check the legitimacy of the deletion before proceeding. They log the operations and notify the DEP.</li> <li>The DEP notifies the individual data owner about the deletion.</li> </ul>				
2	An individual data owner rectifies their personal data	<ul style="list-style-type: none"> <li>The individual data owner selects their personal data to rectify and provide the new content to the DEP.</li> <li>The DEP forwards the rectification request to the concerned applications or the data hub.</li> <li>The applications or the data hub check the legitimacy of the rectification before proceeding.</li> <li>The DEP notifies the individual data owner about the rectification.</li> </ul>				

## 2. Steps - Scenarios

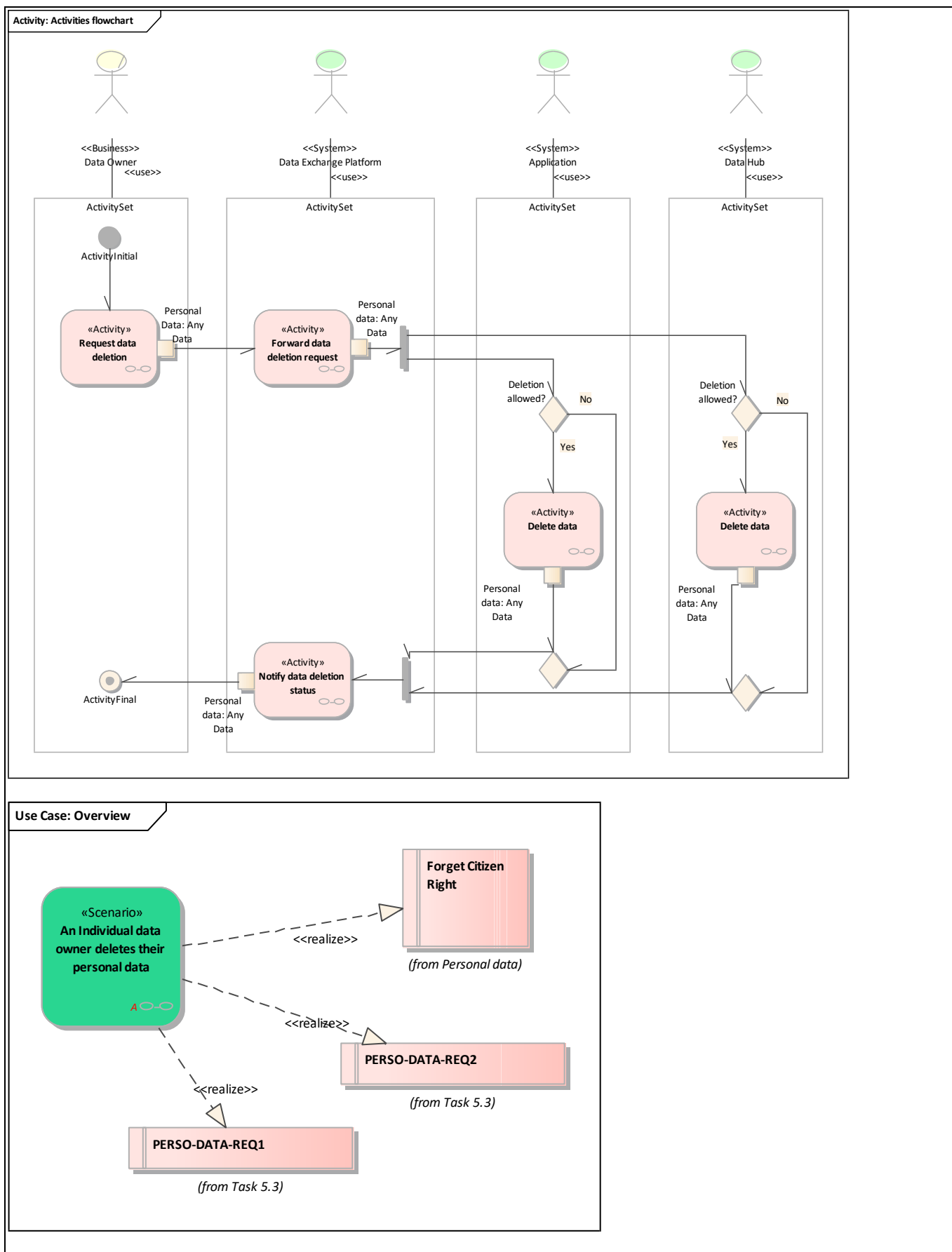
### ▪ An Individual data owner deletes their personal data

5. The individual data owner requests the deletion of only a part of their personal data or the whole of them.
6. The DEP forwards the deletion request to any concerned application or the data hub.
7. The applications or the data hub check the legitimacy of the deletion before proceeding. They log the operations and notify the DEP.
8. The DEP notifies the individual data owner about the deletion.

### Requirement list (refer to "Requirement" section for more information)

Requirement R-ID	Requirement name
Cat1.Reg1	Forget Citizen Right
Cat2.Reg2	PERSO-DATA-REQ2
Cat2.Reg3	PERSO-DATA-REQ1





## Scenario step by step analysis

Scenario								
Scenario name		An Individual data owner deletes their personal data						
Step No	Event	Name of process/activity	Description of process/activity	Service	Information producer (actor)	Information receiver (actor)	Information exchanged (IDs)	Requirement, R-IDs
1.1		Delete data	The data hub proceeds to the deletion.		Data Hub	Data Exchange Platform	Info1-Any Data	
1.2		Delete data	The application proceeds to the deletion.		Application	Data Exchange Platform	Info1-Any Data	
1.3		Forward data deletion request	The DEP forwards the deletion request to any concerned application or the data hub.		Data Exchange Platform	Application, Data Exchange Platform, Data Hub, Data Exchange Platform	Info1-Any Data	
1.4		Notify data deletion status	The DEP notifies the individual data owner about the success or the failure of the deletion process.		Data Exchange Platform	Data Owner	Info1-Any Data	
1.5		Request data deletion	The individual data owner requests the deletion of only a part or the whole of their personal data.		Data Owner	Data Exchange Platform	Info1-Any Data	

- 1.1. Delete data

**Business section: An Individual data owner deletes their personal data/Delete data**

The data hub proceeds to the deletion.

Information sent:

Business object	Instance name	Instance description
Any Data	Personal data	

- 1.2. Delete data

**Business section: An Individual data owner deletes their personal data/Delete data**

The application proceeds to the deletion.

Information sent:

Business object	Instance name	Instance description
Any Data	Personal data	

- 1.3. Forward data deletion request

**Business section: An Individual data owner deletes their personal data/Forward data deletion request**

The DEP forwards the deletion request to any concerned application or the data hub.

Information sent:

<i><b>Business object</b></i>	<i><b>Instance name</b></i>	<i><b>Instance description</b></i>
Any Data	Personal data	

- 1.4. Notify data deletion status

**Business section: An Individual data owner deletes their personal data/Notify data deletion status**

The DEP notifies the individual data owner about the success or the failure of the deletion process.

Information sent:

<i><b>Business object</b></i>	<i><b>Instance name</b></i>	<i><b>Instance description</b></i>
Any Data	Personal data	

- 1.5. Request data deletion

**Business section: An Individual data owner deletes their personal data/Request data deletion**

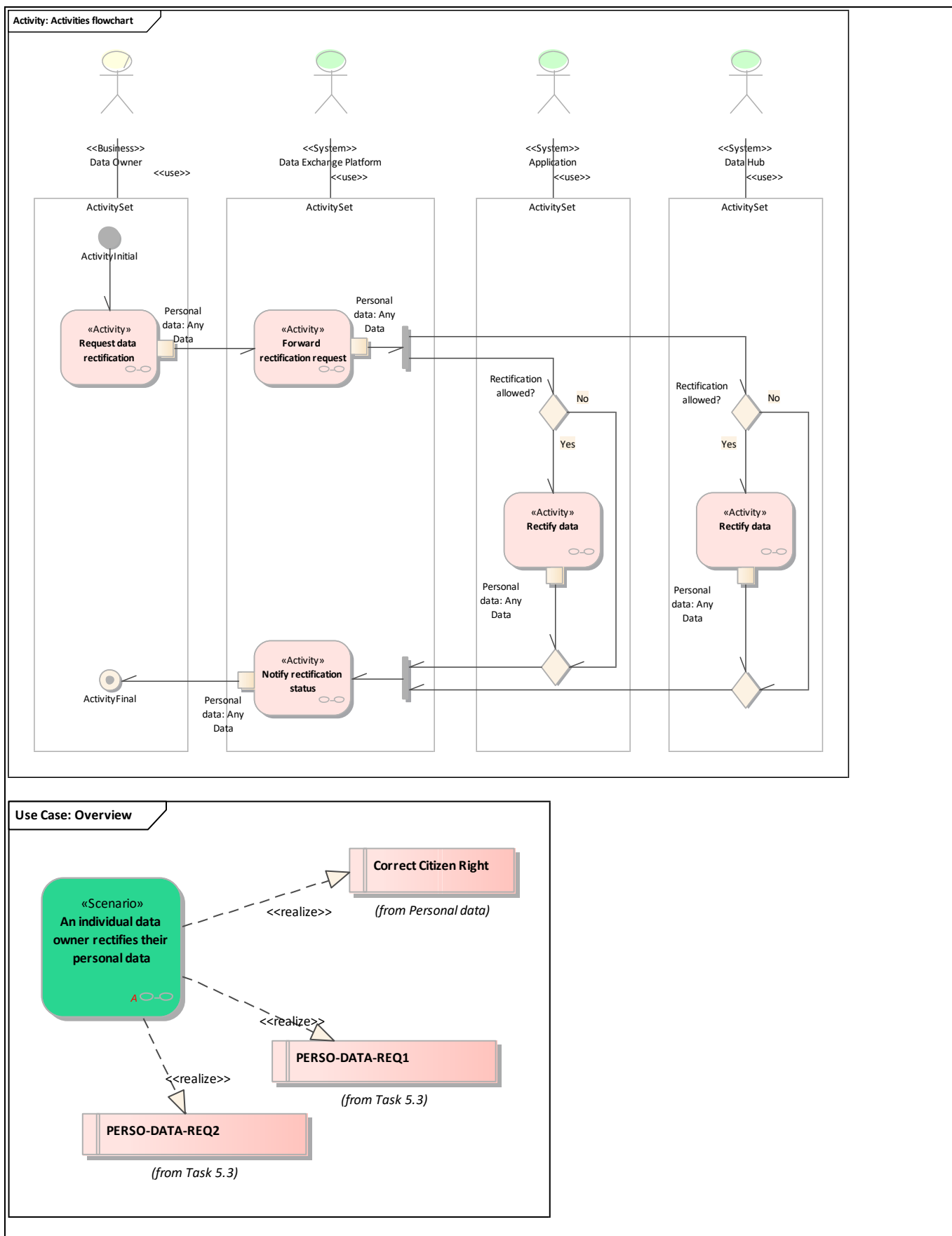
The individual data owner requests the deletion of only a part or the whole of their personal data.

Information sent:

<i><b>Business object</b></i>	<i><b>Instance name</b></i>	<i><b>Instance description</b></i>
Any Data	Personal Data	

- **An individual data owner rectifies their personal data**
  - The individual data owner selects their personal data to rectify and provide the new content to the DEP.
  - The DEP forwards the rectification request to the concerned applications or the data hub.
  - The applications or the data hub check the legitimacy of the rectification before proceeding.
  - The DEP notifies the individual data owner about the rectification.

<i><b>Requirement list (refer to "Requirement" section for more information)</b></i>	
<i><b>Requirement R-ID</b></i>	<i><b>Requirement name</b></i>
Cat1.Reg4	Correct Citizen Right
Cat2.Reg2	PERSO-DATA-REQ2
Cat2.Reg3	PERSO-DATA-REQ1



## Scenario step by step analysis

Scenario								
Scenario name		An individual data owner rectifies their personal data						
Step No	Event	Name of process/activity	Description of process/activity	Service	Information producer (actor)	Information receiver (actor)	Information exchanged (IDs)	Requirement, R-IDs
2.1		Forward rectification request	The DEP forwards the rectification request to any concerned application.		Data Exchange Platform	Application, Data Exchange Platform, Data Hub, Data Exchange Platform	Info1-Any Data	
2.2		Notify rectification status	The DEP notifies the individual data owner about the success or the failure of the rectification process.		Data Exchange Platform	Data Owner	Info1-Any Data	
2.3		Rectify data	The application proceeds to the rectification.		Application	Data Exchange Platform	Info1-Any Data	
2.4		Rectify data	The data hub proceeds to the rectification.		Data Hub	Data Exchange Platform	Info1-Any Data	
2.5		Request data rectification	The individual data owner requests the rectification of their personal data by providing updated data. The objective is to correct inaccurate data or to complete data if they are incomplete.		Data Owner	Data Exchange Platform	Info1-Any Data	

- 2.1. Forward rectification request

**Business section: An individual data owner rectifies their personal data/Forward rectification request**

The DEP forwards the rectification request to any concerned application.

Information sent:

Business object	Instance name	Instance description
Any Data	Personal data	

- 2.2. Notify rectification status

**Business section: An individual data owner rectifies their personal data/Notify rectification status**

The DEP notifies the individual data owner about the success or the failure of the rectification process.

Information sent:

<b>Business object</b>	<b>Instance name</b>	<b>Instance description</b>
Any Data	Personal data	

- 2.3. Rectify data

**Business section: An individual data owner rectifies their personal data/Rectify data**

The application proceeds to the rectification.

Information sent:

<b>Business object</b>	<b>Instance name</b>	<b>Instance description</b>
Any Data	Personal data	

- 2.4. Rectify data

**Business section: An individual data owner rectifies their personal data/Rectify data**

The data hub proceeds to the rectification.

Information sent:

<b>Business object</b>	<b>Instance name</b>	<b>Instance description</b>
Any Data	Personal data	

- 2.5. Request data rectification

**Business section: An individual data owner rectifies their personal data/Request data rectification**

The individual data owner requests the rectification of their personal data by providing updated data.

The objective is to correct inaccurate data or to complete data if they are incomplete.

Information sent:

<b>Business object</b>	<b>Instance name</b>	<b>Instance description</b>
Any Data	Personal data	

## 5. Information exchanged

<b>Information exchanged</b>			
<b>Information exchanged, ID</b>	<b>Name of information</b>	<b>Description of information exchanged</b>	<b>Requirement, R-IDs</b>
Info1	Any Data		

## 6. Requirements (optional)

<b>Requirements (optional)</b>		
<b>Categories ID</b>	<b>Category name for requirements</b>	<b>Category description</b>
Cat1	Personal data	
<b>Requirement R-ID</b>	<b>Requirement name</b>	<b>Requirement description</b>
Req1	Forget Citizen Right	Right to request the deletion or removal of personal data where there is no compelling reason for its continued processing
Req4	Correct Citizen Right	Right to rectify data if inaccurate or incomplete
<b>Requirements (optional)</b>		
<b>Categories ID</b>	<b>Category name for requirements</b>	<b>Category description</b>

Cat2	Task 5.3	Requirements integrated from Task 5.3.
<b>Requirement R-ID</b>	<b>Requirement name</b>	<b>Requirement description</b>
Req2	PERSO-DATA-REQ2	Ability to share information related to rectification of personal data between data owners, concerned DEPs, applications and data sources
Req3	PERSO-DATA-REQ1	Ability to share information related to erasure of personal data between data owners, concerned DEPs, applications and data sources

## 7. Common terms and definitions

## 8. Custom information (optional)

### 9.7 EXCHANGE DATA BETWEEN DERS AND SYSTEM OPERATORS

# Exchange data between DERs and System Operators

Based on IEC 62559-2 edition 1

Generated from UML Use Case Repository with Modsarus® (EDF R&D Tool)

## 1. Description of the use case

### 1. Name of use case

<b>Use case identification</b>		
<b>ID</b>	<b>Area(s)/Domain(s)/Zone(s)</b>	<b>Name of use case</b>
	Market for flexibilities, Operational planning and forecasting	Exchange data between DERs and System Operators

### 2. Version management

<b>Version management</b>				
<b>Version No.</b>	<b>Date</b>	<b>Name of author(s)</b>	<b>Changes</b>	<b>Approval status</b>
1	2018-04-05	Wojciech Lubczynski (PSE)		
2	2018-07-19	Ricardo Jover (EDF), Eric Suignard (EDF)		
3	2018-08-02	Eric Suignard (EDF)		
4	2018-09-21	Ricardo Jover (EDF)	Remarks from Elering (Narrative) and EirGrid.	
5	2018-10-04	Eric Suignard (EDF)	Version post WP5&9 physical meeting in Tallinn	
6	2018-10-17	Eric Suignard (EDF)	Version reviewed by WP5&9 partners	
7	2019-05-07	Eric Suignard (EDF)	WP6-7-8 demos alignment and miscellaneous changes	
8	2020-06-16	Eric Suignard (EDF)	innogy's and Elering's review	

### 3. Scope and objectives of use case

<i>Scope and objectives of use case</i>	
<b>Scope</b>	Data exchange between DER (Distributed Energy Resources) and SCADA systems of TSO and DSOs, using the Data Exchange Platform as an intermediary.
<b>Objective(s)</b>	Ensuring the observability and controllability of DER units providing electrical energy and flexibility services to the power system.
<b>Related business case(s)</b>	

### 4. Narrative of Use Case

<i>Narrative of use case</i>
<b>Short description</b>
The use case includes data exchange between distributed generators, demand response (DR) resources and energy storage devices, and a Data Exchange Platform (DEP) that communicates with TSO and DSO SCADA systems. DEP is not appropriate for time-critical data exchange (like activation of very fast products) thus being out of scope of this use case. It is assumed that the SCADA systems may require both schedule data for planning purpose and structural data (including connection diagrams) each time they are changed.
<b>Complete description</b>
<p style="text-align: center;"><u>Summary of use case</u></p> <ul style="list-style-type: none"> <li> <b>Exchange data from DERs to System Operators</b>  <u>Description:</u> <ul style="list-style-type: none"> <li>Provide DER changes in schedule data and DER structural data  <u>Description:</u> Occasional provision of non-real-time data.</li> <li>Provide changes in aggregated DER schedule data and aggregated DER structural data  <u>Description:</u> Occasional provision of non-real-time data.</li> <li>Forward DER schedule and structural data  <u>Description:</u> Transmission of schedule and structural data when they are changed (push method). Data are sent to the SCADA systems of the TSOs and the DSOs which need such data.</li> <li>Forward DER real-time setpoint data  <u>Description:</u> Real-time data transfer for all DERs to SCADA systems (push method). Data are sent to the SCADA systems of the TSOs and the DSOs which need such data.</li> <li>Provide aggregated DER real-time setpoint data  <u>Description:</u> In the case of an aggregator that manages multiple DERs.</li> <li>Provide DER real-time setpoint data  <u>Description:</u> In case of the single DER unit.</li> <li>Take into account DER data  <u>Description:</u></li> </ul> </li> <li> <b>Exchange data from System Operators to DERs</b>  <u>Description:</u> Cf. "Manage flexibility activations" data exchange System Use Case.         </li> </ul>



## 5. Key performance indicators (KPI)

## 6. Use case conditions

<b>Use case conditions</b>	
<b>Assumptions</b>	
1	It is assumed that systems of authentication and access permission are implemented that allow data exchange with all individual DER units, even those that are part of the aggregator pool.
2	<p>Data are exchanged in both direction: This Use Case covers data exchanges:</p> <ul style="list-style-type: none"> <li>From individual DERs or aggregated DERs to TSO/DSO SCADAs for sending DER schedule, DER structural data and DER real-time setpoint data,</li> <li>From TSO/DSO SCADAs to individual DERs or aggregated DERs for sending activation requests (except for very fast flexibility products).</li> </ul> <p>It will not cover data exchanges from TSO/DSO SCADAs to DERs for remote control. It is assumed that activation itself is the responsibility of individual DER itself and/or its aggregator.</p>
<b>Prerequisites</b>	
1	Communication standards must be established
2	The legislative framework is needed (market)
3	Cross-border exchange is required in case of cross-border service provision: This is secondary to the provision of the cross-border service. In this case, it is necessary to implement international technical standards and meet the requirements arising therefrom.
4	<p>The system roles involved in this system use case should be available:</p> <ol style="list-style-type: none"> <li>The DER unit should ensure the implementation of the functionality specified in KORRR art. 17. This means that the DER unit needs to provide real-time data.</li> <li>The aggregator should ensure the implementation of the functionality specified in KORRR art. 17 and, in particular, those referred to in SO GL art. 53. This means that the aggregator must have a system that collects in real-time the setpoints of individual DER units and their configurations.</li> <li>DEP should be able to handle real-time processes and should be able to handle numerous information streams coming from DER devices. At the same time, DEP should be able to immediately transfer this information to the SCADA systems of TSOs and DSOs.</li> <li>SCADA systems of TSOs and DSOs should be able to receive information from DEP.</li> </ol>

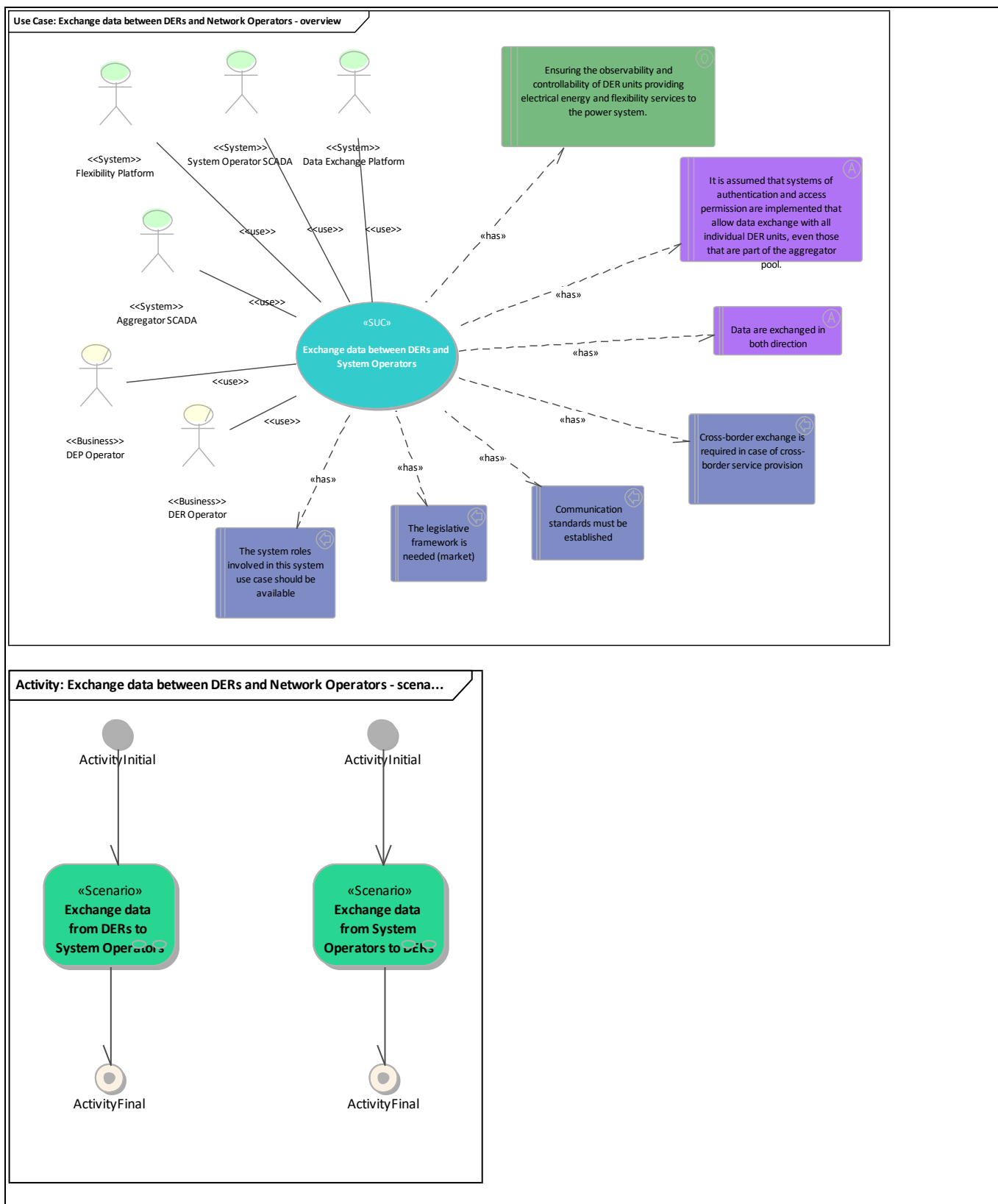
## 7. Further information to the use case for classification/mapping

<b>Classification information</b>
<b>Relation to other use cases</b>
<b>Level of depth</b>
<b>Prioritisation</b>
<b>Generic, regional or national relation</b>
<b>Nature of the use case</b>
SUC
<b>Further keywords for classification</b>

## 8. General remarks

### 2. Diagrams of use case

<b>Diagram(s) of use case</b>
-------------------------------



### 3. Technical details

#### 1. Actors

<b>Actors</b>			
<b>Grouping (e.g. domains, zones)</b>		<b>Group description</b>	
<b>Actor name</b>	<b>Actor type</b>	<b>Actor description</b>	<b>Further information specific to this use case</b>
DER Operator	Business	Operates a single DER unit. Distributed Energy Resources can consist of generation sources, energy storage facilities and facilities participating in Demand Response. Are mainly connected to distribution power grids but can also be connected to transmission power grids (e.g. Portugal). Can be an Asset Operator, a Generator or a Generation Asset Operator (cf. definitions in T3.3 deliverable).	
System Operator SCADA	System	SCADA operated by a System Operator.	
Data Exchange Platform	System	Data exchange platform (DEP) is a communication platform the basic functionality of which is to secure data transfer (routing) from data providers (e.g. data hubs, flexibility service providers, TSOs, DSOs) to the data users (e.g. TSOs, DSOs, consumers, suppliers, energy service providers). DEP stores data related to its services (e.g. cryptographic hash of the data requested). The DEP does not store core energy data (e.g. meter data, grid data, market data) while these data can be stored by data hubs. Several DEPs may exist in different countries and inside one country.	
Aggregator SCADA	System	SCADA operated by an Aggregator.	
Flexibility Platform	System	Flexibility Platform (FP) for System Operators and Flexibility Service Providers that enables the trading of different flexibility products and services. A FP is operated by a Market Operator.  Available to System Operators and Flexibility Services Providers. It is used to support the prequalification, the bidding, the activation and the verification processes, ensuring coordination between activities undertaken by several operators using the same flexible resources. Several national and regional FPs may exist.	
DEP Operator	Business	Data exchange platform operator owns and operates a communication system which basic functionality is data transfer.	

#### 2. References

### 4. Step by step analysis of use case

#### 1. Overview of scenarios

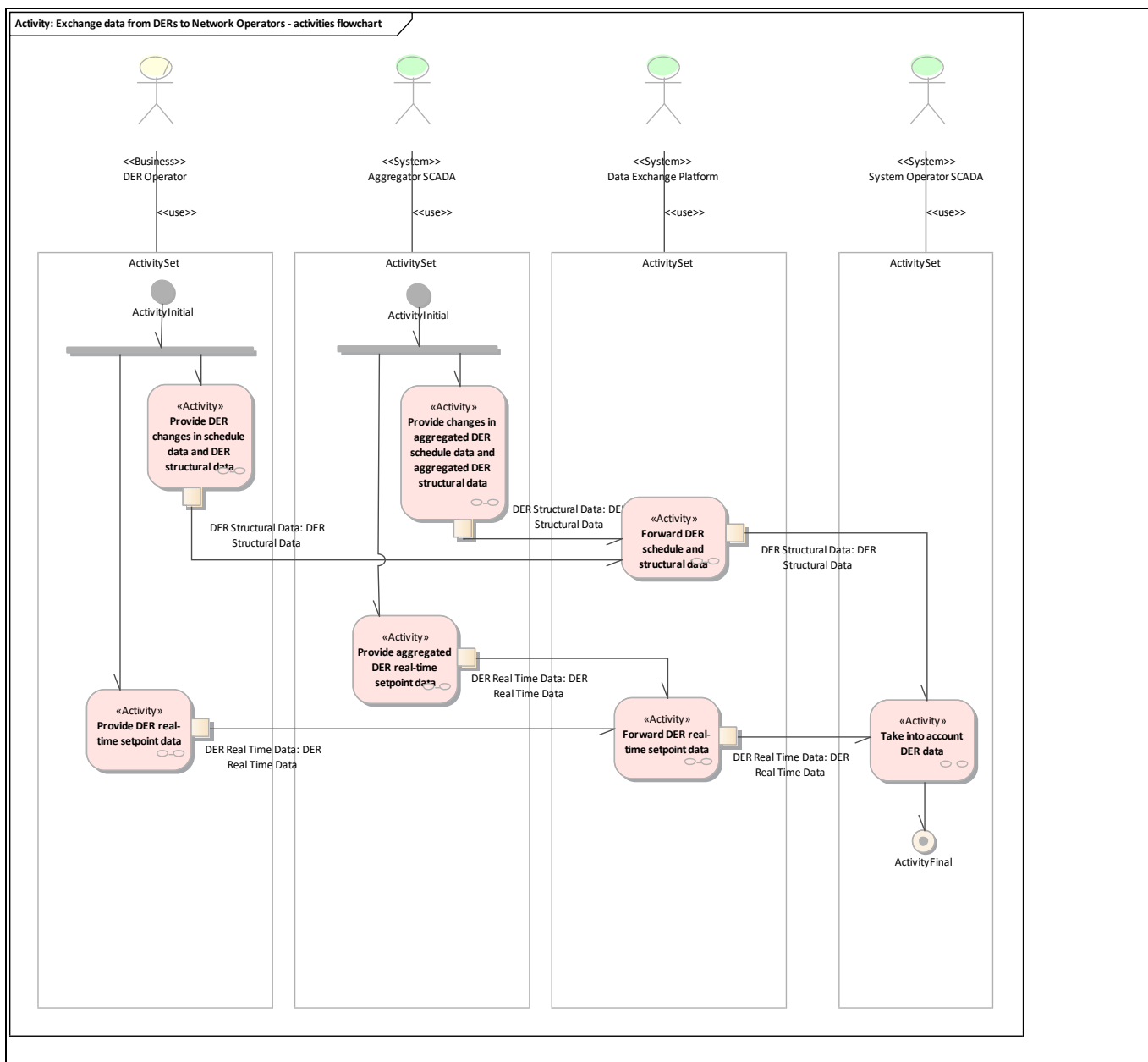
<b>Scenario conditions</b>						
<b>No.</b>	<b>Scenario name</b>	<b>Scenario description</b>	<b>Primary actor</b>	<b>Triggering event</b>	<b>Pre-condition</b>	<b>Post-condition</b>

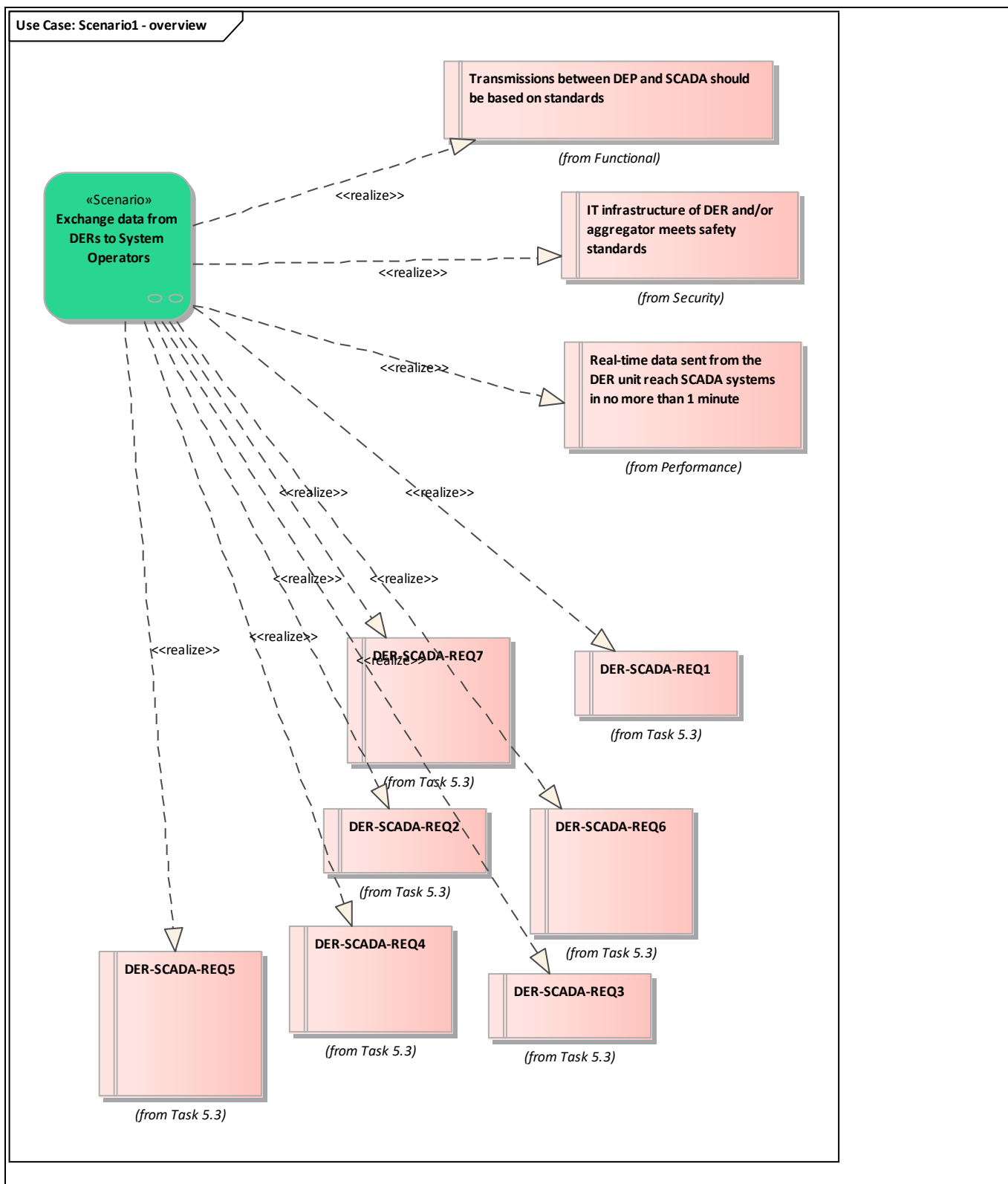
1	Exchange data from DERs to System Operators					
2	Exchange data from System Operators to DERs	Cf. "Manage flexibility activations" data exchange System Use Case.				

## 2. Steps - Scenarios

- Exchange data from DERs to System Operators

<i>Requirement list (refer to "Requirement" section for more information)</i>	
<i>Requirement R-ID</i>	<i>Requirement name</i>
<u>Cat1.Reg1</u>	Transmissions between DEP and SCADA should be based on standards
<u>Cat2.Reg2</u>	IT infrastructure of DER and/or aggregator meets safety standards
<u>Cat3.Reg3</u>	Real-time data sent from the DER unit reach SCADA systems in no more than 1 minute
<u>Cat4.Reg4</u>	DER-SCADA-REQ1
<u>Cat4.Reg5</u>	DER-SCADA-REQ7
<u>Cat4.Reg6</u>	DER-SCADA-REQ6
<u>Cat4.Reg7</u>	DER-SCADA-REQ4
<u>Cat4.Reg8</u>	DER-SCADA-REQ5
<u>Cat4.Reg9</u>	DER-SCADA-REQ2
<u>Cat4.Reg10</u>	DER-SCADA-REQ3





### Scenario step by step analysis

Scenario	
Scenario name	Exchange data from DERs to System Operators

Step No	Event	Name of process/activity	Description of process/activity	Service	Information producer (actor)	Information receiver (actor)	Information exchanged (IDs)	Requirement, R-IDs
1.1		Provide DER changes in schedule data and DER structural data	Occasional provision of non-real-time data.		<u>DER Operator</u>	<u>Data Exchange Platform</u>	Info1-DER Structural Data	
1.2		Provide changes in aggregated DER schedule data and aggregated DER structural data	Occasional provision of non-real-time data.		<u>Aggregator SCADA</u>	<u>Data Exchange Platform</u>	Info1-DER Structural Data	
1.3		Forward DER schedule and structural data	Transmission of schedule and structural data when they are changed (push method). Data are sent to the SCADA systems of the TSOs and the DSOs which need such data.		<u>Data Exchange Platform</u>	<u>System Operator SCADA</u>	Info1-DER Structural Data	
1.4		Forward DER real-time setpoint data	Real-time data transfer for all DERs to SCADA systems (push method). Data are sent to the SCADA systems of the TSOs and the DSOs which need such data.		<u>Data Exchange Platform</u>	<u>System Operator SCADA</u>	Info2-DER Real Time Data	
1.5		Provide aggregated DER real-time setpoint data	In the case of an aggregator that manages multiple DERs.		<u>Aggregator SCADA</u>	<u>Data Exchange Platform</u>	Info2-DER Real Time Data	
1.6		Provide DER real-time setpoint data	In case of the single DER unit.		<u>DER Operator</u>	<u>Data Exchange Platform</u>	Info2-DER Real Time Data	
1.7		Take into account DER data			<u>System Operator SCADA</u>			

- 1.1. Provide DER changes in schedule data and DER structural data

**Business section: Exchange data from DERs to System Operators/Provide DER changes in schedule data and DER structural data**

Occasional provision of non-real-time data.

Information sent:

Business object	Instance name	Instance description
<u>DER Structural Data</u>	DER Structural Data	In case of changes in portfolio or changes in topology.

- 1.2. Provide changes in aggregated DER schedule data and aggregated DER structural data

**Business section: Exchange data from DERs to System Operators/Provide changes in aggregated DER schedule data and aggregated DER structural data**

Occasional provision of non-real-time data.

Information sent:

Business object	Instance name	Instance description
DER Structural Data	DER Structural Data	In case of changes in portfolio or changes in topology.

- 1.3. Forward DER schedule and structural data

**Business section: Exchange data from DERs to System Operators/Forward DER schedule and structural data**

Transmission of schedule and structural data when they are changed (push method).

Data are sent to the SCADA systems of the TSOs and the DSOs which need such data.

Information sent:

Business object	Instance name	Instance description
DER Structural Data	DER Structural Data	In case of changes in portfolio or changes in topology.

- 1.4. Forward DER real-time setpoint data

**Business section: Exchange data from DERs to System Operators/Forward DER real-time setpoint data**

Real-time data transfer for all DERs to SCADA systems (push method).

Data are sent to the SCADA systems of the TSOs and the DSOs which need such data.

Information sent:

Business object	Instance name	Instance description
DER Real Time Data	DER Real Time Data	At least P,Q,V.

- 1.5. Provide aggregated DER real-time setpoint data

**Business section: Exchange data from DERs to System Operators/Provide aggregated DER real-time setpoint data**

In the case of an aggregator that manages multiple DERs.

Information sent:

Business object	Instance name	Instance description
DER Real Time Data	DER Real Time Data	At least P,Q,V.

- 1.6. Provide DER real-time setpoint data

**Business section: Exchange data from DERs to System Operators/Provide DER real-time setpoint data**

In case of the single DER unit.

Information sent:

Business object	Instance name	Instance description
DER Real Time Data	DER Real Time Data	At least P,Q,V.



## 5. Information exchanged

Information exchanged			
Information exchanged, ID	Name of information	Description of information exchanged	Requirement, R-IDs
Info1	DER Structural Data		
Info2	DER Real Time Data		

## 6. Requirements (optional)

Requirements (optional)		
Categories ID	Category name for requirements	Category description
Cat1	Functional	Functional requirements
Requirement R-ID	Requirement name	Requirement description
Req1	Transmissions between DEP and SCADA should be based on standards	Applicable standards, in particular: <ul style="list-style-type: none"> <li>• ICCP: Inter-Control Center Communications Protocol (IEC 60870-6/TASE.2),</li> <li>• Communication networks and systems for power utility automation (IEC 61850-8-2),</li> <li>• RESTful services.</li> </ul>
Requirements (optional)		
Categories ID	Category name for requirements	Category description
Cat2	Security	Security requirements
Requirement R-ID	Requirement name	Requirement description
Req2	IT infrastructure of DER and/or aggregator meets safety standards	Applicable standards, in particular IEC 62351.
Requirements (optional)		
Categories ID	Category name for requirements	Category description
Cat3	Performance	
Requirement R-ID	Requirement name	Requirement description
Req3	Real-time data sent from the DER unit reach SCADA systems in no more than 1 minute	According to KORRR art. 10, the refresh rate for the real-time data exchanges shall not be longer than 1 minute. It should be defined by each TSO in its control area.
Requirements (optional)		
Categories ID	Category name for requirements	Category description
Cat4	Task 5.3	Requirements integrated from Task 5.3.
Requirement R-ID	Requirement name	Requirement description
Req4	DER-SCADA-REQ1	Encrypted data exchange
Req5	DER-SCADA-REQ7	Ability of DEP to forward activation requests from System Operators to DER
Req6	DER-SCADA-REQ6	Ability of DEP to forward near-real-time (up to 1 hour) data from DER's to System Operators
Req7	DER-SCADA-REQ4	Ability of DEP to forward real-time data from DER's to System Operators
Req8	DER-SCADA-REQ5	Ability of DEP to forward very-near-real-time (up to 1 minute) data from DER's to System Operators

Req9	DER-SCADA-REQ2	Communication link between DEP and SO's SCADA
Req10	DER-SCADA-REQ3	Safety of DER's IT infrastructure

## 7. Common terms and definitions

## 8. Custom information (optional)

### 9.8 MANAGE ACCESS PERMISSIONS

## Manage access permissions

Based on IEC 62559-2 edition 1  
Generated from UML Use Case Repository with Modsarus® (EDF R&D Tool)

### 1. Description of the use case

#### 1. Name of use case

Use case identification		
ID	Area(s)/Domain(s)/Zone(s)	Name of use case
	Market for flexibilities,Operational planning and forecasting,Access to data,Balance management,Services related to end customers	Manage access permissions

#### 2. Version management

Version management				
Version No.	Date	Name of author(s)	Changes	Approval status
1	2018-04-06	Christian Radl (Transnet)		
2	2018-06-01	Kalle Kukk (Elering), Georg Rute (Elering) ...		
3	2018-07-17	Mandimby Ranaivo R. (AKKA), Florentin Dam (AKKA)		
4	2018-08-02	Eric Suignard (EDF)		
5	2018-09-05	Mandimby Ranaivo R. (AKKA)		
6	2018-09-21	Eric Suignard (EDF)		
7	2018-10-04	Eric Suignard (EDF)	Version post WP5&9 physical meeting in Tallinn	
8	2018-10-17	Eric Suignard (EDF)	Version reviewed by WP5&9 partners	
9	2019-05-07	Eric Suignard (EDF)	WP6-7-8 demos alignment and miscellaneous changes	
10	2020-06-16	Eric Suignard (EDF)	innogy's and Elering's review	
11	2020-08-05	Eric Suignard (EDF)	'Authorization Grant' Business Object identical to 'Customer Consent'.	

### 3. Scope and objectives of use case

Scope and objectives of use case	
<b>Scope</b>	Giving authorization by data owners (e.g. consumers) to other parties interested in using this data.
<b>Objective(s)</b>	Facilitating exchange of personal and other sensitive data as well as associated energy services (incl. across country borders).
<b>Related business case(s)</b>	

### 4. Narrative of Use Case

Narrative of use case
<b>Short description</b> The party who is the data owner (e.g. electricity consumer is the owner of its consumption data) can authorize any application to have access to its data. Cross-border acknowledgement of authorizations shall be enabled.
<b>Complete description</b> <div style="text-align: center;"><u>Summary of use case</u></div> <ul style="list-style-type: none"> <li> <b>The Data Owner gives authorization directly</b>  <u>Description:</u> <ul style="list-style-type: none"> <li>Via the Customer Portal and the Data Exchange Platform (DEP), any data owner (e.g. electricity consumer is the owner of its consumption data) can authorize any application (incl. from other countries) to have access to its data. A data owner can select the available applications from the list of service providers (see SUC Provide list of suppliers and ESCOs).</li> <li>In the cross-border case, the DEP forwards the customer consent to the relevant foreign Customer Portal.</li> <li>The Customer Portal operator sends the information about the authorization to the application (optional) and to the data source concerned (incl. from other countries).</li> </ul> <p>An example for this scenario would be when a customer looks for a new electricity supplier or service provider (incl. aggregator), and, therefore, makes his data accessible.</p> <ul style="list-style-type: none"> <li>Acknowledge customer consent <u>Description:</u> Optional</li> <li>Acknowledge customer consent <u>Description:</u></li> <li>Choose application and data object from the list <u>Description:</u> The data owner can select the available applications in the list of service providers (see SUC Provide list of suppliers and ESCOs) and the available data objects.</li> <li>Create customer consent <u>Description:</u></li> <li>Create customer consent <u>Description:</u></li> <li>Create customer consent <u>Description:</u></li> <li>Grant customer consent <u>Description:</u></li> </ul> </li> </ul>

- Notify customer consent  
Description:
- Notify customer consent  
Description:
- Notify customer consent  
Description:
- Notify customer consent  
Description:
- Present list of applications and list of data objects  
Description:
- The application requests for authorization  
Description:
  - An application sends request for authorization in order to access the data of a data owner.
  - In the cross-border case, the DEP forwards the customer consent to the relevant foreign Customer Portal.
  - The Customer Portal operator sends the information about the authorization to the application (optional) and to the data source concerned (incl. in other countries).
  - Notify authorization refusal  
Description:
  - Notify authorization request  
Description:
  - Notify customer consent  
Description:
  - Request authorization  
Description:
  - Notify authorization request  
Description:
  - Acknowledge authorization request  
Description:
  - Create authorization  
Description:
  - Notify customer consent  
Description:
  - Acknowledge customer consent  
Description:
  - Acknowledge customer consent  
Description:
  - Notify authorization refusal  
Description:

- Acknowledge authorization refusal  
Description:

## 5. Key performance indicators (KPI)

## 6. Use case conditions

<i>Use case conditions</i>	
<i>Assumptions</i>	
1	Focus on data that has a big sensitivity to its owner and therefore requires high level of confidentiality.
2	For system operation and market operation, data is needed from data generating roles which require high confidentiality (e.g. private households).
3	An authorization system has to be in place to enable cross border exchange of data.
<i>Prerequisites</i>	
1	DEPs and authorization systems of different countries and different authorization systems inside a country are able to acknowledge each other.
2	Data generating roles need to have IT tools that enable access to data (RT or ex-post) in real time.
3	Elaborating which roles are generating which type of data and which type of data is requested by which role: In order to create and provide information about authorization, the DEP have to know which roles are interested to exchange data. Thus an overview of all roles that are generating or requesting data must be available along with the type of data they intend to generate or request.

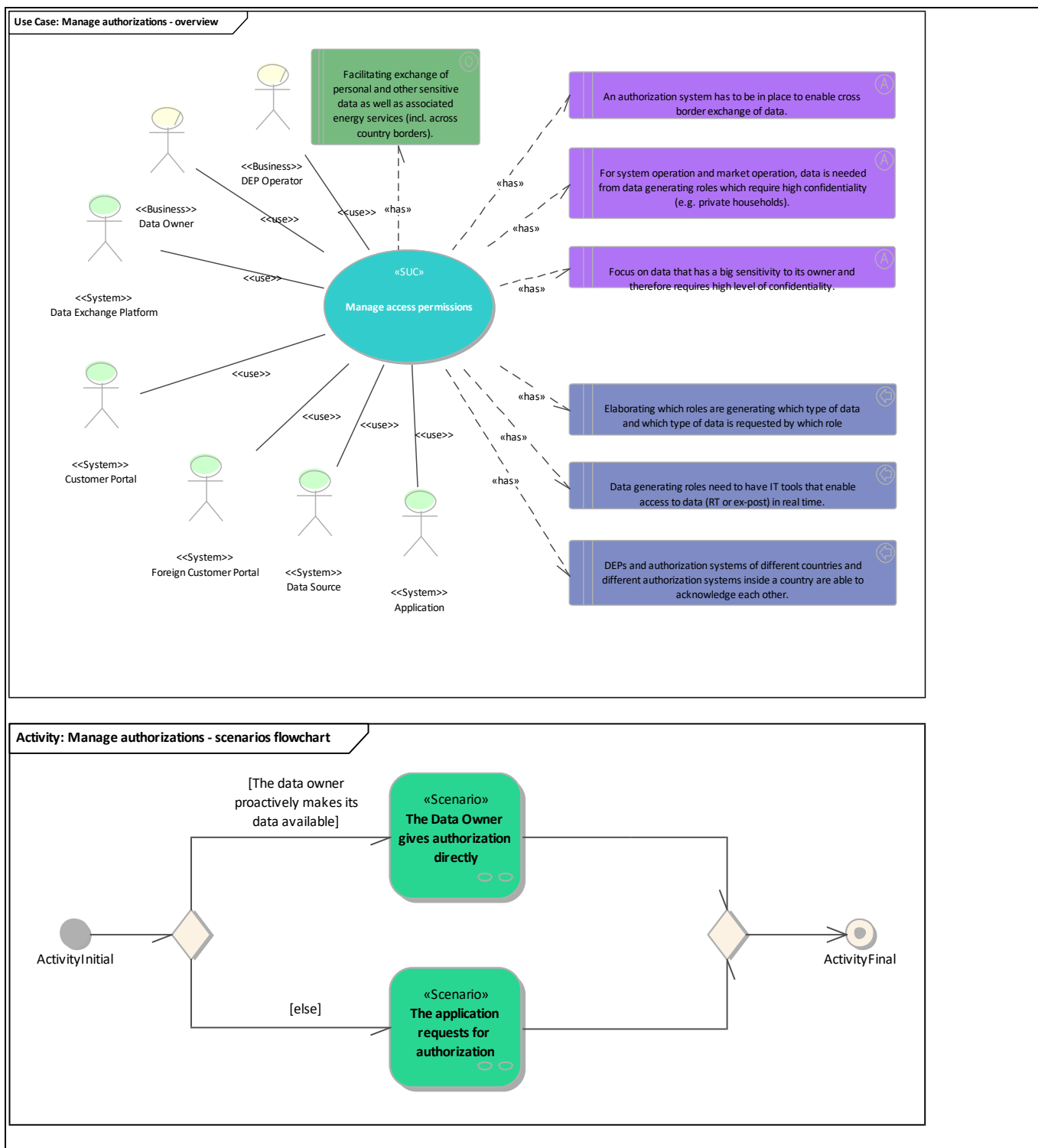
## 7. Further information to the use case for classification/mapping

<i>Classification information</i>
<i>Relation to other use cases</i>
<i>Level of depth</i>
<i>Prioritisation</i>
<i>Generic, regional or national relation</i>
<i>Nature of the use case</i>
SUC
<i>Further keywords for classification</i>

## 8. General remarks

### 2. Diagrams of use case

<i>Diagram(s) of use case</i>
-------------------------------



### 3. Technical details

#### 1. Actors

Actors	
Grouping (e.g. domains, zones)	Group description

Actor name	Actor type	Actor description	Further information specific to this use case
Data Source	System	Any kind of system used to store data (including Data Hub and Flexibility Platform).	
Data Owner	Business	Any person who owns data and can give authorization to other parties to access them. Can be, inter alia: <ul style="list-style-type: none"> <li>Flexibility Services Provider</li> <li>Market Operator</li> <li>Consumer</li> <li>Generator</li> </ul>	
Application	System	Any kind of system connected to a Data Exchange Platform and used by a market participant who wishes to receive data.	
Customer Portal	System	Customer Portal manages data users' authentication, access permissions and data logs. Customer Portals store data related to its services (e.g. authentication information, representation rights, access permissions, data logs).	
Foreign Customer Portal	System	Customer Portal for another country. Can also mean a separate portal in the same country.	
DEP Operator	Business	Data exchange platform operator owns and operates a communication system which basic functionality is data transfer.	
Data Exchange Platform	System	Data exchange platform (DEP) is a communication platform the basic functionality of which is to secure data transfer (routing) from data providers (e.g. data hubs, flexibility service providers, TSOs, DSOs) to the data users (e.g. TSOs, DSOs, consumers, suppliers, energy service providers). DEP stores data related to its services (e.g. cryptographic hash of the data requested). The DEP does not store core energy data (e.g. meter data, grid data, market data) while these data can be stored by data hubs. Several DEPs may exist in different countries and inside one country.	Data exchange platform to create and forward authorization information.

## 2. References

### 4. Step by step analysis of use case

#### 1. Overview of scenarios

Scenario conditions						
No.	Scenario name	Scenario description	Primary actor	Triggering event	Pre-condition	Post-condition
1	The Data Owner gives authorization directly	<ul style="list-style-type: none"> <li>Via the Customer Portal and the Data Exchange Platform (DEP), any data owner (e.g. electricity consumer is the owner of its consumption data) can authorize any application (incl. from other countries) to have access to its data. A data owner can select the available applications from the list of service providers (see SUC Provide list of suppliers and ESCOs).</li> <li>In the cross-border case, the DEP forwards the customer consent to the relevant foreign Customer Portal.</li> </ul>				

		<ul style="list-style-type: none"> <li>The Customer Portal operator sends the information about the authorization to the application (optional) and to the data source concerned (incl. from other countries).</li> </ul> <p>An example for this scenario would be when a customer looks for a new electricity supplier or service provider (incl. aggregator), and, therefore, makes his data accessible.</p>				
2	The application requests for authorization	<ul style="list-style-type: none"> <li>An application sends request for authorization in order to access the data of a data owner.</li> <li>In the cross-border case, the DEP forwards the customer consent to the relevant foreign Customer Portal.</li> <li>5. The Customer Portal operator sends the information about the authorization to the application (optional) and to the data source concerned (incl. in other countries).</li> </ul>				

## 1. Steps - Scenarios

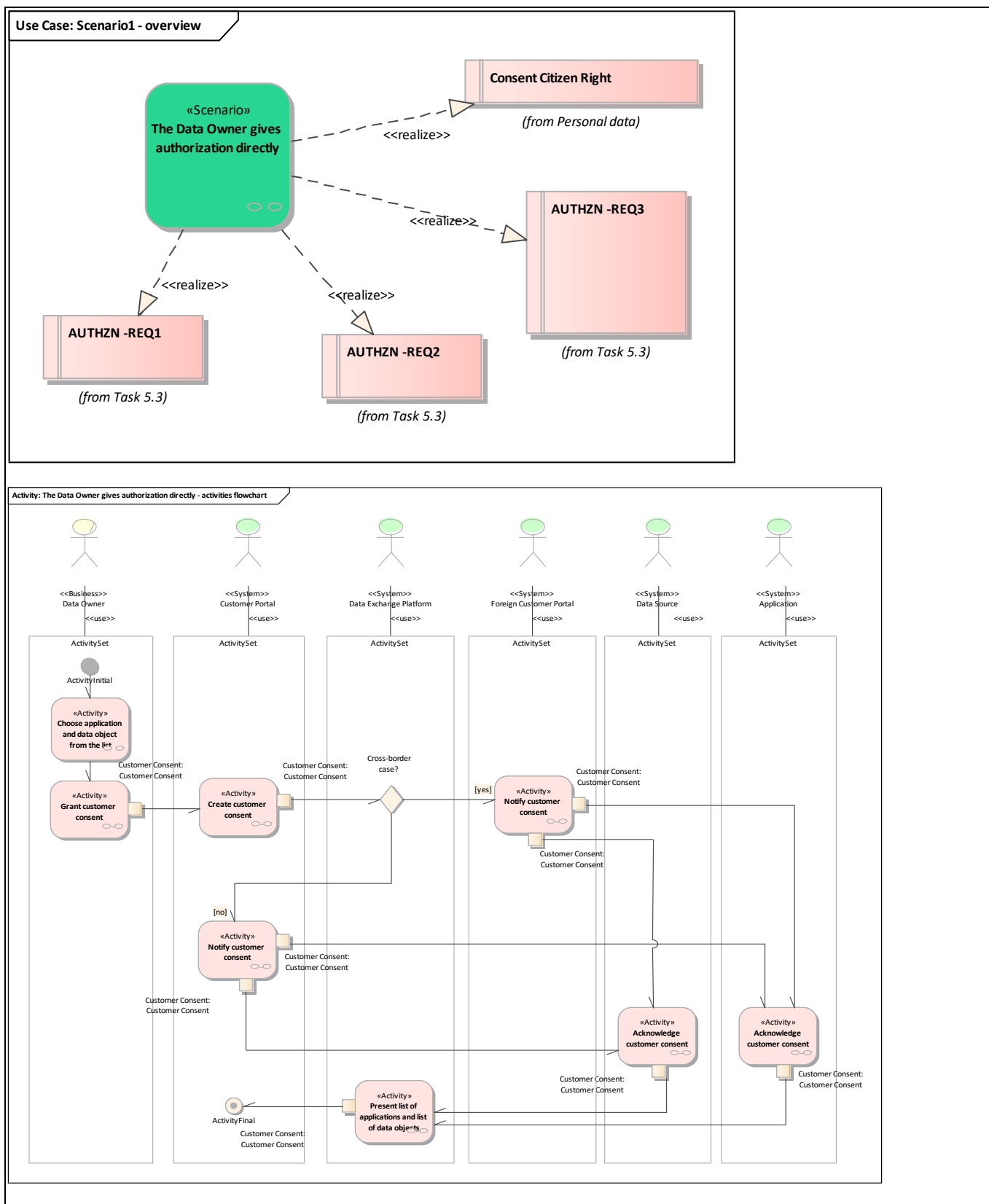
### ▪ The Data Owner gives authorization directly

- Via the Customer Portal and the Data Exchange Platform (DEP), any data owner (e.g. electricity consumer is the owner of its consumption data) can authorize any application (incl. from other countries) to have access to its data. A data owner can select the available applications from the list of service providers (see SUC Provide list of suppliers and ESCOs).
- In the cross-border case, the DEP forwards the customer consent to the relevant foreign Customer Portal.
- The Customer Portal operator sends the information about the authorization to the application (optional) and to the data source concerned (incl. from other countries).

An example for this scenario would be when a customer looks for a new electricity supplier or service provider (incl. aggregator), and, therefore, makes his data accessible.

Requirement list (refer to "Requirement" section for more information)	
Requirement R-ID	Requirement name
<u>Cat1.Reg1</u>	Consent Citizen Right
<u>Cat2.Reg2</u>	AUTHZN -REQ3
<u>Cat2.Reg3</u>	AUTHZN -REQ1
<u>Cat2.Reg4</u>	AUTHZN -REQ2





## Scenario step by step analysis

### Scenario

Scenario name		The Data Owner gives authorization directly						
Step No	Event	Name of process/activity	Description of process/activity	Service	Information producer (actor)	Information receiver (actor)	Information exchanged (IDs)	Requirement, R-IDs
1.1		Acknowledge customer consent	Optional		<u>Application</u>	<u>Data Exchange Platform</u>	Info1-Customer consent	
1.2		Acknowledge customer consent			<u>Data Source</u>	<u>Data Exchange Platform</u>	Info1-Customer consent	
1.3		Choose application and data object from the list	The data owner can select the available applications in the list of service providers (see SUC Provide list of suppliers and ESCOs) and the available data objects.		<u>Data Owner</u>			
1.4		Create customer consent			<u>Customer Portal</u>	<u>Customer Portal, Foreign Customer Portal</u>	Info1-Customer consent	
1.5		Create customer consent			<u>Customer Portal</u>	<u>Customer Portal</u>		
1.6		Create customer consent			<u>Customer Portal</u>			
1.7		Grant customer consent			<u>Data Owner</u>	<u>Customer Portal</u>	Info2-Customer consent	
1.8		Notify customer consent			<u>Customer Portal</u>	<u>Application</u>	Info1-Customer consent	
1.9		Notify customer consent			<u>Customer Portal</u>	<u>Data Source</u>	Info1-Customer consent	
1.10		Notify customer consent			<u>Foreign Customer Portal</u>	<u>Data Source</u>	Info1-Customer consent	
1.11		Notify customer consent			<u>Foreign Customer Portal</u>	<u>Application</u>	Info1-Customer consent	
1.12		Present list of applications and list of data objects			<u>Data Exchange Platform</u>	<u>Customer Portal</u>	Info1-Customer consent	

- 1.1. Acknowledge customer consent

**Business section: The Data Owner gives authorization directly/Acknowledge customer consent**

Optional

Information sent:

<b>Business object</b>	<b>Instance name</b>	<b>Instance description</b>
Customer consent	Customer consent	

- 1.2. Acknowledge customer consent

**Business section: The Data Owner gives authorization directly/Acknowledge customer consent**

Information sent:

<b>Business object</b>	<b>Instance name</b>	<b>Instance description</b>
Customer consent	Customer consent	

- 1.4. Create customer consent

**Business section: The Data Owner gives authorization directly/Create customer consent**

Information sent:

<b>Business object</b>	<b>Instance name</b>	<b>Instance description</b>
Customer consent	Customer consent	

- 1.7. Grant customer consent

**Business section: The Data Owner gives authorization directly/Grant customer consent**

Information sent:

<b>Business object</b>	<b>Instance name</b>	<b>Instance description</b>
Customer consent	Customer consent	

- 1.8. Notify customer consent

**Business section: The Data Owner gives authorization directly/Notify customer consent**

Information sent:

<b>Business object</b>	<b>Instance name</b>	<b>Instance description</b>
Customer consent	Customer consent	

- 1.9. Notify customer consent

**Business section: The Data Owner gives authorization directly/Notify customer consent**

Information sent:

<b>Business object</b>	<b>Instance name</b>	<b>Instance description</b>
Customer consent	Customer consent	

- 1.10. Notify customer conseny

### **Business section: The Data Owner gives authorization directly/Notify customer consent**

Information sent:

<b><i>Business object</i></b>	<b><i>Instance name</i></b>	<b><i>Instance description</i></b>
Customer consent	Customer consent	

- 1.11. Notify customer consent

### **Business section: The Data Owner gives authorization directly/Notify customer consent**

Information sent:

<b><i>Business object</i></b>	<b><i>Instance name</i></b>	<b><i>Instance description</i></b>
Customer consent	Customer consent	

- 1.12. Present list of applications and list of data objects

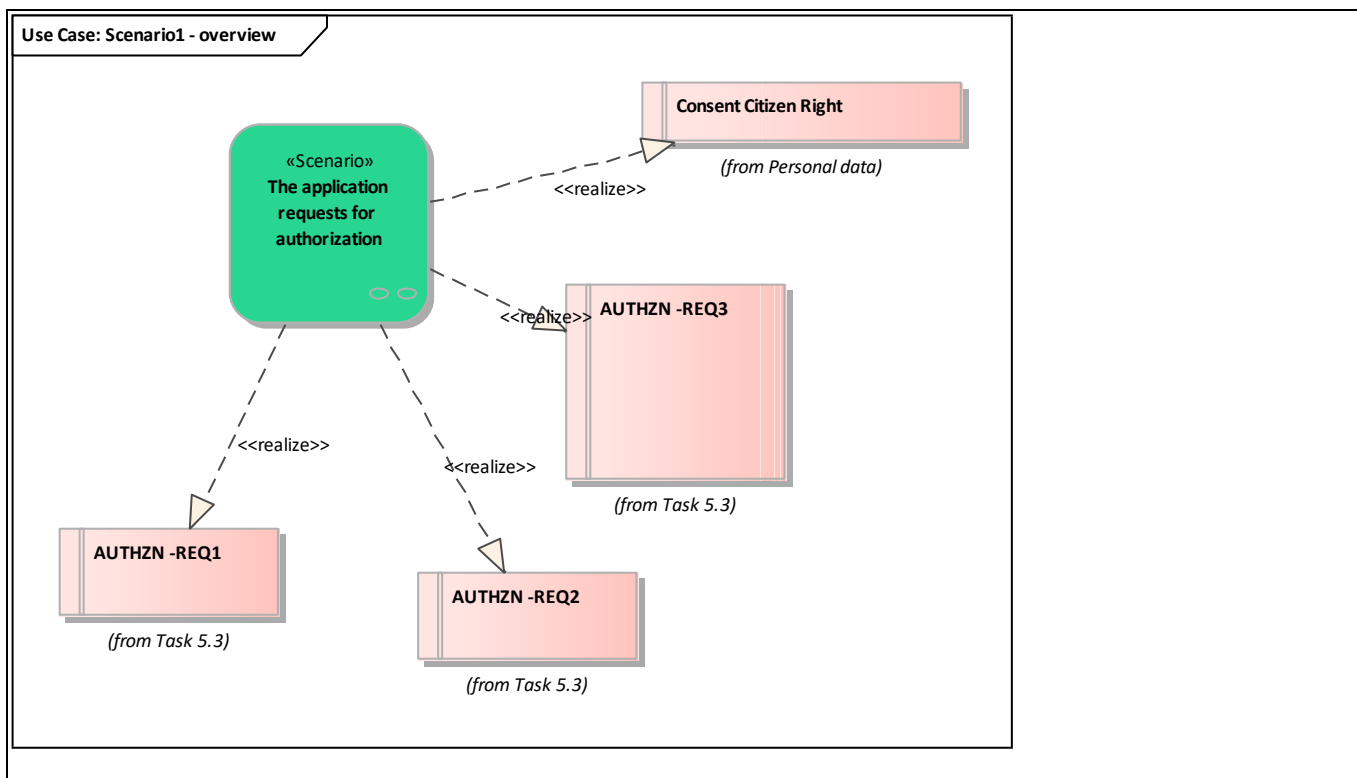
### **Business section: The Data Owner gives authorization directly/Present list of applications and list of data objects**

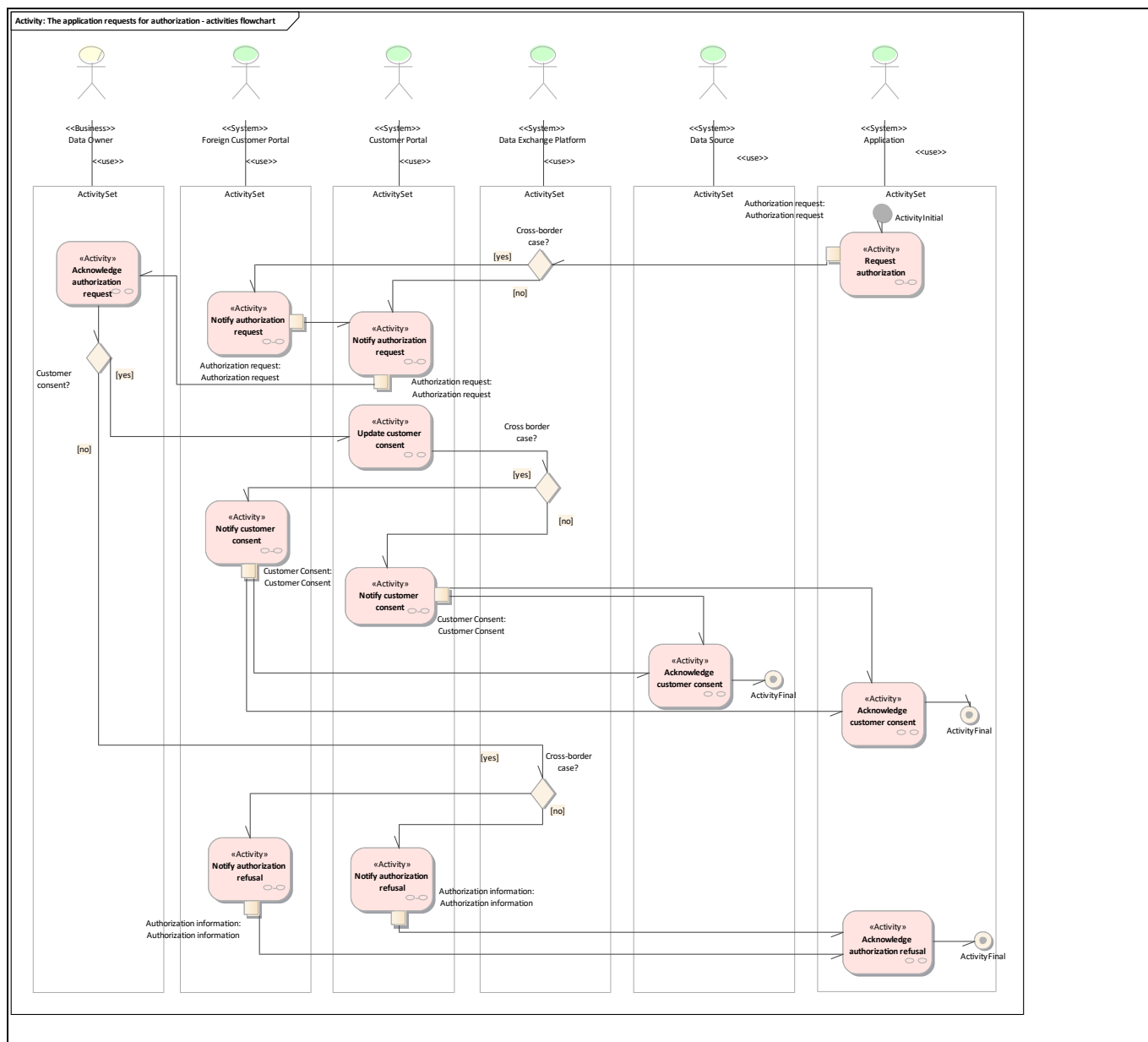
Information sent:

<b><i>Business object</i></b>	<b><i>Instance name</i></b>	<b><i>Instance description</i></b>
Authorization information	Authorization information	

- **The application requests for authorization**
- An application sends request for authorization in order to access the data of a data owner.
- In the cross-border case, the DEP forwards the customer consent to the relevant foreign Customer Portal.
- The Customer Portal operator sends the information about the authorization to the application (optional) and to the data source concerned (incl. in other countries).

<b><i>Requirement list (refer to "Requirement" section for more information)</i></b>	
<b><i>Requirement R-ID</i></b>	<b><i>Requirement name</i></b>
Cat1.Reg1	Consent Citizen Right
Cat2.Reg2	AUTHZN -REQ3
Cat2.Reg3	AUTHZN -REQ1
Cat2.Reg4	AUTHZN -REQ2





### Scenario step by step analysis

Scenario								
Scenario name		The application requests for authorization						
Step No	Event	Name of process/activity	Description of process/activity	Service	Information producer (actor)	Information receiver (actor)	Information exchanged (IDs)	Requirement, R-IDs
2.1		Notify authorization refusal			<u>Foreign Customer Portal</u>	<u>Application</u>	Info2-Authorization information	
2.2		Notify authorization request			<u>Foreign Customer Portal</u>	<u>CustomerPortal</u>	Info3-Authorization request	

2.3		Notify customer consent			<u>Foreign Customer Portal</u>	<u>Application, Data Source</u>	Info1- Customer consent	
2.4		Request authorization			<u>Application</u>	<u>Foreign Customer Portal, Customer Portal</u>	Info3- Authorization request	
2.5		Notify authorization request			<u>Customer Portal</u>	<u>Data Owner</u>	Info3- Authorization request	
2.6		Acknowledge authorization request			<u>Data Owner</u>			
2.7		Create authorization			<u>Customer Portal</u>	<u>Customer Portal</u>		
2.8		Notify customer consent			<u>Customer Portal</u>	<u>Application, Data Source</u>	Info1- Customer consent	
2.9		Acknowledge customer consent			<u>Data Source</u>			
2.10		Acknowledge customer consent			<u>Application</u>			
2.11		Notify authorization refusal			<u>Customer Portal</u>	<u>Application</u>	Info1- Authorization information	
2.12		Acknowledge authorization refusal			<u>Application</u>			

- 2.1. Notify authorization refusal

**Business section: The application requests for authorization/Notify authorization refusal**

Information sent:

<b><i>Business object</i></b>	<b><i>Instance name</i></b>	<b><i>Instance description</i></b>
<u>Authorization information</u>	Authorization information	

- 2.2. Notify authorization request

**Business section: The application requests for authorization/Notify authorization request**

Information sent:

<b><i>Business object</i></b>	<b><i>Instance name</i></b>	<b><i>Instance description</i></b>
<u>Authorization request</u>	Authorization request	

- 2.3. Notify customer consent

**Business section: The application requests for authorization/Notify customer consent**

Information sent:

<b><i>Business object</i></b>	<b><i>Instance name</i></b>	<b><i>Instance description</i></b>
<u>Customer Consent</u>	Customer Consent	

- **2.4. Request authorization**

**Business section: The application requests for authorization/Request authorization**

Information sent:

<b><i>Business object</i></b>	<b><i>Instance name</i></b>	<b><i>Instance description</i></b>
<u>Authorization request</u>	Authorization request	

- **2.5. Notify authorization request**

**Business section: The application requests for authorization/Notify authorization request**

Information sent:

<b><i>Business object</i></b>	<b><i>Instance name</i></b>	<b><i>Instance description</i></b>
<u>Authorization request</u>	Authorization request	Authorization request

- **2.8. Notify customer consent**

**Business section: The application requests for authorization/Notify customer consent**

Information sent:

<b><i>Business object</i></b>	<b><i>Instance name</i></b>	<b><i>Instance description</i></b>
<u>Customer Consent</u>	Customer Consent	

- **2.11. Notify authorization refusal**

**Business section: The application requests for authorization/Notify authorization refusal**

Information sent:

<b><i>Business object</i></b>	<b><i>Instance name</i></b>	<b><i>Instance description</i></b>
<u>Authorization information</u>	Authorization information	

## 5. Information exchanged

<b><i>Information exchanged</i></b>			
<b><i>Information exchanged, ID</i></b>	<b><i>Name of information</i></b>	<b><i>Description of information exchanged</i></b>	<b><i>Requirement, R-IDs</i></b>
Info1	Customer Consent		



Info2	Authorization information		
Info3	Authorization request		

## 6. Requirements (optional)

<i>Requirements (optional)</i>		
<i>Categories ID</i>	<i>Category name for requirements</i>	<i>Category description</i>
Cat1	Personal data	
<i>Requirement R-ID</i>	<i>Requirement name</i>	<i>Requirement description</i>
Req1	Consent Citizen Right	Right to withdraw consent or restrict the processing or sharing their data. Explicit and unambiguous informed consent must be obtained
<i>Requirements (optional)</i>		
<i>Categories ID</i>	<i>Category name for requirements</i>	<i>Category description</i>
Cat2	Task 5.3	Requirements integrated from Task 5.3.
<i>Requirement R-ID</i>	<i>Requirement name</i>	<i>Requirement description</i>
Req2	AUTHZN -REQ3	Ability to share access permissions between data owners, concerned DEPs, applications and data sources
Req3	AUTHZN -REQ1	Every person needs access permission
Req4	AUTHZN -REQ2	Valid identity of the person receiving access permissions

## 7. Common terms and definitions

## 8. Custom information (optional)

### 9.9 MANAGE DATA LOGS

# Manage data logs

Based on IEC 62559-2 edition 1  
Generated from UML Use Case Repository with Modsarus® (EDF R&D Tool)

## 1. Description of the use case

### 1.1. Name of use case

<i>Use case identification</i>		
<i>ID</i>	<i>Area(s)/Domain(s)/Zone(s)</i>	<i>Name of use case</i>
	Access to data,Market for flexibilities,Operational planning and forecasting,Services related to end customers,Balance management	Manage data logs

## 1.2. Version management

Version management				
Version No.	Date	Name of author(s)	Changes	Approval status
1	2018-06-01	Kalle Kukk (Elering)		
2	2018-07-10	Mandimby Ranaivo R. (AKKA)		
3	2018-08-02	Eric Suignard (EDF)		
4	2018-09-21	Eric Suignard (EDF)		
5	2018-10-04	Eric Suignard (EDF)	Version post WP5&9 physical meeting in Tallinn	
6	2018-10-17	Eric Suignard (EDF)	Version reviewed by WP5&9 partners	
7	2019-05-07	Eric Suignard (EDF)	WP6-7-8 demos alignment and miscellaneous changes	
8	2020-06-16	Eric Suignard (EDF)	innogy's and Elering's review	

## 1.3. Scope and objectives of use case

Scope and objectives of use case	
<b>Scope</b>	Making available security logs including data access logs and authorization logs.
<b>Objective(s)</b>	Ensure personal data protection.
<b>Related business case(s)</b>	

## 1.4. Narrative of Use Case

Narrative of use case
<b>Short description</b>
Data Owner's access to data logs contributes to personal data protection. The data logs include information about data access (e.g. who has accessed consumption data and when), authorizations (e.g. who has issued a new authorization and when) and authentication (e.g. who has identified himself/herself in Customer Portal and when).
<b>Complete description</b>
Via a Customer Portal, a Data Owner (e.g. electricity consumer is the owner of its consumption data) has access to data logs. They include two types of logs: <ul style="list-style-type: none"> <li>• Data access logs: e.g. who has accessed data and when</li> <li>• Authorization logs: e.g. who has requested/received authorization to access data and when</li> <li>• Authentication logs: e.g. who has identified himself/herself in Customer Portal and when</li> </ul> <p>The Customer Portal operator makes the data logs available in the Customer Portal. In addition, in case of cross border data exchange, the Customer Portal operators of the involved countries share information about data logs between them.</p> <p style="text-align: center;"><u>Summary of use case</u></p> <ul style="list-style-type: none"> <li>• <u>Data Owner accesses data logs</u>  <u>Description:</u> The Data Owner requests access to its data logs from the Customer Portal. In case of cross border data exchange, the later retrieves the data logs from the corresponding foreign Customer Portal. Finally, the Data Owner consults the requested data logs.</li> </ul>

- Request data logs  
Description: The Data Owner requests data logs to the Customer Portal. The request contains the desired log type:
  - Data access (e.g. who has accessed data and when)
  - Authorization (e.g. who has requested/received authorization to access data and when)
  - Authentication logs (e.g. who has identified himself/herself in Customer Portal and when)

It also contains selection criteria like dates, log level etc.
- Retrieve data access logs  
Description: The Customer Portal retrieves data access logs corresponding to the received selection criteria.
- Retrieve authorization logs  
Description: The Customer Portal retrieves authorization logs corresponding to the received selection criteria.
- Retrieve data access logs  
Description: The foreign Customer Portal retrieves data access logs corresponding to the received selection criteria and hands them over to the original Customer Portal.
- Retrieve authorization logs  
Description: The foreign Customer Portal retrieves authorization request logs corresponding to the received selection criteria and hands them over to the original Customer Portal.
- Consult data logs  
Description: The Data Owner receives the data log records he requested.

### 1.5. Key performance indicators (KPI)

### 1.6. Use case conditions

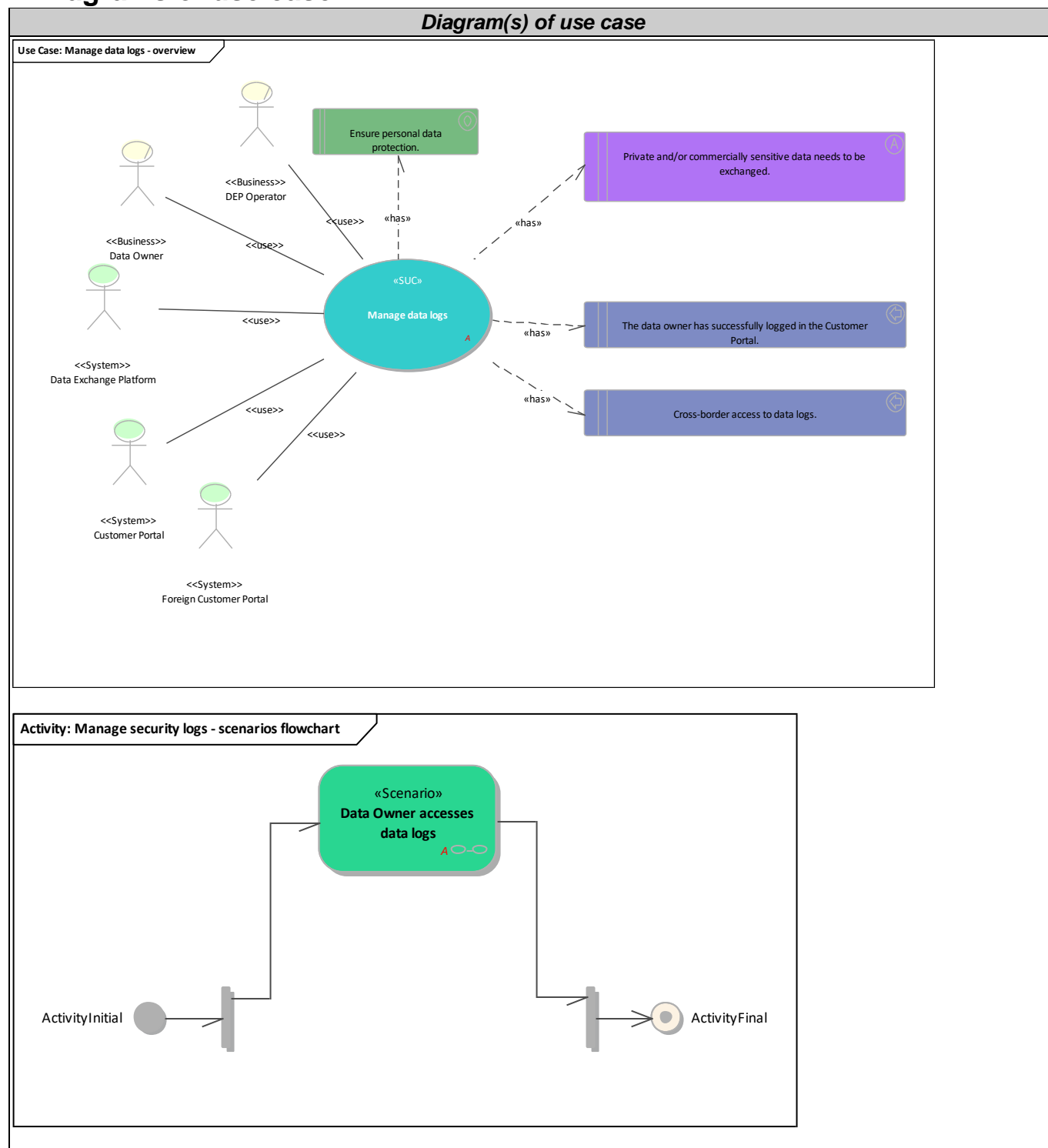
<i>Use case conditions</i>	
<i>Assumptions</i>	
1	Private and/or commercially sensitive data needs to be exchanged.
<i>Prerequisites</i>	
1	The data owner has successfully logged in the Customer Portal.
2	Cross-border access to data logs.: Data logs can be exchanged between Customer Portals from different countries.

### 1.7. Further information to the use case for classification/mapping

<i>Classification information</i>
<i>Relation to other use cases</i>
<i>Level of depth</i>
<i>Prioritisation</i>
<i>Generic, regional or national relation</i>
<i>Nature of the use case</i>
SUC
<i>Further keywords for classification</i>

## 1.8. General remarks

## 2. Diagrams of use case



### 3. Technical details

#### 3.1. Actors

Actors			
Grouping (e.g. domains, zones)		Group description	
Actor name	Actor type	Actor description	Further information specific to this use case
Data Exchange Platform	System	Data exchange platform (DEP) is a communication platform the basic functionality of which is to secure data transfer (routing) from data providers (e.g. data hubs, flexibility service providers, TSOs, DSOs) to the data users (e.g. TSOs, DSOs, consumers, suppliers, energy service providers). DEP stores data related to its services (e.g. cryptographic hash of the data requested). The DEP does not store core energy data (e.g. meter data, grid data, market data) while these data can be stored by data hubs. Several DEPs may exist in different countries and inside one country.	The data exchange platform stores the security logs and makes them available upon request.
Foreign Customer Portal	System	Customer Portal for another country. Can also mean a separate portal in the same country.	
Data Owner	Business	Any person who owns data and can give authorization to other parties to access them. Can be, inter alia: <ul style="list-style-type: none"> <li>Flexibility Services Provider</li> <li>Market Operator</li> <li>Consumer</li> <li>Generator</li> </ul>	
Customer Portal	System	Customer Portal manages data users' authentication, access permissions and data logs. Customer Portals store data related to its services (e.g. authentication information, representation rights, access permissions, data logs).	
DEP Operator	Business	Data exchange platform operator owns and operates a communication system which basic functionality is data transfer.	

#### 3.2. References

### 4. Step by step analysis of use case

#### 4.1. Overview of scenarios

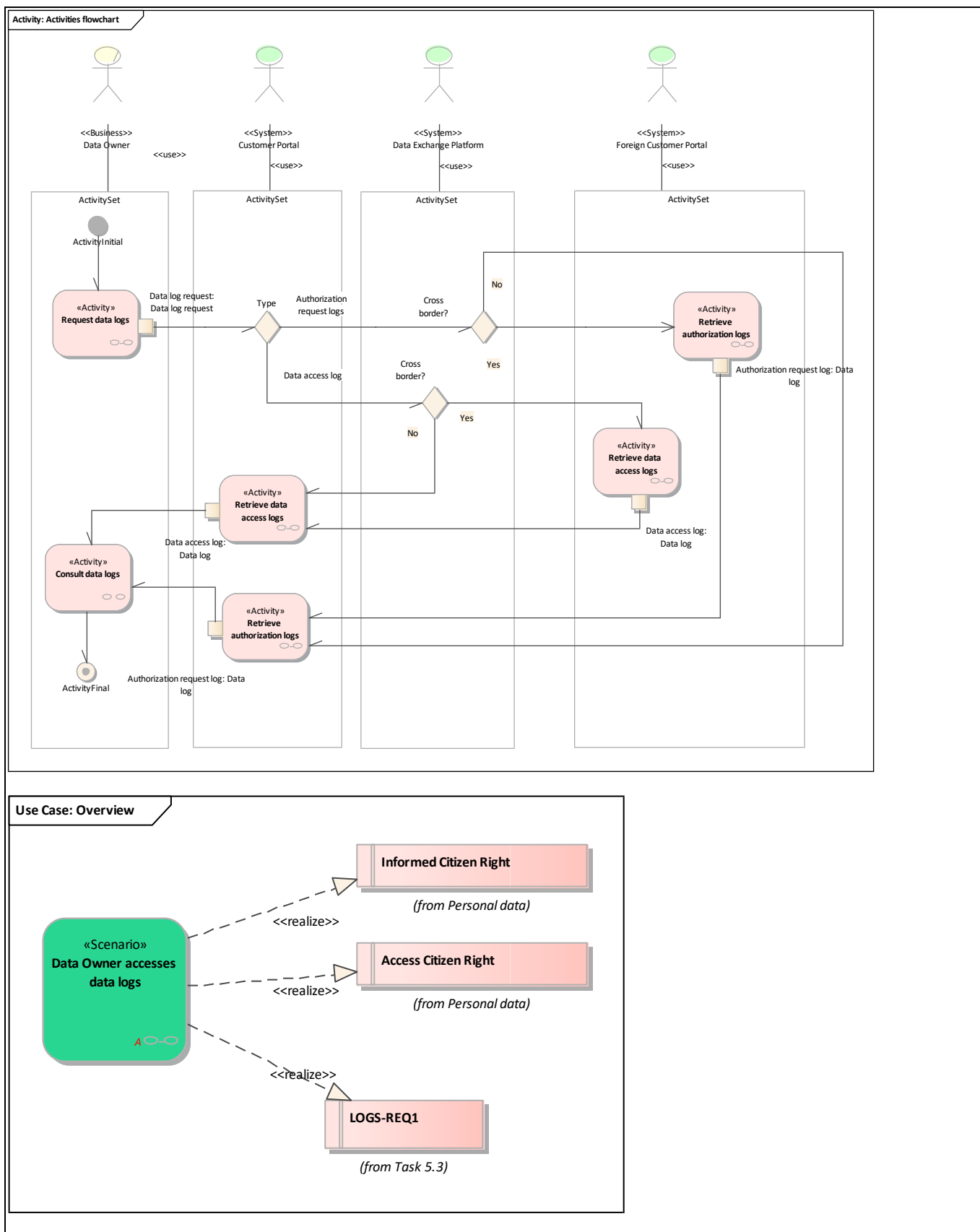
Scenario conditions						
No.	Scenario name	Scenario description	Primary actor	Triggering event	Pre-condition	Post-condition
1	Data Owner accesses data logs	The Data Owner requests access to its data logs from the Customer Portal. In case of cross border data exchange, the later retrieves the data logs from the corresponding foreign Customer Portal. Finally, the Data Owner consults the requested data logs.				

## 4.2. Steps - Scenarios

### 4.2.1. Data Owner accesses data logs

The Data Owner requests access to its data logs from the Customer Portal. In case of cross border data exchange, the later retrieves the data logs from the corresponding foreign Customer Portal. Finally, the Data Owner consults the requested data logs.

<i>Requirement list (refer to "Requirement" section for more information)</i>	
<i>Requirement R-ID</i>	<i>Requirement name</i>
Cat1.Reg1	Access Citizen Right
Cat1.Reg2	Informed Citizen Right
Cat2.Reg3	LOGS-REQ1



## Scenario step by step analysis

Scenario								
Scenario name		Data Owner accesses data logs						
Step No	Event	Name of process/activity	Description of process/activity	Service	Information producer (actor)	Information receiver (actor)	Information exchanged (IDs)	Requirements, R-IDs
1.1		Request data logs	<p>The Data Owner requests data logs to the Customer Portal. The request contains the desired log type:</p> <ul style="list-style-type: none"> <li>Data access (e.g. who has accessed data and when)</li> <li>Authorization (e.g. who has requested/received authorization to access data and when)</li> <li>Authentication logs (e.g. who has identified himself/herself in Customer Portal and when)</li> </ul> <p>It also contains selection criteria like dates, log level etc.</p>		Data Owner	Foreign Customer Portal, Customer Portal, Foreign Customer Portal, Customer Portal	Info1-Data log request	
1.2		Retrieve data access logs	The Customer Portal retrieves data access logs corresponding to the received selection criteria.		Customer Portal	Data Owner	Info2-Data log	
1.3		Retrieve authorization logs	The Customer Portal retrieves authorization logs corresponding to the received selection criteria.		Customer Portal	Data Owner	Info2-Data log	
1.4		Retrieve data access logs	The foreign Customer Portal retrieves data access logs corresponding to the received selection criteria and hands them over to the original Customer Portal.		Foreign Customer Portal	Customer Portal	Info2-Data log	
1.5		Retrieve authorization logs	The foreign Customer Portal retrieves authorization request logs corresponding to the received selection criteria and hands them over to the original Customer Portal.		Foreign Customer Portal	Customer Portal	Info2-Data log	



1.6		Consult data logs	The Data Owner receives the data log records he requested.		Data Owner			
-----	--	-------------------	--	--	------------	--	--	--

- 1.1. Request data logs

**Business section: Data Owner accesses data logs/Request data logs**

The Data Owner requests data logs to the Customer Portal. The request contains the desired log type:

- Data access (e.g. who has accessed data and when)
- Authorization (e.g. who has requested/received authorization to access data and when)
- Authentication logs (e.g. who has identified himself/herself in Customer Portal and when)

It also contains selection criteria like dates, log level etc.

Information sent:

Business object	Instance name	Instance description
Data log request	Data log request	

- 1.2. Retrieve data access logs

**Business section: Data Owner accesses data logs/Retrieve data access logs**

The Customer Portal retrieves data access logs corresponding to the received selection criteria.

Information sent:

Business object	Instance name	Instance description
Data log	Data access log	

- 1.3. Retrieve authorization logs

**Business section: Data Owner accesses data logs/Retrieve authorization logs**

The Customer Portal retrieves authorization logs corresponding to the received selection criteria.

Information sent:

Business object	Instance name	Instance description
Data log	Authorization request log	

- 1.4. Retrieve data access logs

**Business section: Data Owner accesses data logs/Retrieve data access logs**

The foreign Customer Portal retrieves data access logs corresponding to the received selection criteria and hands them over to the original Customer Portal.

Information sent:

Business object	Instance name	Instance description
Data log	Data access log	

- 1.5. Retrieve authorization logs

**Business section: Data Owner accesses data logs/Retrieve authorization logs**

The foreign Customer Portal retrieves authorization request logs corresponding to the received selection

criteria and hands them over to the original Customer Portal.

Information sent:

<b>Business object</b>	<b>Instance name</b>	<b>Instance description</b>
Data log	Authorization request log	

## 5. Information exchanged

<b>Information exchanged</b>			
<b>Information exchanged, ID</b>	<b>Name of information</b>	<b>Description of information exchanged</b>	<b>Requirement, R-IDs</b>
Info1	Data log request	Contains the type of the requested logs (data access logs or authorization request logs) and other criteria like dates, log level etc.	
Info2	Data log	Contains the selected log records.	

## 6. Requirements (optional)

<b>Requirements (optional)</b>		
<b>Categories ID</b>	<b>Category name for requirements</b>	<b>Category description</b>
Cat1	Personal data	
<b>Requirement R-ID</b>	<b>Requirement name</b>	<b>Requirement description</b>
Req1	Access Citizen Right	Right to secure direct access of own personal data and to any processing, storage or sharing details
Req2	Informed Citizen Right	Right to be informed of any personal data held, of how it is used or processed, of any breach, and of any disclosure/usage to third parties
<b>Requirements (optional)</b>		
<b>Categories ID</b>	<b>Category name for requirements</b>	<b>Category description</b>
Cat2	Task 5.3	Requirements integrated from Task 5.3.
<b>Requirement R-ID</b>	<b>Requirement name</b>	<b>Requirement description</b>
Req3	LOGS-REQ1	Ability to share information related to data logs between data owners, concerned DEPs, applications and data sources

## 7. Common terms and definitions

## 8. Custom information (optional)

### 9.10 MANAGE FLEXIBILITY ACTIVATIONS - ALTERNATIVE 1

# Manage flexibility activations

Based on IEC 62559-2 edition 1  
 Generated from UML Use Case Repository with Modsarus® (EDF R&D Tool)

## 1. Description of the use case

### 1.1. Name of use case

Use case identification		
ID	Area(s)/Domain(s)/Zone(s)	Name of use case
	Market for flexibilities, Operational planning and forecasting, Services related to end customers	Manage flexibility activations

### 1.2. Version management

Version management				
Version No.	Date	Name of author(s)	Changes	Approval status
1	2018-04-17	Olivia Alonso Garcia (REE)		
2	2018-06-22	Ricardo Jover (EDF), Eric Suignard (EDF)		
3	2018-07-30	Eric Suignard (EDF)		
4	2018-08-02	Eric Suignard (EDF)		
5	2018-09-21	Eric Suignard (EDF), Ricardo Jover (EDF)	Remarks from Innogy and EirGrid.	
6	2018-10-04	Eric Suignard (EDF)	Version post WP5&9 physical meeting in Tallinn	
7	2018-10-17	Eric Suignard (EDF)	Version reviewed by WP5&9 partners	
8	2018-10-30	Eric Suignard (EDF)	Description of Grid data	
9	2019-05-07	Eric Suignard (EDF)	WP6-7-8 demos alignment and miscellaneous changes	
10	2019-06-05	Ricardo Jover (EDF), Eric Suignard (EDF)	Changes following WP5&9 workshop in Chatou	
11	2019-06-13	Eric Suignard (EDF)	Elering review	
12	2019-08-22	Eric Suignard (EDF), Wiebke Albers (innogy)	Partial convergence on Grid Validation System usage	
13	2020-06-16	Eric Suignard (EDF)	innogy's and Elering's review	

### 1.3. Scope and objectives of use case

Scope and objectives of use case	
Scope	Developing generic case describing the data exchange for the process of flexibility activation.
Objective(s)	Make data exchange for activation of flexibilities effective and reliable.
Related business case(s)	

### 1.4. Narrative of Use Case

Narrative of use case
<b>Short description</b> Description of the needed data exchange for the selection (taking into account any grid limitations) and initiation of activation of flexibilities bids that previously have been sent to the Flexibility Platform. Delivery of notification of activation requests to the Flexibility Service Providers (FSPs), in a reliable and timely manner according to the relevant terms and conditions applicable to FSPs. According to EU-SysFlex WP3 suggestion, the function of grid impact assessment and hosting of Grid Validation

System could be taken over by Optimisation Operator role from the Primary and Secondary System Operator roles.

### Complete description

#### Summary of use case

- Manage flexibility activation

Description:

- Request flexibility activation  
Description: Primary System Operator initiates flexibility activation on Flexibility Platform which selects bids considering the amounts of energy/capacity needed, maximum price and grid impact analysis results from SO - limitation and sensitivities where applicable (e.g. congestion management call for tender)
- Forward request for flexibility activation  
Description: DEP forwards request to FP.
- Register request for flexibility activation  
Description: FP registers the request.
- Send necessary information for grid impact assessment  
Description: Flexibility Platform sends required level of information necessary for grid impact assessment to Secondary System Operators concerned via DEP. This concerns bids to be activated.
- Forward necessary information for grid impact assessment  
Description: DEP forwards information to Secondary System Operator
- Assess secondary grid impact  
Description: Secondary System Operator assesses the impact of flexibility activations in its grid in order to avoid congestions due to these activations. Secondary System Operator provides the results of grid impact assessment to the Flexibility Platform setting restrictions – if necessary - on the activation of flexibilities which would cause congestion in other grids.
- Forward results of secondary grid impact assessment  
Description: DEP forwards results to Flexibility Platform
- Collect the result of the grid impact assessment of SSO  
Description: Flexibility Platform collects the results of grid impact assessment to see if activations would cause further imbalance or congestions and therefore counter actions would be needed. Counter actions are an inherent part of this step (frequency products do not need counteractions, redispatch is per definition an energy balance neutral measure - the increased and decreased energy of a measure is always equal).
- Select next set of bids based on the merit order principle  
Description:
- Forward request for counter action  
Description:
- Take a counter action  
Description: The flexibility service in the opposite direction should be activated to balance the system. As TSO is responsible for balancing, we can assume it is TSO's responsibility to initiate the counteraction (it is assumed that TSO is the Primary System Operator in this use case). In case a counter action is not possible (e.g. due to lack of time if it is happening close to real-time), emergency plan (not defined yet) is activated. Alternatively, this activity could be automatic action

in the Flexibility Platform without direct involvement of System Operator, but only after the check of the technical limits of the network involved.	
<ul style="list-style-type: none"> <li>Forward request for activation <u>Description:</u></li> <li>Register request for activation <u>Description:</u></li> <li>Activate bids (Operational) <u>Description:</u></li> <li>Forward activation confirmation <u>Description:</u></li> <li>Register activation confirmation <u>Description:</u> Flexibility Platform receives and registers confirmations from Flexibility Service Providers in order to make sure that they actually received the requests for activation. This step does not include the verifications aspects of activations (see "Verify and settle activated flexibilities" SUC for activation verification).</li> </ul>	

### 1.5. Key performance indicators (KPI)

### 1.6. Use case conditions

Use case conditions	
Assumptions	
1	Data exchange occurs as a result of business processes. The method of implementing business processes depends on the architecture of the flexibility services markets
2	Common TSO-DSO flexibility market design: The use case assumes a single market place operated by a Flexibility Platform. 'Single' stands for concept where different flexibility buyers and sellers can trade, see also definition in section 3.1. In case of time-critical very fast products, the flexibility units must react as direct response to the deviations in the system – for this specific case and step, the Flexibility Platform and the Data Exchange Platform cannot be used.
Prerequisites	
1	FSPs have been prequalified and have submitted bids.
2	TSOs and DSOs play equivalent roles in this use case: TSOs and DSOs request and initiate activation of flexibilities for their own needs regardless in whose network the flexibility is located. The validation of the flexibility initiation is always done by the SO where the flexibility is connected and whose grid is impacted. Flexibilities can be activated in real time (e.g. FCR) or not (e.g. FRR).
3	FSPs are being selected by the PSO based on bids in merit order list taking into account the sensitivities and limitations he receives from the SO.
4	Flexibility activation should not create congestion in any grid.
5	Flexibility Service Providers and System Operators need their own applications to connect to the Flexibility Platform.
6	Communication standards must be established.
7	Flexibility Platform holds the information about which Primary System Operator is linked to which Secondary System Operator.

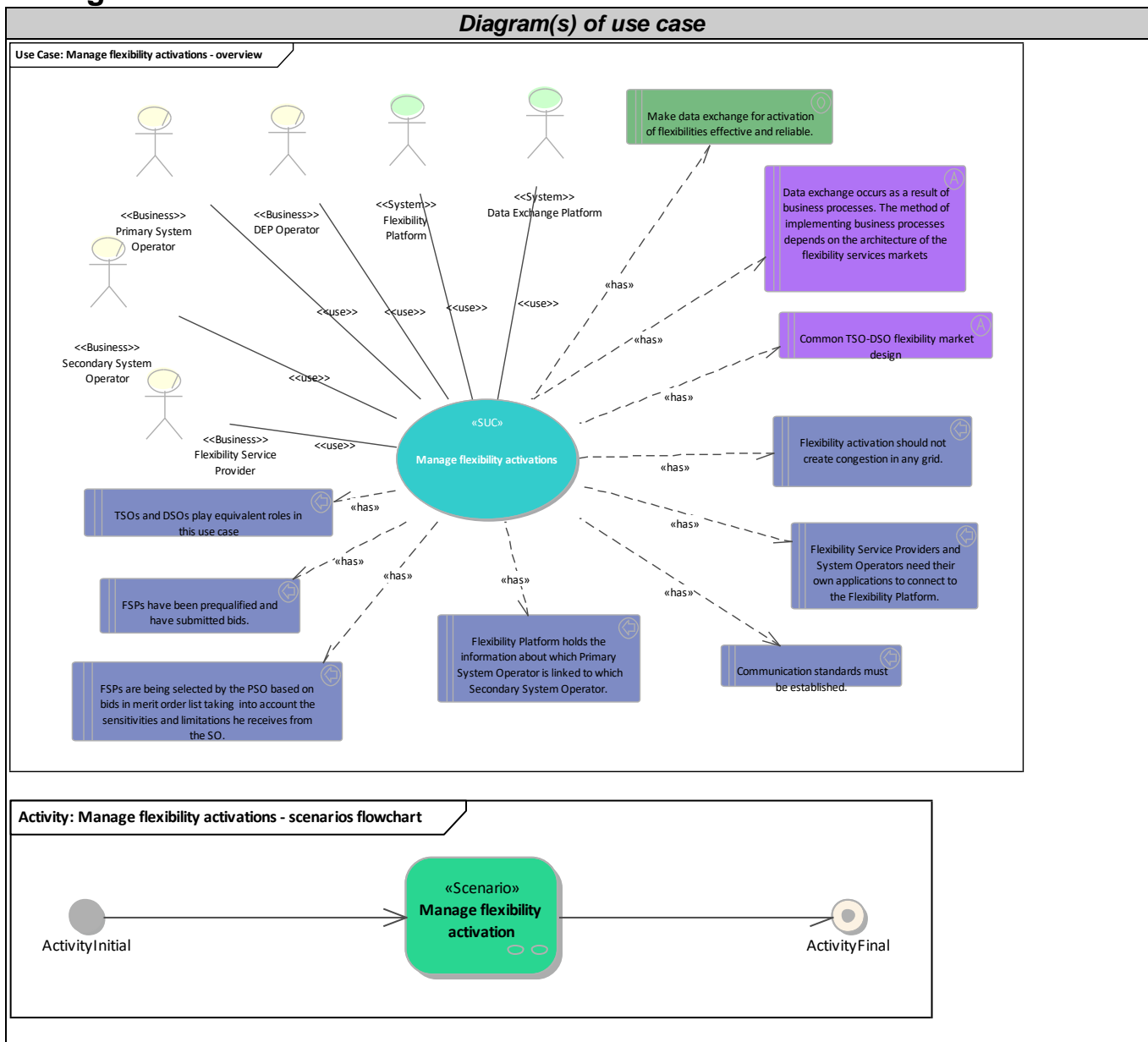
### 1.7. Further information to the use case for classification/mapping

Classification information
Relation to other use cases
Level of depth

<b>Prioritisation</b>
<b>Generic, regional or national relation</b>
<b>Nature of the use case</b>
SUC
<b>Further keywords for classification</b>

## 1.8. General remarks

## 2. Diagrams of use case



### 3. Technical details

#### 3.1. Actors

<b>Actors</b>			
<b>Grouping (e.g. domains, zones)</b>		<b>Group description</b>	
<b>Actor name</b>	<b>Actor type</b>	<b>Actor description</b>	<b>Further information specific to this use case</b>
Secondary System Operator	Business	Operates the power grid on which a flexibility service unit is connected or this unit may otherwise impact its grid. Assesses the impact on its network of the flexibility to be procured because the activation of such flexibility may potentially cause congestion in its grid.	
Flexibility Service Provider	Business	Can be a Distribution Network Flexibility Provider or a Transmission Network Flexibility Provider (cf. definitions in T3.3 deliverable). Similar to Flexibility Aggregator. Can be both aggregator and individual consumer/generator. Type of Energy Service Provider.	
Primary System Operator	Business	Initiates the call for tenders and initiates the activation of a flexibility. It also can operate the power grid on which a flexibility service unit is connected or this unit may otherwise impact its grid. In this case, it assesses the impact on its network of the flexibility to be procured because the activation of such flexibility may potentially cause congestion in its grid.	
Data Exchange Platform	System	Data exchange platform (DEP) is a communication platform the basic functionality of which is to secure data transfer (routing) from data providers (e.g. data hubs, flexibility service providers, TSOs, DSOs) to the data users (e.g. TSOs, DSOs, consumers, suppliers, energy service providers). DEP stores data related to its services (e.g. cryptographic hash of the data requested). The DEP does not store core energy data (e.g. meter data, grid data, market data) while these data can be stored by data hubs. Several DEPs may exist in different countries and inside one country.	
Flexibility Platform	System	Flexibility Platform (FP) for System Operators and Flexibility Service Providers that enables the trading of different flexibility products and services. A FP is operated by a Market Operator.  Available to System Operators and Flexibility Services Providers. It is used to support the prequalification, the bidding, the activation and the verification processes, ensuring coordination between activities undertaken by several operators using the same flexible resources. Several national and regional FPs may exist.	
Grid Validation System	System	System hosted by Optimisation Operators and used for the power grid congestion assessment, including grid validation if activation will cause congestion.	
Optimisation Operator	Business	Optimise and select the bids, where relevant in combination with switching measures; clear the market for auctions or select individual bids in the order book organised by the MO taking into account the grid data (constraints and sensitivities/topology if needed) provided by DS_O and TS_O ; communicate results (rewarded offers and prices) to the MO. The OO role can be carried out by a system operator, market operator or a third party. (cf. definition in T3.2 deliverable)	
DEP Operator	Business	Data exchange platform operator owns and operates a communication system which basic functionality is data transfer.	

### 3.2. References

## 4. Step by step analysis of use case

### 4.1. Overview of scenarios

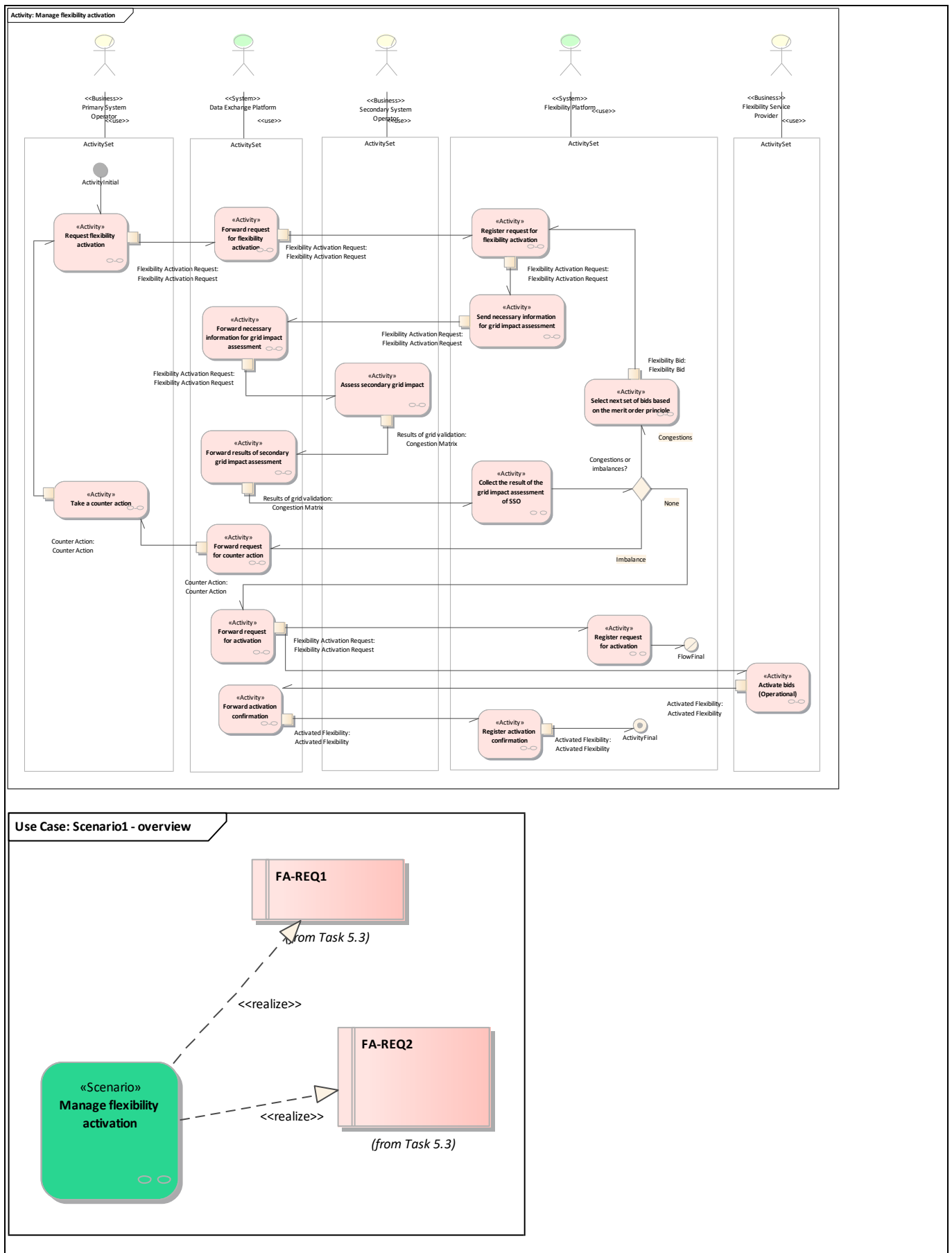
Scenario conditions						
No.	Scenario name	Scenario description	Primary actor	Triggering event	Pre-condition	Post-condition
1	Manage flexibility activation					

### 4.2. Steps - Scenarios

#### 4.2.1. Manage flexibility activation

Requirement list (refer to "Requirement" section for more information)	
Requirement R-ID	Requirement name
Cat1.Reg1	FA-REQ2
Cat1.Reg2	FA-REQ1





## Scenario step by step analysis

Scenario								
Scenario name		Manage flexibility activation						
Step No	Event	Name of process/activity	Description of process/activity	Service	Information producer (actor)	Information receiver (actor)	Information exchanged (IDs)	Requirement, R-IDs
1.1		Request flexibility activation	Primary System Operator initiates flexibility activation on Flexibility Platform which selects bids considering the amounts of energy/capacity needed, maximum price and grid impact analysis results from SO - limitation and sensitivities where applicable (e.g. congestion management call for tender)		<u>Primary System Operator</u>	<u>Data Exchange Platform</u>	Info1-Flexibility Activation Request	
1.2		Forward request for flexibility activation	DEP forwards request to FP.		<u>Data Exchange Platform</u>	<u>Flexibility Platform</u>	Info1-Flexibility Activation Request	
1.3		Register request for flexibility activation	FP registers the request.		<u>Flexibility Platform</u>	<u>Flexibility Platform</u>	Info1-Flexibility Activation Request	
1.4		Send necessary information for grid impact assessment	Flexibility Platform sends required level of information necessary for grid impact assessment to Secondary System Operators concerned via DEP. This concerns bids to be activated.		<u>Flexibility Platform</u>	<u>Data Exchange Platform</u>	Info1-Flexibility Activation Request	
1.5		Forward necessary information for grid impact assessment	DEP forwards information to Secondary System Operator		<u>Data Exchange Platform</u>	<u>Secondary System Operator</u>	Info1-Flexibility Activation Request	
1.6		Assess secondary grid impact	Secondary System Operator assesses the impact of flexibility activations in its grid in order to avoid congestions due to these activations. Secondary System Operator provides the		<u>Secondary System Operator</u>	<u>Data Exchange Platform</u>	Info3-Congestion Matrix	

			results of grid impact assessment to the Flexibility Platform setting restrictions – if necessary - on the activation of flexibilities which would cause congestion in other grids.					
1.7		Forward results of secondary grid impact assessment	DEP forwards results to Flexibility Platform		<u>Data Exchange Platform</u>	<u>Flexibility Platform</u>	<u>Info3-Congestion Matrix</u>	
1.8		Collect the result of the grid impact assessment of SSO	Flexibility Platform collects the results of grid impact assessment to see if activations would cause further imbalance or congestions and therefore counter actions would be needed. Counter actions are an inherent part of this step (frequency products do not need counteractions, redispatch is per definition an energy balance neutral measure - the increased and decreased energy of a measure is always equal).		<u>Flexibility Platform</u>			<u>Cat2.Reg3</u>
1.9		Select next set of bids based on the merit order principle			<u>Flexibility Platform</u>	<u>Flexibility Platform</u>	<u>Info4-Flexibility Bid</u>	<u>Cat2.Reg3, Cat2.Reg4</u>
1.10		Forward request for counter action			<u>Data Exchange Platform</u>	<u>Primary System Operator</u>	<u>Info5-Counter Action</u>	
1.11		Take a counter action	The flexibility service in the opposite direction should be activated to balance the system. As TSO is responsible for balancing, we can assume it is TSO's responsibility to initiate the counteraction (it is assumed that TSO is the Primary System		<u>Primary System Operator</u>	<u>Primary System Operator</u>	<u>Info5-Counter Action</u>	

			Operator in this use case). In case a counter action is not possible (e.g. due to lack of time if it is happening close to real-time), emergency plan (not defined yet) is activated. Alternatively, this activity could be automatic action in the Flexibility Platform without direct involvement of System Operator, but only after the check of the technical limits of the network involved.					
1.12		Forward request for activation			Data Exchange Platform	Flexibility Platform, Flexibility Service Provider	Info1-Flexibility Activation Request	
1.13		Register request for activation			Flexibility Platform			
1.14		Activate bids (Operational)			Flexibility Service Provider	Data Exchange Platform	Info6-Activated Flexibility	
1.15		Forward activation confirmation			Data Exchange Platform	Flexibility Platform	Info6-Activated Flexibility	
1.16		Register activation confirmation	Flexibility Platform receives and registers confirmations from Flexibility Service Providers in order to make sure that they actually received the requests for activation. This step does not include the verifications aspects of activations (see "Verify and settle activated flexibilities" SUC for activation verification).		Flexibility Platform	Flexibility Platform	Info6-Activated Flexibility	

- 1.1. Request flexibility activation

**Business section: Manage flexibility activation/Request flexibility activation**

Primary System Operator initiates flexibility activation on Flexibility Platform which selects bids considering the amounts of energy/capacity needed, maximum price and grid impact analysis results from SO - limitation and sensitivities where applicable (e.g. congestion management call for tender)

Information sent:

<b>Business object</b>	<b>Instance name</b>	<b>Instance description</b>
<u>Flexibility Activation Request</u>	Flexibility Activation Request	

- 1.2. Request flexibility activation

**Business section: Manage flexibility activation/Request flexibility activation**

Primary System Operator initiates flexibility activation on Flexibility Platform which selects bids considering the amounts of energy/capacity needed, maximum price and grid impact analysis results from SO - limitation and sensitivities where applicable (e.g. congestion management call for tender)

Information sent:

<b>Business object</b>	<b>Instance name</b>	<b>Instance description</b>
<u>Flexibility Activation Request</u>	Flexibility Activation Request	

- 1.3. Forward request for flexibility activation

**Business section: Manage flexibility activation/Forward request for flexibility activation**

DEP forwards request to FP.

Information sent:

<b>Business object</b>	<b>Instance name</b>	<b>Instance description</b>
<u>Flexibility Activation Request</u>	Flexibility Activation Request	

- 1.4. Register request for flexibility activation

**Business section: Manage flexibility activation/Register request for flexibility activation**

FP registers the request.

Information sent:

<b>Business object</b>	<b>Instance name</b>	<b>Instance description</b>
<u>Flexibility Activation Request</u>	Flexibility Activation Request	

- 1.5. Send necessary information for grid impact assessment

**Business section: Manage flexibility activation/Send necessary information for grid impact assessment**

Flexibility Platform sends required level of information necessary for grid impact assessment to System Operators concerned via DEP. This concerns bids to be activated.

Information sent:

<b>Business object</b>	<b>Instance name</b>	<b>Instance description</b>
<u>Flexibility Activation Request</u>	Flexibility Activation Request	

- 1.6. Forward necessary information for grid impact assessment

**Business section: Manage flexibility activation/Forward necessary information for grid impact assessment**

DEP forwards information to Secondary System Operator

Information sent:

<b>Business object</b>	<b>Instance name</b>	<b>Instance description</b>
<u>Flexibility Activation Request</u>	Flexibility Activation Request	

- 1.7. Assess secondary grid impact

**Business section: Manage flexibility activation/Assess secondary grid impact**

Secondary System Operator assesses the impact of flexibility activations in its grid in order to avoid congestions due to these activations.

Secondary System Operator provides the results of grid impact assessment to the Flexibility Platform setting restrictions – if necessary - on the activation of flexibilities which would cause congestion in its grids.  
Information sent:

Business object	Instance name	Instance description
Congestion Matrix	Results of grid validation	

- 1.8. Forward results of secondary grid impact assessment

**Business section: Manage flexibility activation/Forward results of secondary grid impact assessment**

DEP forwards results to Flexibility Platform

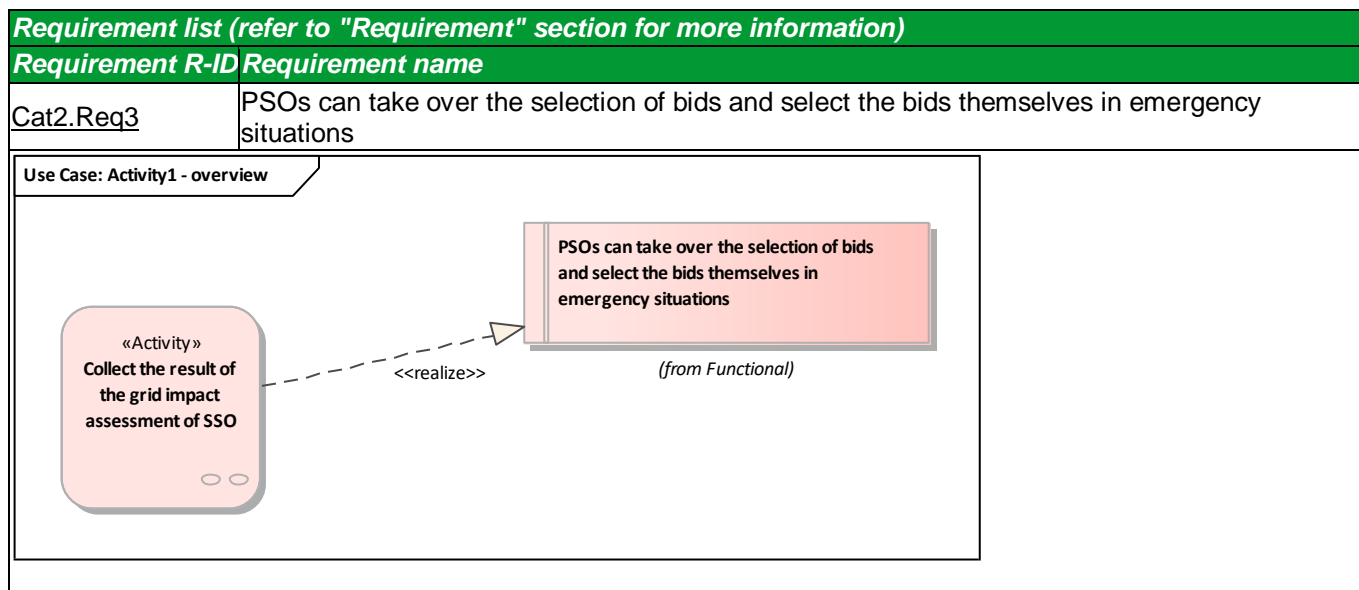
Information sent:

Business object	Instance name	Instance description
Congestion Matrix	Results of grid validation	

- 1.9. Collect the result of the grid impact assessment of SSO

**Business section: Manage flexibility activation/Collect the result of the grid impact assessment of SSO**

Flexibility Platform collects the results of grid impact assessment to see if activations would cause further imbalance or congestions and therefore counter actions would be needed. Counter actions are an inherent part of this step (frequency products do not need counteractions, redispatch is per definition an energy balance neutral measure - the increased and decreased energy of a measure is always equal).

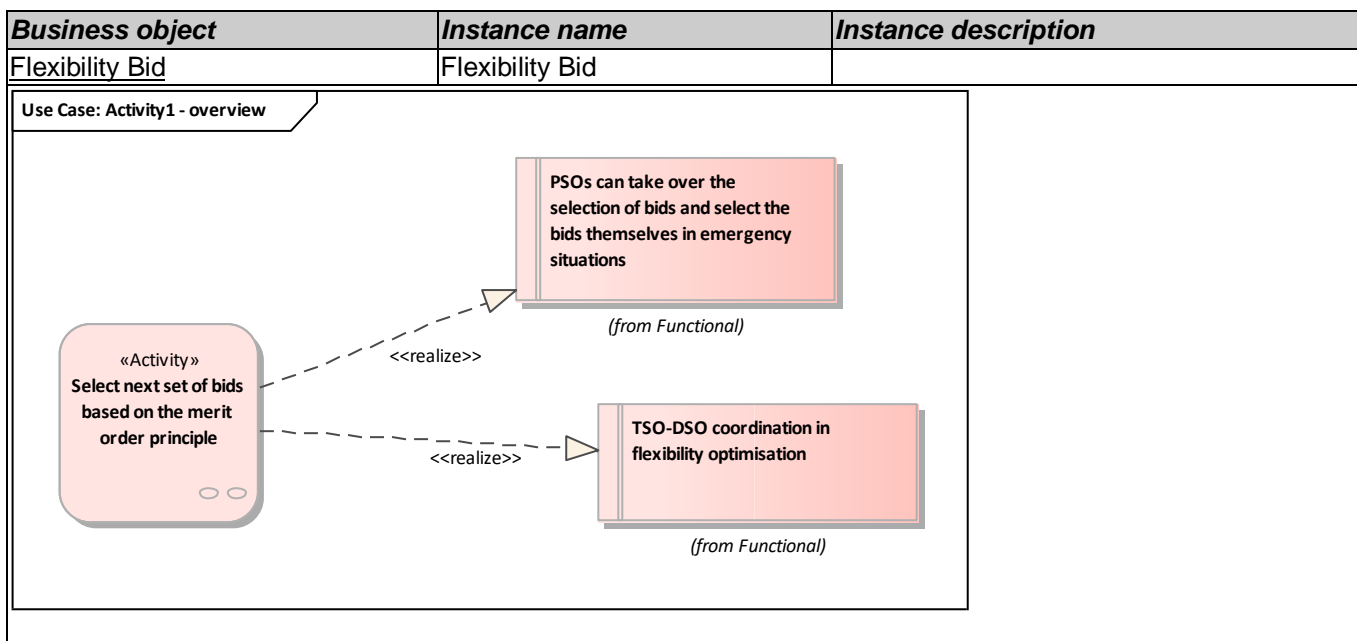


- 1.10. Select next set of bids based on the merit order principle

**Business section: Manage flexibility activation/Select next set of bids based on the merit order principle**

Requirement list (refer to "Requirement" section for more information)	
Requirement R-ID	Requirement name
Cat2.Reg3	PSOs can take over the selection of bids and select the bids themselves in emergency situations
Cat2.Reg4	TSO-DSO coordination in flexibility optimisation

Information sent:



### 1.11. Forward request for counter action

#### Business section: Manage flexibility activation/Forward request for counter action

Information sent:

Business object	Instance name	Instance description
Counter Action	Counter Action	

### 1.12. Take a counter action

#### Business section: Manage flexibility activation/Take a counter action

The flexibility service in the opposite direction should be activated to balance the system. As TSO is responsible for balancing, we can assume it is TSO's responsibility to initiate the counteraction (it is assumed that TSO is the Primary System Operator in this use case). In case a counter action is not possible (e.g. due to lack of time if it is happening close to real-time), emergency plan (not defined yet) is activated. Alternatively, this activity could be automatic action in the Flexibility Platform without direct involvement of System Operator, but only after the check of the technical limits of the network involved.

Information sent:

Business object	Instance name	Instance description
Counter Action	Counter Action	

- 1.13. Forward request for activation

**Business section: Manage flexibility activation/Forward request for activation**

Information sent:

<i>Business object</i>	<i>Instance name</i>	<i>Instance description</i>
Flexibility Activation Request	Flexibility Activation Request	

- 1.15. Activate bids (Operational)

**Business section: Manage flexibility activation/Activate bids (Operational)**

Information sent:

<i>Business object</i>	<i>Instance name</i>	<i>Instance description</i>
Activated Flexibility	Activated Flexibility	

- 1.16. Activate bids (Operational)

**Business section: Manage flexibility activation/Activate bids (Operational)**

Information sent:

<i>Business object</i>	<i>Instance name</i>	<i>Instance description</i>
Activated Flexibility	Activated Flexibility	

- 1.17. Forward activation confirmation

**Business section: Manage flexibility activation/Forward activation confirmation**

Information sent:

<i>Business object</i>	<i>Instance name</i>	<i>Instance description</i>
Activated Flexibility	Activated Flexibility	

- 1.18. Register activation confirmation

**Business section: Manage flexibility activation/Register activation confirmation**

Flexibility Platform receives and registers confirmations from Flexibility Service Providers in order to make sure that they actually received the requests for activation. This step does not include the verifications aspects of activations (see "Verify and settle activated flexibilities" SUC for activation verification).

Information sent:

<i>Business object</i>	<i>Instance name</i>	<i>Instance description</i>
Activated Flexibility	Activated Flexibility	

## 5. Information exchanged

<i>Information exchanged</i>			
<i>Information exchanged, ID</i>	<i>Name of information</i>	<i>Description of information exchanged</i>	<i>Requirement, R-IDs</i>



Info1	Flexibility Activation Request		
Info2	Congestion Matrix	Congestion matrices are provided by System Operators and stored in Flexibility Platforms. It consists in a matrix based on grid models. Flexibility bids are inserted into the matrix, in order to check whether congestions would occur.	
Info3	Flexibility Bid		
Info4	Counter Action		
Info5	Activated Flexibility		

## 6. Requirements (optional)

Requirements (optional)		
Categories ID	Category name for requirements	Category description
Cat1	Task 5.3	Requirements integrated from Task 5.3.
Requirement R-ID	Requirement name	Requirement description
Req1	FA-REQ2	Exchange of activation requests through DEP and flexibility platform
Req2	FA-REQ1	Automated activation of devices is possible
Requirements (optional)		
Categories ID	Category name for requirements	Category description
Cat2	Functional	Functional requirements
Requirement R-ID	Requirement name	Requirement description
Req3	PSOs can take over the selection of bids and select the bids themselves in emergency situations	Flexibility bids are selected by Flexibility Platforms on a merit order basis and with several criteria. Different criteria should be considered (e.g. price, social economic value, location). However, in some cases, this may not be feasible. This situation can occur for congestion management or frequency control, when flexibility needs are too close to real time (emergency situations).
Req4	TSO-DSO coordination in flexibility optimisation	Flexibilities must be studied and validated by TSOs and DSOs in a coordinated manner before activation requests can be submitted to Flexibility Service Providers.

## 7. Common terms and definitions

## 8. Custom information (optional)

### 9.11 MANAGE FLEXIBILITY ACTIVATIONS - ALTERNATIVE 2

## Manage flexibility activations - Alternative 2

## 1. Description of the use case

### 1. Name of use case

Use case identification		
ID	Area(s)/Domain(s)/Zone(s)	Name of use case
	Services related to end customers, Operational planning and forecasting, Market for flexibilities	Manage flexibility activations - Alternative 2

### 2. Version management

Version management				
Version No.	Date	Name of author(s)	Changes	Approval status
1	2019-08-30	Wiebke Albers (innogy SE)	alternative SUC for "Manage Flexibility Activation"	
2	2020-06-16	Eric Suignard (EDF)	innogy's and Elering's review	

### 3. Scope and objectives of use case

Scope and objectives of use case	
<b>Scope</b>	Developing generic case describing the data exchange for the process of flexibility activation where the capacity has already been reserved during earlier time frames and a new grid assessment is necessary to select the best flexibility.
<b>Objective(s)</b>	Make data exchange for activation of flexibilities effective and reliable.
<b>Related business case(s)</b>	

### 4. Narrative of Use Case

Narrative of use case	
<b>Short description</b>	
<p>Description of the needed data exchange for the selection (taking into account any grid limitations) and initiation of activation of flexibilities bids that previously have been sent to the Flexibility Platform and where previously the bids were not activated but their capacity was reserved in the bidding process. Delivery of notification of activation requests to the Flexibility Service Providers (FSPs), in a reliable and timely manner according to the relevant terms and conditions applicable to FSPs.</p> <p>According to EU-SysFlex WP3 suggestion, the function of grid impact assessment and hosting of Grid Validation System could be taken over by Optimisation Operator role from the Primary and Secondary System Operator roles.</p>	
<b>Complete description</b>	
<p style="text-align: center;"><u>Summary of use case</u></p> <ul style="list-style-type: none"> <li> <b>Manage flexibility activation</b>  <u>Description:</u> <ul style="list-style-type: none"> <li>Request flexibility activation  <u>Description:</u> Primary System Operator initiates flexibility activation on Flexibility Platform by selecting bids on the Flexibility Platform considering the amounts of energy/capacity needed as well as the maximum price based on the grid impact analysis results from SO - limitation and sensitivities where applicable (e.g. congestion management call for tender)</li> <li>Request flexibility activation  <u>Description:</u> Primary System Operator initiates flexibility activation on Flexibility Platform by</li> </ul> </li> </ul>	

selecting bids on the Flexibility Platform considering the amounts of energy/capacity needed as well as the maximum price based on the grid impact analysis results from SO - limitation and sensitivities where applicable (e.g. congestion management call for tender)

- **Assess secondary grid impact**  
Description: Secondary System Operator assesses the impact of flexibility activations in its grid in order to avoid congestions due to these activations.  
Secondary System Operator provides the results of grid impact assessment to the PSO setting restrictions – if necessary - on the activation of flexibilities which would cause congestion in its grids and provide sensitivities in case of a congestion management tender.
- **Deccluster flexibility bids**  
Description: Secondary System Operator declusters flexibility bid cluster and selects best flexibilities, so carries out the final individual bid selection based on its new grid information. SSO informs FP, PSO and FSP
- **Collect the resulting requests of the SO and send request for activation**  
Description:
- **Collect the resulting requests of the SO and send request for activation**  
Description:
- **Forward resulting flexibility request**  
Description:
- **Activate bids (Operational)**  
Description:
- **Activate bids (Operational)**  
Description:
- **Forward activation confirmation**  
Description:
- **Register flexibility activation confirmation**  
Description:
- **Register flexibility activation confirmation**  
Description:
- **Register activation confirmation**  
Description: Flexibility Platform receives and registers confirmations from Flexibility Service Providers in order to make sure that they actually received the requests for activation. This step does not include the verifications aspects of activations (see "Verify and settle activated flexibilities" SUC for activation verification).

## 5. Key performance indicators (KPI)

## 6. Use case conditions

Use case conditions	
Assumptions	
1	Data exchange occurs as a result of business processes. The method of implementing business processes depends on the architecture of the flexibility services markets
2	Common TSO-DSO flexibility market design: The use case assumes a single market place operated by a Flexibility Platform. 'Single' stands for concept where different flexibility buyers and sellers can trade, see also

	definition in section 3.1. In case of time-critical very fast products, the flexibility units must react as direct response to the deviations in the system – for this specific case and step, the Flexibility Platform and the Data Exchange Platform cannot be used.
<b>Prerequisites</b>	
1	Communication standards must be established.
2	In a previous stage, the PSO has procured capacity bids. : This SUC is necessary, because there is a significant time duration between the capacity procurement and activation of the bids which makes a new grid assessment necessary.
3	Flexibility Service Providers and System Operators need their own applications to connect to the Flexibility Platform.
4	FSPs are being selected by the PSO based on bids in merit order list taking into account the sensitivities and limitations he receives from the SSO.
5	Flexibility Platform holds the information about which Primary System Operator is linked to which Secondary System Operator.: However, this information does not include the current switching state of individual grid assets.
6	Flexibility activation should not create congestion in any grid.
7	TSOs and DSOs play equivalent roles in this use case: TSOs and DSOs request and initiate activation of flexibilities for their own needs regardless in whose network the flexibility is located. The validation of the flexibility initiation is always done by the SO where the flexibility is connected and whose grid is impacted. Flexibilities can be activated in real time (e.g. FCR) or not (e.g. FRR).
8	FSPs have been prequalified and have submitted bids.
9	If this process shall work with the clustering of bids, the PSO cannot reserve any individual flexibility capacity bids, : but only clusters and the SSO declusters at a later stage, so carries out the final individual bid selection based on its new grid information (see also SUC “Manage flexibility bids”).

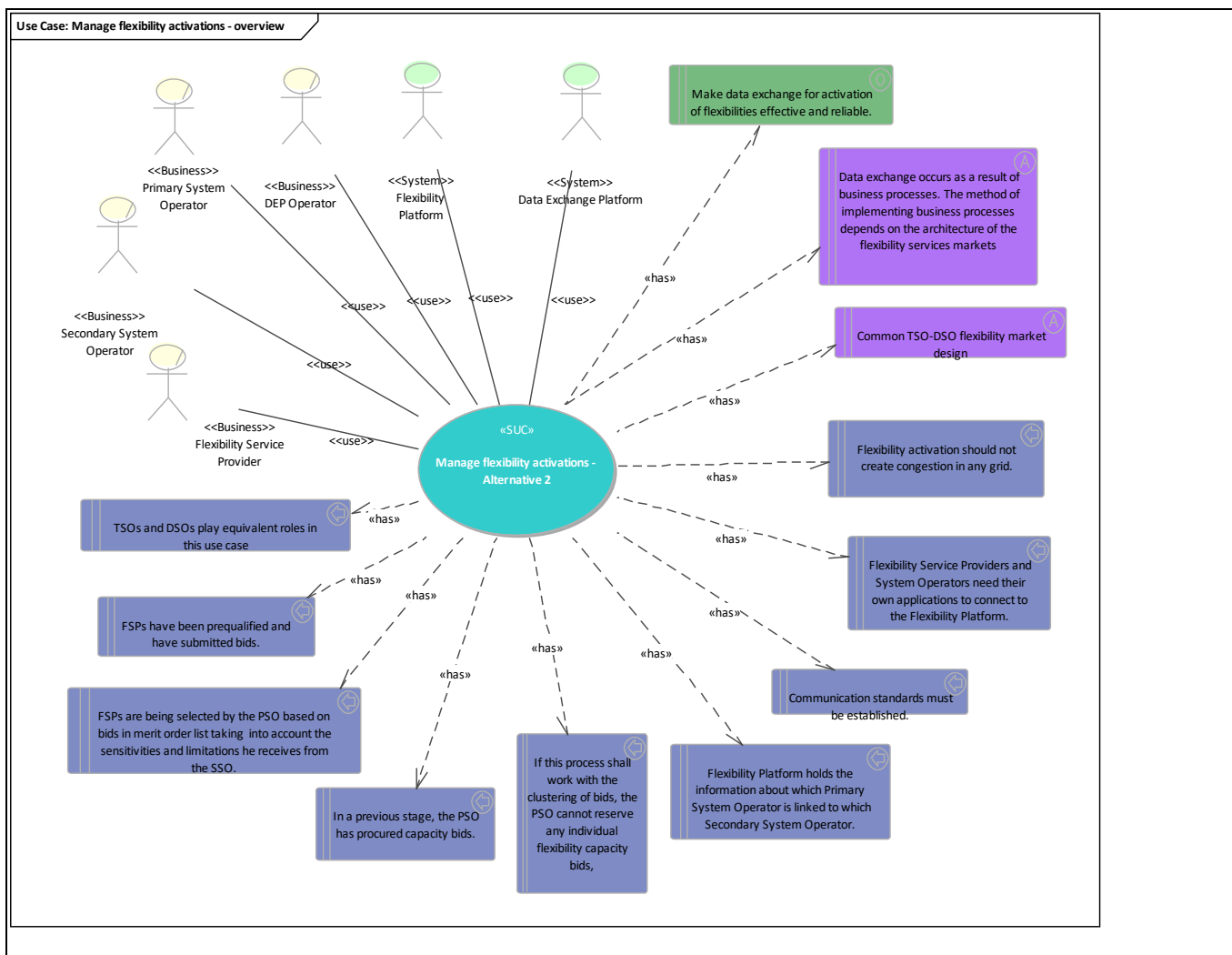
## 7. Further information to the use case for classification/mapping

<b>Classification information</b>
<b>Relation to other use cases</b>
<b>Level of depth</b>
<b>Prioritisation</b>
<b>Generic, regional or national relation</b>
<b>Nature of the use case</b>
SUC
<b>Further keywords for classification</b>

## 8. General remarks

### 2. Diagrams of use case

<b>Diagram(s) of use case</b>
-------------------------------



### 3. Technical details

#### 1. Actors

Actors			
Grouping (e.g. domains, zones)		Group description	
Actor name	Actor type	Actor description	Further information specific to this use case
Data Exchange Platform	System	Data exchange platform (DEP) is a communication platform the basic functionality of which is to secure data transfer (routing) from data providers (e.g. data hubs, flexibility service providers, TSOs, DSOs) to the data users (e.g. TSOs, DSOs, consumers, suppliers, energy service providers). DEP stores data related to its services (e.g. cryptographic hash of the data requested). The DEP does not store core energy data (e.g. meter data, grid data, market data) while these data can be stored by data hubs. Several DEPs may exist in different countries and inside one country.	

Secondary System Operator	Business	Operates the power grid on which a flexibility service unit is connected or this unit may otherwise impact its grid. Assesses the impact on its network of the flexibility to be procured because the activation of such flexibility may potentially cause congestion in its grid.	
Flexibility Platform	System	Flexibility Platform (FP) for System Operators and Flexibility Service Providers that enables the trading of different flexibility products and services. A FP is operated by a Market Operator.  Available to System Operators and Flexibility Services Providers. It is used to support the prequalification, the bidding, the activation and the verification processes, ensuring coordination between activities undertaken by several operators using the same flexible resources. Several national and regional FPs may exist.	
Primary System Operator	Business	Initiates the call for tenders and initiates the activation of a flexibility. It also can operate the power grid on which a flexibility service unit is connected or this unit may otherwise impact its grid. In this case, it assesses the impact on its network of the flexibility to be procured because the activation of such flexibility may potentially cause congestion in its grid.	
Grid Validation System	System	System hosted by Optimisation Operators and used for the power grid congestion assessment, including grid validation if activation will cause congestion.	
Flexibility Service Provider	Business	Can be a Distribution Network Flexibility Provider or a Transmission Network Flexibility Provider (cf. definitions in T3.3 deliverable). Similar to Flexibility Aggregator. Can be both aggregator and individual consumer/generator. Type of Energy Service Provider.	
Optimisation Operator	Business	Optimise and select the bids, where relevant in combination with switching measures; clear the market for auctions or select individual bids in the order book organised by the MO taking into account the grid data (constraints and sensitivities/topology if needed) provided by DS_O and TS_O ; communicate results (rewarded offers and prices) to the MO. The OO role can be carried out by a system operator, market operator or a third party. (cf. definition in T3.2 deliverable)	
DEP Operator	Business	Data exchange platform operator owns and operates a communication system which basic functionality is data transfer.	

## 2. References

### 4. Step by step analysis of use case

#### 1. Overview of scenarios

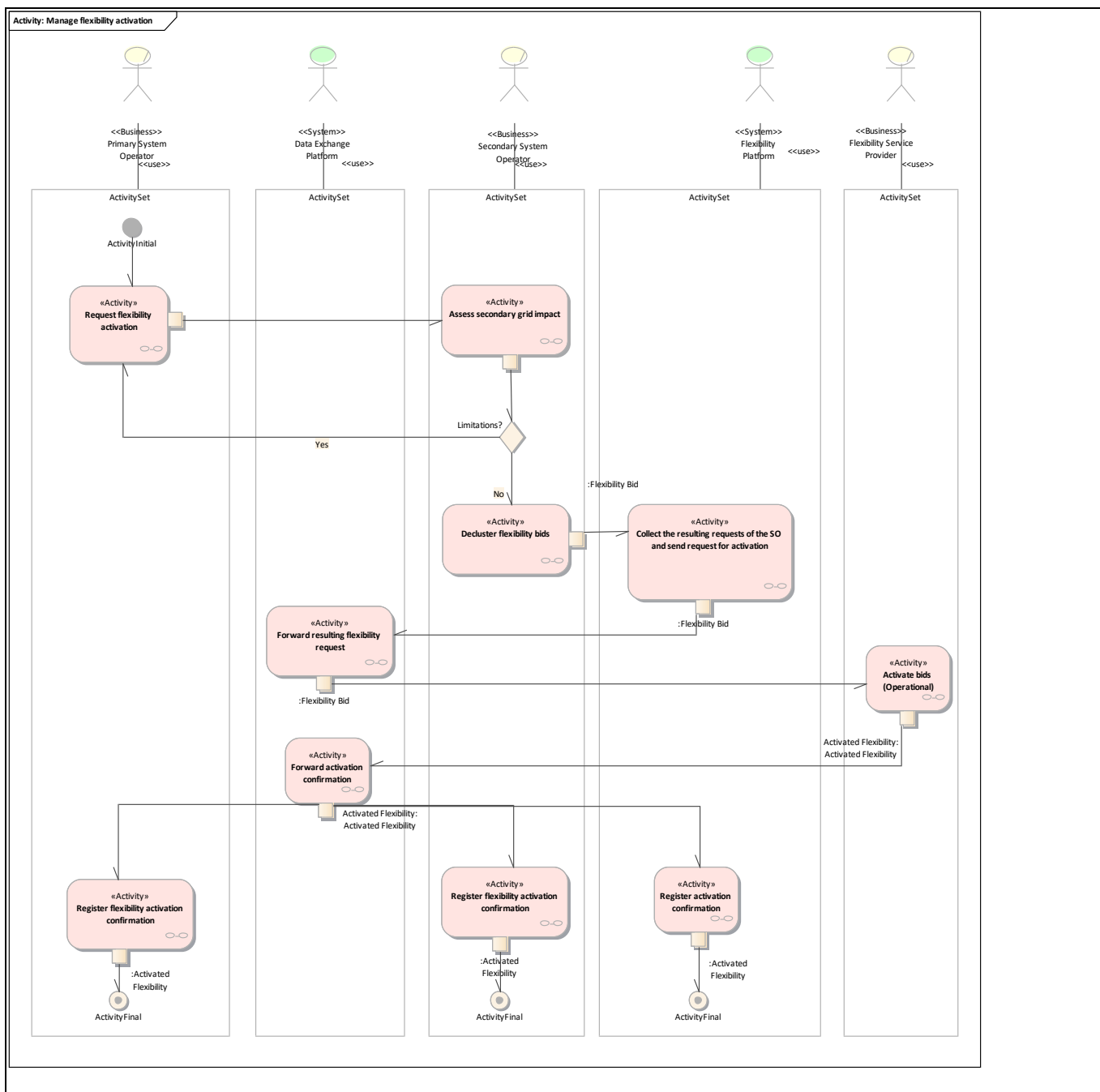
Scenario conditions						
No.	Scenario name	Scenario description	Primary actor	Triggering event	Pre-condition	Post-condition
1	Manage flexibility activation					

#### 2. Steps - Scenarios

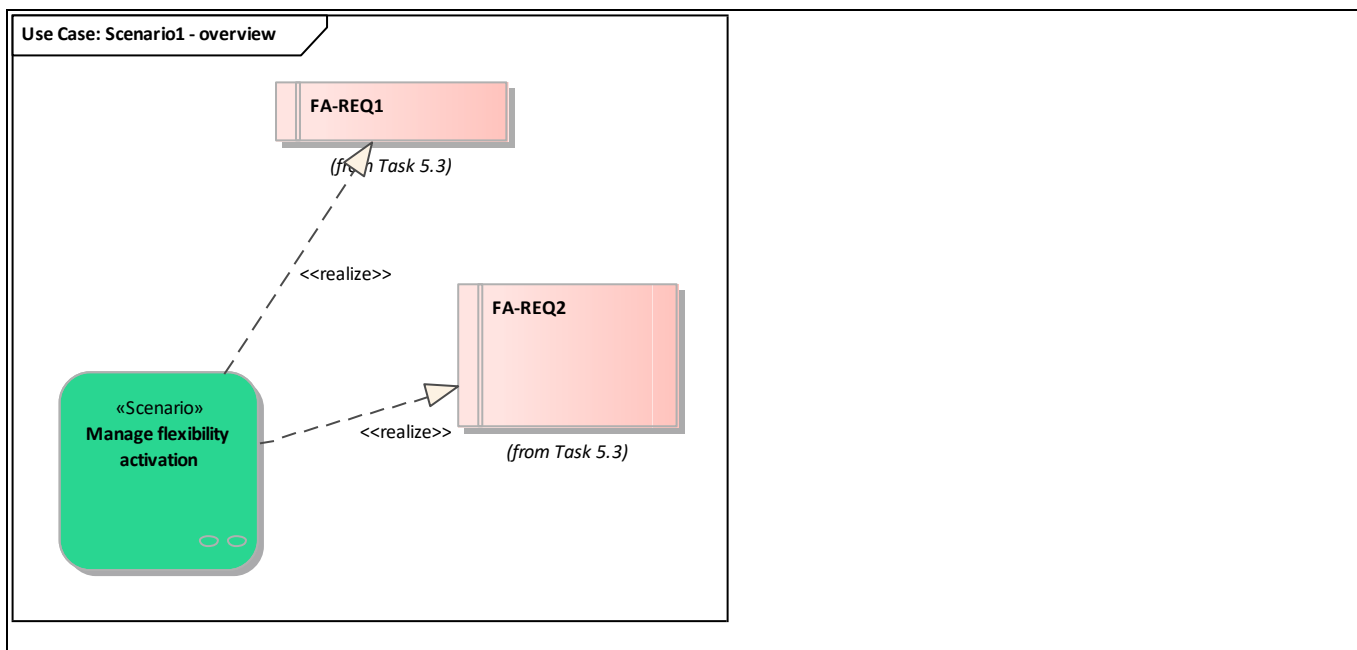
- Manage flexibility activation

Requirement list (refer to "Requirement" section for more information)	
Requirement R-ID	Requirement name
Cat1.Req1	FA-REQ2

Cat1.Reg2	FA-REQ1
-----------	---------







## Scenario step by step analysis

Scenario								
Scenario name		Manage flexibility activation						
Step No	Event	Name of process/activity	Description of process/activity	Service	Information producer (actor)	Information receiver (actor)	Information exchanged (IDs)	Requirement, R-IDs
1.1		Request flexibility activation	Primary System Operator initiates flexibility activation on Flexibility Platform by selecting bids on the Flexibility Platform considering the amounts of energy/capacity needed as well as the maximum price based on the grid impact analysis results from SO - limitation and sensitivities where applicable (e.g. congestion management call for tender)		Primary System Operator	Secondary System Operator		
1.2		Request flexibility activation	Primary System Operator initiates flexibility activation on Flexibility Platform by selecting bids on the Flexibility Platform considering		Primary System Operator		Info1- Flexibility Bid, Info2- Flexibility Potential	

			the amounts of energy/capacity needed as well as the maximum price based on the grid impact analysis results from SO - limitation and sensitivities where applicable (e.g. congestion management call for tender)					
1.3		Assess secondary grid impact	Secondary System Operator assesses the impact of flexibility activations in its grid in order to avoid congestions due to these activations. Secondary System Operator provides the results of grid impact assessment to the PSO setting restrictions – if necessary - on the activation of flexibilities which would cause congestion in its grids and provide sensitivities in case of a congestion management tender.		<u>Secondary System Operator</u>	<u>Secondary System Operator, Primary System Operator</u>		
1.4		Declassify flexibility bids	Secondary System Operator declassifies flexibility bid cluster and selects best flexibilities, so carries out the final individual bid selection based on its new grid information. SSO informs FP, PSO and FSP		<u>Secondary System Operator</u>	<u>Flexibility Platform</u>	Info1-Flexibility Bid	
1.5		Collect the resulting requests of the SO and send request for activation			<u>Flexibility Platform</u>	<u>Data Exchange Platform</u>	Info1-Flexibility Bid	
1.6		Collect the resulting requests of the SO and send request for activation			<u>Flexibility Platform</u>		Info1-Flexibility Bid	

1.7		Forward resulting flexibility request			Data Exchange Platform	Flexibility Service Provider	Info1-Flexibility Bid	
1.8		Activate bids (Operational)			Flexibility Service Provider	Data Exchange Platform	Info3-Activated Flexibility	
1.9		Activate bids (Operational)			Flexibility Service Provider	Flexibility Platform	Info1-Flexibility Bid	
1.10		Forward activation confirmation			Data Exchange Platform	Primary System Operator, Secondary System Operator, Flexibility Platform	Info3-Activated Flexibility	
1.11		Register flexibility activation confirmation			Primary System Operator	Primary System Operator	Info3-Activated Flexibility	
1.12		Register flexibility activation confirmation			Secondary System Operator	Secondary System Operator	Info3-Activated Flexibility	
1.13		Register activation confirmation	Flexibility Platform receives and registers confirmations from Flexibility Service Providers in order to make sure that they actually received the requests for activation. This step does not include the verifications aspects of activations (see "Verify and settle activated flexibilities" SUC for activation verification).		Flexibility Platform	Flexibility Platform	Info3-Activated Flexibility	

- 1.2. Request flexibility activation

**Business section: Manage flexibility activation/Request flexibility activation**

Primary System Operator initiates flexibility activation on Flexibility Platform by selecting bids on the Flexibility Platform considering the amounts of energy/capacity needed as well as the maximum price based on the grid impact analysis results from SO - limitation and sensitivities where applicable (e.g. congestion management call for tender)

Information sent:

Business object	Instance name	Instance description
Flexibility Bid	Flexibility Bid	
Flexibility Potential	Flexibility potential	

- 1.4. Decluster flexibility bids

**Business section: Manage flexibility activation/Deccluster flexibility bids**

Secondary System Operator declusters flexibility bid cluster and selects best flexibilities, so carries out the final individual bid selection based on its new grid information. SSO informs FP, PSO and FSP

Information sent:

<i>Business object</i>	<i>Instance name</i>	<i>Instance description</i>
Flexibility Bid		

- 1.5. Collect the resulting requests of the SO and send request for activation

**Business section: Manage flexibility activation/Collect the resulting requests of the SO and send request for activation**

Information sent:

<i>Business object</i>	<i>Instance name</i>	<i>Instance description</i>
Flexibility Bid		

- 1.6. Collect the resulting requests of the SO and send request for activation

**Business section: Manage flexibility activation/Collect the resulting requests of the SO and send request for activation**

Information sent:

<i>Business object</i>	<i>Instance name</i>	<i>Instance description</i>
Flexibility Bid	Flexibility Bid	

- 1.7. Forward resulting flexibility request

**Business section: Manage flexibility activation/Forward resulting flexibility request**

Information sent:

<i>Business object</i>	<i>Instance name</i>	<i>Instance description</i>
Flexibility Bid		

- 1.8. Activate bids (Operational)

**Business section: Manage flexibility activation/Activate bids (Operational)**

Information sent:

<i>Business object</i>	<i>Instance name</i>	<i>Instance description</i>
Activated Flexibility	Activated Flexibility	

- 1.9. Activate bids (Operational)

**Business section: Manage flexibility activation/Activate bids (Operational)**

Information sent:

<b>Business object</b>	<b>Instance name</b>	<b>Instance description</b>
<u>Flexibility Bid</u>	Flexibility Bid	

- 1.10. Forward activation confirmation

**Business section: Manage flexibility activation/Forward activation confirmation**

Information sent:

<b>Business object</b>	<b>Instance name</b>	<b>Instance description</b>
<u>Activated Flexibility</u>	Activated Flexibility	

- 1.11. Register flexibility activation confirmation

**Business section: Manage flexibility activation/Register flexibility activation confirmation**

Information sent:

<b>Business object</b>	<b>Instance name</b>	<b>Instance description</b>
<u>Activated Flexibility</u>		

- 1.12. Register flexibility activation confirmation

**Business section: Manage flexibility activation/Register flexibility activation confirmation**

Information sent:

<b>Business object</b>	<b>Instance name</b>	<b>Instance description</b>
<u>Activated Flexibility</u>		

- 1.13. Register activation confirmation

**Business section: Manage flexibility activation/Register activation confirmation**

Flexibility Platform receives and registers confirmations from Flexibility Service Providers in order to make sure that they actually received the requests for activation. This step does not include the verifications aspects of activations (see "Verify and settle activated flexibilities" SUC for activation verification).

Information sent:

<b>Business object</b>	<b>Instance name</b>	<b>Instance description</b>
<u>Activated Flexibility</u>		

## 5. Information exchanged

<b>Information exchanged</b>			
<b>Information exchanged, ID</b>	<b>Name of information</b>	<b>Description of information exchanged</b>	<b>Requirement, R-IDs</b>
Info1	Flexibility Bid		
Info2	Flexibility Potential		
Info3	Activated Flexibility		

## 6. Requirements (optional)

<i>Requirements (optional)</i>		
<i>Categories ID</i>	<i>Category name for requirements</i>	<i>Category description</i>
Cat1	Task 5.3	Requirements integrated from Task 5.3.
<i>Requirement R-ID</i>	<i>Requirement name</i>	<i>Requirement description</i>
Req1	FA-REQ2	Exchange of activation requests through DEP and flexibility platform
Req2	FA-REQ1	Automated activation of devices is possible

## 7. Common terms and definitions

## 8. Custom information (optional)

### 9.12 MANAGE FLEXIBILITY BIDS – ALTERNATIVE 1

# Manage flexibility bids

Based on IEC 62559-2 edition 1  
Generated from UML Use Case Repository with Modsarus® (EDF R&D Tool)

## 1. Description of the use case

### 1. Name of use case

<i>Use case identification</i>		
<i>ID</i>	<i>Area(s)/Domain(s)/Zone(s)</i>	<i>Name of use case</i>
	Market for flexibilities	Manage flexibility bids

### 2. Version management

<i>Version management</i>				
<i>Version No.</i>	<i>Date</i>	<i>Name of author(s)</i>	<i>Changes</i>	<i>Approval status</i>
1	2018-04-02	Wojciech Lubczynski (PSE)		
2	2018-05-07	Kalle Kuk (Elering), Ricardo Jover (EDF), Eric Suignard (EDF)		
3	2018-05-11	Graham Oakes (Upside), Mitchell Curtis (Upside)		
4	2018-05-17	Ricardo Jover (EDF), Eric Suignard (EDF)		
5	2018-05-28	Kalle Kuk (Elering), Karin Lehtmetts (Elering), Wojciech Lubczynski (PSE), Graham Oakes (Upside), Mitchell Curtis (Upside), Przemyslaw Kacprzak (PSE)		
6	2018-06-04	Ricardo Jover (EDF), Eric Suignard (EDF)		
7	2018-06-21	Ricardo Jover (EDF), Eric Suignard (EDF)		

8	2018-07-30	Eric Suignard (EDF)		
9	2018-08-02	Eric Suignard (EDF)		
10	2018-09-21	Eric Suignard (EDF), Ricardo Jover (EDF)	Remarks from Innogy and Elering.	
11	2018-10-04	Eric Suignard (EDF)	Version post WP5&9 physical meeting in Tallinn	
12	2018-10-17	Eric Suignard (EDF)	Version reviewed by WP5&9 partners	
13	2018-10-30	Eric Suignard (EDF)	Description of Grid data	
14	2019-05-07	Eric Suignard (EDF)	WP6-7-8 demos alignment and miscellaneous changes	
15	2019-06-05	Ricardo Jover (EDF), Eric Suignard (EDF)	Changes following WP5&9 workshop in Chatou	
16	2019-07-04	Eric Suignard (EDF)	Elering review	
17	2019-08-22	Eric Suignard (EDF), Wiebke Albers (innogy)	Partial convergence on Grid Validation System usage	
18	2020-06-16	Eric Suignard (EDF)	innogy's and Elering's review	

### 3. Scope and objectives of use case

<b>Scope and objectives of use case</b>	
<b>Scope</b>	Describing the pre-qualification and bidding processes on the flexibility services market and defining required data flow to support management of pre-qualification of Flexibility Service Providers and management of flexibility bids.
<b>Objective(s)</b>	Explanation regarding the exchange of information supporting the pre-qualification and bidding processes in the Flexibility Services Market.
<b>Related business case(s)</b>	

### 4. Narrative of Use Case

<b>Narrative of use case</b>
<b>Short description</b> <p>The use case describes the process of pre-qualification of the Flexibility Service Providers (aggregators and individual consumption, generation and storage units) and the bidding process ending with the merit order of flexibility bids, which will then be activated by the Primary System Operator (see separate system use case for flexibility activation). Implementation of these processes takes place on the Flexibility Platform (flexibility register), which gathers flexibility needs provided by System Operators as well as flexibility potentials, and registers flexibility bids provided by Flexibility Service Providers.</p> <p>According to EU-SysFlex WP3 suggestion, the function of grid impact assessment and hosting of Grid Validation System could be taken over by Optimisation Operator role from the Primary and Secondary System Operator roles.</p>
<b>Complete description</b> <p style="text-align: center;"><u>Summary of use case</u></p> <ul style="list-style-type: none"> <li><u>Prequalification of the Flexibility Service Providers and their flexibilities</u>  <u>Description:</u> Prequalification of both Flexibility Service Providers themselves and the technical</li> </ul>

feasibility of the flexibility ('product prequalification') as well as the assessment if the flexibilities can cause congestions in the grid ('grid prequalification').

- Publish flexibility need  
Description: Each System Operator defines services and publishes the definition of these services on the flexibility platform.
- Forward flexibility need  
Description:
- Register flexibility need  
Description:
- Publish flexibility potential  
Description: Each Flexibility Service Provider registers its flexibility potential on the Flexibility Platform with respect to the need of a System Operator.
- Forward flexibility potential  
Description:
- Register flexibility potential  
Description:
- Send necessary information for grid impact assessment  
Description: Flexibility Platform sends required level of information necessary for grid impact assessment to the different System Operators concerned (both TSOs and DSOs).  
 This activity leads to registering restrictions if there are congestions. But equally, these congestions could lead to the identification of needs for additional flexibility, feeding back to the early stage. This sort of feedback will be essential to optimizing exploitation of flexibility
- Forward necessary information for grid impact assessment  
Description:
- Assess grid impact  
Description: System Operators assess the impact of flexibility activations in their grid in order to avoid congestions due to these activations.  
 System Operators provide the results of grid impact assessment setting restrictions on the activation of flexibilities which would cause congestion in their grids.
- Forward results of grid impact assessment  
Description:
- Prequalify Flexibility Service Provider  
Description: Based on the information submitted in Flexibility Service Providers' flexibility potential, Flexibility Platform prequalifies the ability of Flexibility Service Providers to deliver flexibility with respect to System Operators' needs.  
 This activity leads to registering restrictions if there are congestions. But equally, these congestions could lead to the identification of needs for additional flexibility, feeding back to the early stage. This sort of feedback will be essential for optimizing exploitation of flexibility.  
 The impact assessment is a continuous process, i.e. even if the potential is prequalified at one point of time, the same potential may be excluded at next point of time. However, only structural congestions should be considered in the prequalification phase and thus new impact assessment is needed only if there is a change in structural congestion.
- Set long-term restrictions  
Description: If the results of grid impact assessment showed that there are congestions identified, then long-term restrictions are set on the Flexibility Platform for such Flexibility Service Provider.



- Register long-term restrictions  
Description:
- Forward the results of prequalification  
Description:
- Publish the results of prequalification with additional restrictions information  
Description:
- Bidding process  
Description: The Flexibility Platform should allow many parallel calls for tender in which  $n$  Flexibility Service Providers offer flexibilities for  $m$  flexibility products, previously defined with System Operators and possibly standardized, and, on the buyers' side, there are  $x$  System Operators looking for the cheapest products.  
This means that it may happen that more than one System Operator will be willing to buy same flexibility. It may also mean that it is not necessarily the cheapest flexibility which would bring highest socio-economic value.  
System Operators mutually coordinate the flexibility buying before the final selection of bids. The Flexibility Platform should therefore have an arbitration mechanism that indicates the System Operator to whom the flexibility will be allocated. This mechanism should take into account the maximum global benefit. This coordination It is out of the scope of this use case.
  - Open the flexibility call for tenders  
Description: A call for tenders of flexibility services relies on specific products and covers specific periods (week ahead, day ahead, intraday, etc.).  
The call for tenders is opened by the Primary System Operator. The Primary System Operator is the operator who needs the flexibility service.
  - Forward flexibility call for tenders opening  
Description:
  - Register flexibility call for tenders opening  
Description: Secondary System Operators and FSPs should receive information about call for tenders opening from via Flexibility Platform (not directly from Primary System Operator).
  - Send flexibility bids  
Description:
  - Forward flexibility bids  
Description:
  - Register flexibility bids  
Description: In addition to flexibility bids received from Flexibility Service Providers, the Flexibility Platform also registers flexibility coming from European/regional/national platforms and systems like MARI, PICASSO or COBA (Common Baltic balancing Area). These platforms are used to collect the bids for some flexibility services (e.g. mFRR). The value of Flexibility Platform is to bring different information together and making it available to different flexibility buyers.  
Flexibility bids are ranked on merit order principle and location.
  - Send necessary information for grid impact assessment  
Description: Flexibility Platform sends required level of information necessary for grid impact assessment to System Operators concerned
  - Forward necessary information for grid impact assessment  
Description: DEP forwards necessary information to both Primary System Operator and Secondary System Operator.

- **Assess primary grid impact**  
Description: Primary System Operator assesses the impact of flexibility activations in its grid in order to avoid congestions due to these activations.  
 Primary System Operator provides the results of grid impact assessment setting restrictions on the activation of flexibilities which would cause congestion in its grids.
- **Forward result of primary grid impact assessment**  
Description:
- **Assess secondary grid impact**  
Description: Secondary System Operator assesses the impact of flexibility activations in its grid in order to avoid congestions due to these activations.  
 Secondary System Operator provides the results of grid impact assessment setting restrictions on the activation of flexibilities which would cause congestion in its grids.
- **Forward result of secondary grid impact assessment**  
Description:
- **Collect the results of grid impact assessment**  
Description: Flexibility Platform collects the results of grid impact assessment of the flexibility bids with respect to grid congestions from all concerned System Operators.  
 This activity leads to registering restrictions if there are congestions. But equally, these congestions could lead to the identification of needs for additional flexibility, feeding back to the early stage. This sort of feedback will be essential to optimize exploitation of flexibility.  
 The impact assessment is a continuous process, i.e. even if the bid is included in a merit order list at one point of time, the same bid may be excluded at next point of time.
- **Set short-term restrictions**  
Description: If the results of grid impact assessment showed that there are congestions identified, then short-term restrictions are set on the Flexibility Platform for such flexibility bids.
- **Rank bids based on the merit order principle**  
Description:
- **Register flexibility bids**  
Description:
- **Close the flexibility call for tenders**  
Description:
- **Forward flexibility call for tenders closure**  
Description:
- **Register flexibility call for tenders closure**  
Description:

## 5. Key performance indicators (KPI)

## 6. Use case conditions

Use case conditions	
Assumptions	
1	Data exchange occurs as a result of business processes. The method of implementing business processes depends on the architecture of the flexibility services market

2	Scenario 2 assumes a call for tenders-based process for matching flexibility bids to demands of flexibility: Alternative market processes, e.g. for real time bid/offer price matching are also possible. A mixed model (e.g. periodic calls for tenders to buy “baseload” flexibility plus a real time spot market) is also feasible.
3	Each System Operator has the same right to participate in the flexibility platform. : The System Operator who initiates the call for tenders is a leading operator. There is no single lead operator. The flexibility platform should accept several parallel calls for tenders initiated by different System Operators.
4	<p>The use case assumes a single market place operated by a Flexibility Platform: 'Single' stands for concept where different flexibility buyers and sellers can trade. According to SmartNet project's conclusion, the «Integrated flexibility market model» should be implemented being similar concept to single Flexibility Platform.</p> <p>Peer-to-peer models are also feasible, e.g. with several individual stakeholders, platforms and inter-platform trading flexibility. This model is very likely to apply at trans-national scale and may be preferred within some national jurisdictions.</p> <p>However, many flexibility platforms with limited access of flexibility buyers and/or sellers lead to market fragmentation, which will reduce their liquidity. We should avoid fragmentation to ensure the maximum liquidity.</p> <p>Nevertheless, we should also take into account the existence of other platforms dealing with reserves, like MARI (in Baltics the analogue is COBA), Picasso and Terre, and foresee a communication with these platforms. A single Flexibility Platform could be a layer over these separate platforms.</p>
5	<p>Scenario 2 assumes flexibility bids can be placed in a single merit order as agreed between the Flexibility Platform and the System Operators: This is true where flexibility is a well-defined commodity/product, but may be more complex when more complex trade-offs of factors such as reliability of service delivery, speed versus scale of response, location, etc., come into play.</p> <p>The prequalification phase may be able to account for this via derating factors and suchlike, or more complex call for tenders designs may be useful in these circumstances.</p>
6	A flexibility market design gathers TSOs and DSOs
<b>Prerequisites</b>	
1	The entry barrier for Flexibility Service Providers should be as low as possible
2	Before entering bidding process scenario, service providers should undergo a process of prequalification and their infrastructure including application should meet technical requirements, the fulfilment of which is a condition for positive certification
3	In some cases, provision for bi-lateral flexibility contracts to be negotiated would be useful, in order to trial new and innovative flexibility products before they can be specified fully for call for tenders
4	Flexibility Service Providers and System Operators need their own applications to connect to the flexibility platform.
5	Communication standards must be established
6	Cross-border effect: Cross-border data exchange and bidding should be enabled if there are opportunities for cross-border energy transfer. This is beneficial due to larger market and increased competition. Standards must be implemented to ensure data exchange.
7	Flexibility Platform holds the information about which Primary System Operator is linked to which Secondary System Operator.
8	<p>Flexibility Service Providers should be prevented from gambling and influencing the load flow to create high revenues for them or for associated flexibilities, whereas the System Operators must manage these congestions and pay for them: To achieve this prerequisite, Flexibility Service Providers only see justified information related to their bids as a result from the grid assessments carried out by Primary System Operators and Secondary System Operators.</p> <p>Clear regulation and surveillance, incl. penalties, should be in place. As a result and for the sake of transparency, as much as possible information should be made available to Flexibility Service Providers, so they can know why their potentials/bids were restricted.</p>
9	In the prequalification process, the grid impact assessment and the grid prequalification follow only if product prequalification (matching the SO's need and FSP's potential) is successful.

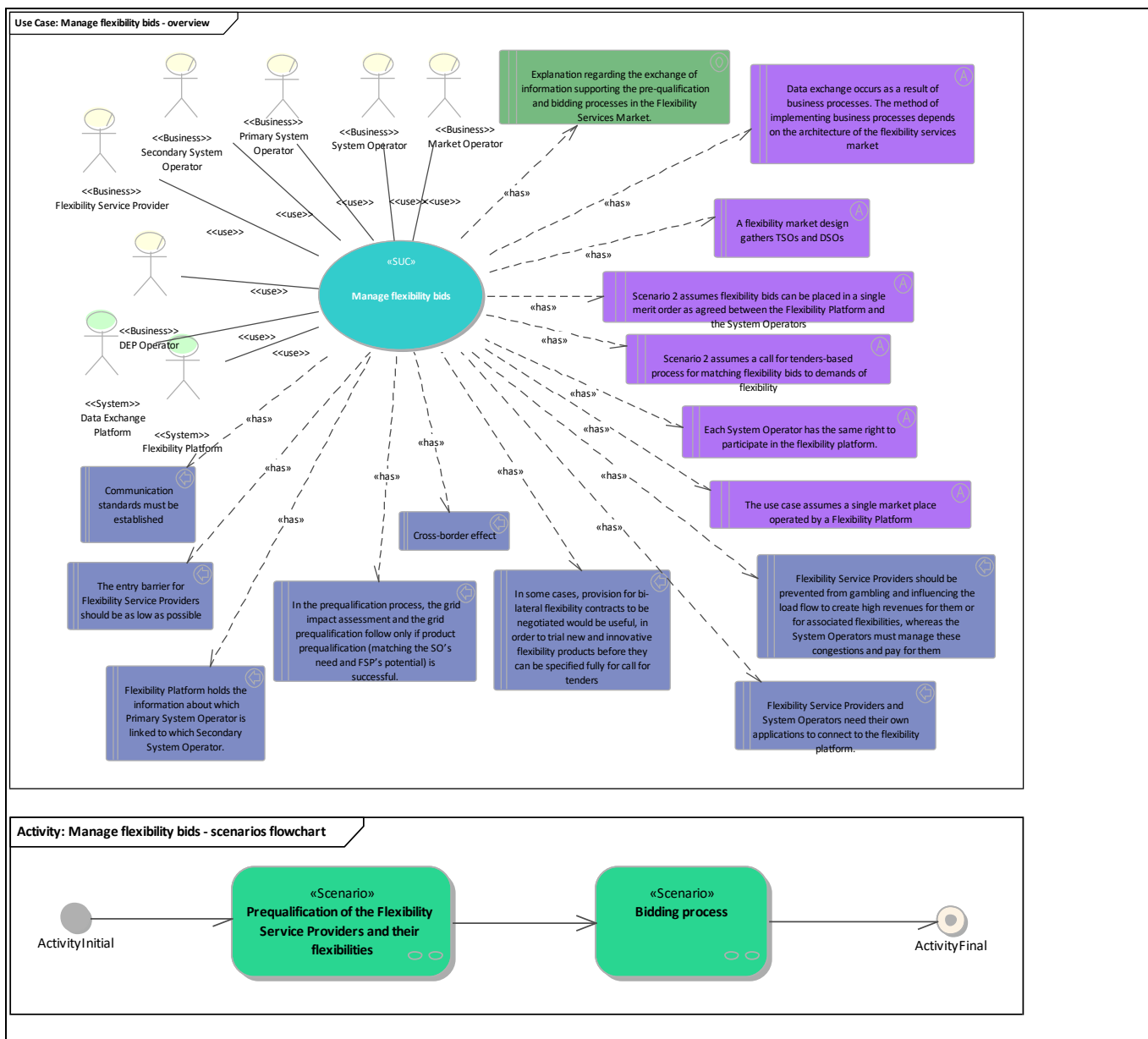
## 7. Further information to the use case for classification/mapping

<i>Classification information</i>
<i>Relation to other use cases</i>
<i>Level of depth</i>
<i>Prioritisation</i>
<i>Generic, regional or national relation</i>
<i>Nature of the use case</i>
SUC
<i>Further keywords for classification</i>

## 8. General remarks

### 2. Diagrams of use case

<i>Diagram(s) of use case</i>
-------------------------------



### 3. Technical details

#### 1. Actors

Actors			
Grouping (e.g. domains, zones)		Group description	
Actor name	Actor type	Actor description	Further information specific to this use case
Market Operator	Business	A market operator is a party that provides a service whereby the offers to sell electricity are matched with bids to buy electricity (cf. ENTSOE-EFET-ebIX harmonized role model 2019). In EU-SysFlex project, a market operator not only trades electricity but also flexibility services.	

		<p>Organize auctions (continuous auctions, discrete auctions, calls for tender) between buyers and sellers of electricity-related products in the markets, and more generally publish the corresponding prices, for assets connected to power grid.</p> <p>Manage/operate the platform for trading (where bids and offers are collected).</p> <p>Clear the market and communicate results.</p> <p>(cf. definition in T3.3 deliverable)</p>	
Flexibility Service Provider	Business	<p>Can be a Distribution Network Flexibility Provider or a Transmission Network Flexibility Provider (cf. definitions in T3.3 deliverable).</p> <p>Similar to Flexibility Aggregator. Can be both aggregator and individual consumer/generator. Type of Energy Service Provider.</p>	
System Operator	Business	<p>System Operator means a natural or legal person responsible for operating, ensuring the maintenance of and, if necessary, developing the system in a given area and, where applicable, its interconnections with other systems, and for ensuring the long-term ability of the system to meet reasonable demands for the distribution or transmission of electricity (cf. ENTSOE-EFET-ebIX harmonized role model 2019). Can be:</p> <ul style="list-style-type: none"> <li>• A Transmission System Operator (cf. definition in T3.3 deliverable), for frequency control, congestion management and voltage control on transmission network,</li> <li>• A Distribution System Operator (cf. definition in T3.3 deliverable), for congestion management and voltage control on distribution network.</li> </ul> <p>NB: In some countries (e.g. Germany and Poland), the high voltage network is part of the distribution grid and in other countries (e.g. France and Italy) the high voltage network is part of the transmission grid.</p> <p>A System Operator can be:</p> <ul style="list-style-type: none"> <li>• A Primary System Operator,</li> <li>• A Secondary System Operator.</li> </ul>	
Secondary System Operator	Business	<p>Operates the power grid on which a flexibility service unit is connected or this unit may otherwise impact its grid. Assesses the impact on its network of the flexibility to be procured because the activation of such flexibility may potentially cause congestion in its grid.</p>	
Primary System Operator	Business	<p>Initiates the call for tenders and initiates the activation of a flexibility. It also can operate the power grid on which a flexibility service unit is connected or this unit may otherwise impact its grid. In this case, it assesses the impact on its network of the flexibility to be procured because the activation of such flexibility may potentially cause congestion in its grid.</p>	
Data Exchange Platform	System	<p>Data exchange platform (DEP) is a communication platform the basic functionality of which is to secure data transfer (routing) from data providers (e.g. data hubs, flexibility service providers, TSOs, DSOs) to the data users (e.g. TSOs, DSOs, consumers, suppliers, energy service providers). DEP stores data related to its services (e.g. cryptographic hash of the data requested). The DEP does not store core energy data (e.g. meter data, grid data, market data) while these data can be stored by data hubs. Several DEPs may exist in different countries and inside one country.</p>	

Flexibility Platform	System	Flexibility Platform (FP) for System Operators and Flexibility Service Providers that enables the trading of different flexibility products and services. A FP is operated by a Market Operator.  Available to System Operators and Flexibility Services Providers. It is used to support the prequalification, the bidding, the activation and the verification processes, ensuring coordination between activities undertaken by several operators using the same flexible resources. Several national and regional FPs may exist.	
Grid Validation System	System	System hosted by Optimisation Operators and used for the power grid congestion assessment, including grid validation if activation will cause congestion.	
Optimisation Operator	Business	Optimise and select the bids, where relevant in combination with switching measures; clear the market for auctions or select individual bids in the order book organised by the MO taking into account the grid data (constraints and sensitivities/topology if needed) provided by DS_O and TS_O ; communicate results (rewarded offers and prices) to the MO. The OO role can be carried out by a system operator, market operator or a third party. (cf. definition in T3.2 deliverable)	
DEP Operator	Business	Data exchange platform operator owns and operates a communication system which basic functionality is data transfer.	

## 2. References

## 4. Step by step analysis of use case

### 1. Overview of scenarios

Scenario conditions						
No.	Scenario name	Scenario description	Primary actor	Triggering event	Pre-condition	Post-condition
1	Prequalification of the Flexibility Service Providers and their flexibilities	Prequalification of both Flexibility Service Providers themselves and the technical feasibility of the flexibility ('product prequalification') as well as the assessment if the flexibilities can cause congestions in the grid ('grid prequalification').			Before entering bidding process scenario, service providers should undergo a process of prequalification and their infrastructure including application should meet technical requirements, the fulfilment of which is a condition for positive certification In some cases, provision for bi-lateral flexibility contracts to be negotiated would be useful, in order to trial new and innovative flexibility products before they can be specified fully for call for tenders The entry barrier for Flexibility Service Providers should be as low as possible Communication standards must be established	



2	Bidding process	<p>The Flexibility Platform should allow many parallel calls for tender in which <math>n</math> Flexibility Service Providers offer flexibilities for <math>m</math> flexibility products, previously defined with System Operators and possibly standardized, and, on the buyers' side, there are <math>x</math> System Operators looking for the cheapest products.</p> <p>This means that it may happen that more than one System Operator will be willing to buy same flexibility. It may also mean that it is not necessarily the cheapest flexibility which would bring highest socio-economic value.</p> <p>System Operators mutually coordinate the flexibility buying before the final selection of bids. The Flexibility Platform should therefore have an arbitration mechanism that indicates the System Operator to whom the flexibility will be allocated. This mechanism should take into account the maximum global benefit. This coordination It is out of the scope of this use case.</p>				
---	-----------------	---	--	--	--	--

## 2. Steps - Scenarios

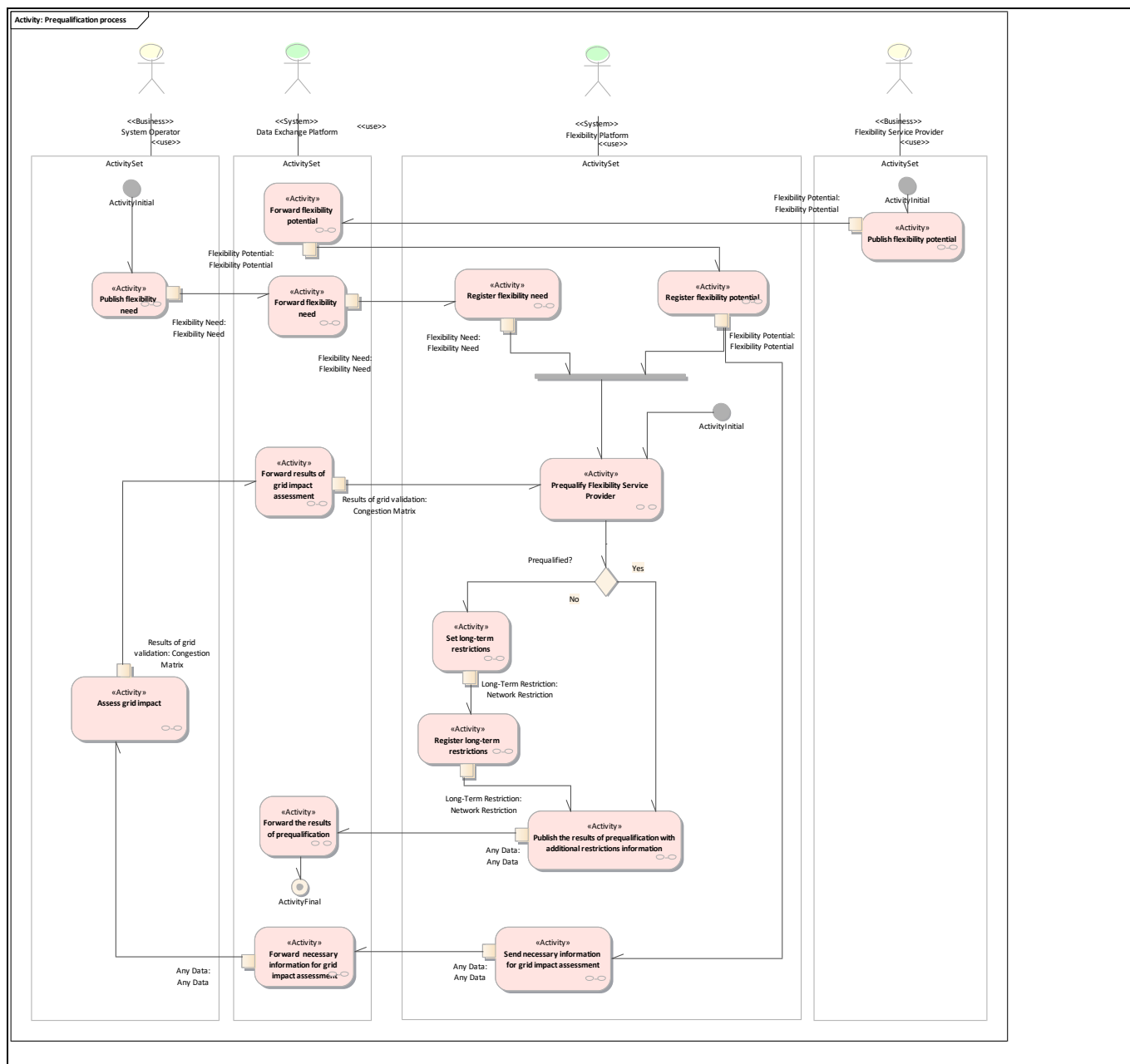
### 1. Prequalification of the Flexibility Service Providers and their flexibilities

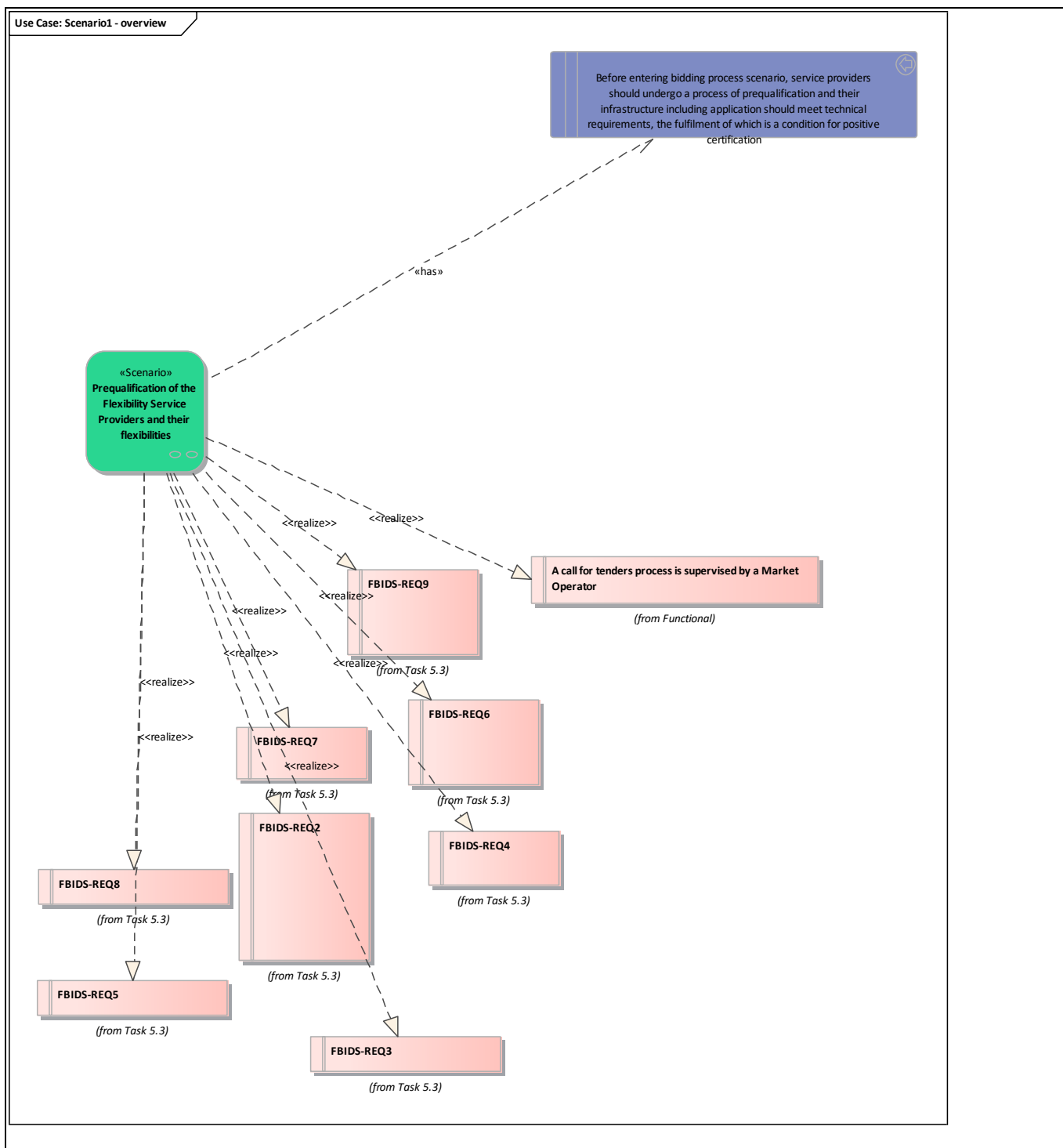
Prequalification of both Flexibility Service Providers themselves and the technical feasibility of the flexibility ('product prequalification') as well as the assessment if the flexibilities can cause congestions in the grid ('grid prequalification').

**Requirement list (refer to "Requirement" section for more information)**

Requirement R-ID	Requirement name
Cat1.Reg1	A call for tenders process is supervised by a Market Operator
Cat2.Reg2	FBIDS-REQ9
Cat2.Reg3	FBIDS-REQ7
Cat2.Reg4	FBIDS-REQ6
Cat2.Reg5	FBIDS-REQ2
Cat2.Reg6	FBIDS-REQ4
Cat2.Reg7	FBIDS-REQ8
Cat2.Reg8	FBIDS-REQ5
Cat2.Reg9	FBIDS-REQ3







## Scenario step by step analysis

Scenario								
Scenario name		Prequalification of the Flexibility Service Providers and their flexibilities						
Step No	Event	Name of process/activity	Description of process/activity	Service	Information producer (actor)	Information receiver (actor)	Information exchanged (IDs)	Requirement, R-IDs

1.1		Publish flexibility need	Each System Operator defines services and publishes the definition of these services on the flexibility platform.		<u>System Operator</u>	<u>Data Exchange Platform</u>	Info1-Flexibility Need	
1.2		Forward flexibility need			<u>Data Exchange Platform</u>	<u>Flexibility Platform</u>	Info1-Flexibility Need	
1.3		Register flexibility need			<u>Flexibility Platform</u>	<u>Flexibility Platform</u>	Info1-Flexibility Need	
1.4		Publish flexibility potential	Each Flexibility Service Provider registers its flexibility potential on the Flexibility Platform with respect to the need of a System Operator.		<u>Flexibility Service Provider</u>	<u>Data Exchange Platform</u>	Info2-Flexibility Potential	
1.5		Forward flexibility potential			<u>Data Exchange Platform</u>	<u>Flexibility Platform</u>	Info2-Flexibility Potential	
1.6		Register flexibility potential			<u>Flexibility Platform</u>	<u>Flexibility Platform, Flexibility Platform</u>	Info2-Flexibility Potential	
1.7		Send necessary information for grid impact assessment	Flexibility Platform sends required level of information necessary for grid impact assessment to the different System Operators concerned (both TSOs and DSOs). This activity leads to registering restrictions if there are congestions. But equally, these congestions could lead to the identification of needs for additional flexibility, feeding back to the early stage. This sort of feedback will be essential to optimizing exploitation of flexibility		<u>Flexibility Platform</u>	<u>Data Exchange Platform</u>	Info3-Any Data	
1.8		Forward necessary information for			<u>Data Exchange Platform</u>	<u>System Operator</u>	Info3-Any Data	

		grid impact assessment						
1.9		Assess grid impact	System Operators assess the impact of flexibility activations in their grid in order to avoid congestions due to these activations. System Operators provide the results of grid impact assessment setting restrictions on the activation of flexibilities which would cause congestion in their grids.		<u>System Operator</u>	<u>Data Exchange Platform</u>	<u>Info4-Congestion Matrix</u>	
1.10		Forward results of grid impact assessment			<u>Data Exchange Platform</u>	<u>Flexibility Platform</u>	<u>Info4-Congestion Matrix</u>	
1.11		Prequalify Flexibility Service Provider	Based on the information submitted in Flexibility Service Providers' flexibility potential, Flexibility Platform prequalifies the ability of Flexibility Service Providers to deliver flexibility with respect to System Operators' needs. This activity leads to registering restrictions if there are congestions. But equally, these congestions could lead to the identification of needs for additional flexibility, feeding back to the early stage. This sort of feedback will be essential for optimizing exploitation of flexibility. The impact assessment is a continuous process, i.e. even if the potential is prequalified at one point of time, the same potential may		<u>Flexibility Platform</u>			

			be excluded at next point of time. However, only structural congestions should be considered in the prequalification phase and thus new impact assessment is needed only if there is a change in structural congestion.					
1.12		Set long-term restrictions	If the results of grid impact assessment showed that there are congestions identified, then long-term restrictions are set on the Flexibility Platform for such Flexibility Service Provider.		<u>Flexibility Platform</u>	<u>Flexibility Platform</u>	Info5-Network Restriction	
1.13		Register long-term restrictions			<u>Flexibility Platform</u>	<u>Flexibility Platform</u>	Info5-Network Restriction	
1.14		Forward the results of prequalification			<u>Data Exchange Platform</u>			
1.15		Publish the results of prequalification with additional restrictions information			<u>Flexibility Platform</u>	<u>Data Exchange Platform</u>	Info3-Any Data	

- 1.1. Publish flexibility need

**Business section: Prequalification of the Flexibility Service Providers and their flexibilities/Publish flexibility need**

Each System Operator defines services and publishes the definition of these services on the flexibility platform.

Information sent:

<b>Business object</b>	<b>Instance name</b>	<b>Instance description</b>
<u>Flexibility Need</u>	Flexibility Need	Products and definitions of these products

- 1.2. Forward flexibility need

**Business section: Prequalification of the Flexibility Service Providers and their flexibilities/Forward flexibility need**

Information sent:

<b>Business object</b>	<b>Instance name</b>	<b>Instance description</b>
<u>Flexibility Need</u>	Flexibility Need	

- 1.3. Register flexibility need

**Business section: Prequalification of the Flexibility Service Providers and their flexibilities/Register flexibility need**

Information sent:

<i>Business object</i>	<i>Instance name</i>	<i>Instance description</i>
Flexibility Need	Flexibility Need	

- 1.4. Publish flexibility potential

**Business section: Prequalification of the Flexibility Service Providers and their flexibilities/Publish flexibility potential**

Each Flexibility Service Provider registers its flexibility potential on the Flexibility Platform with respect to the need of a System Operator.

Information sent:

<i>Business object</i>	<i>Instance name</i>	<i>Instance description</i>
Flexibility Potential	Flexibility Potential	

- 1.5. Forward flexibility potential

**Business section: Prequalification of the Flexibility Service Providers and their flexibilities/Forward flexibility potential**

Information sent:

<i>Business object</i>	<i>Instance name</i>	<i>Instance description</i>
Flexibility Potential	Flexibility Potential	

- 1.6. Register flexibility potential

**Business section: Prequalification of the Flexibility Service Providers and their flexibilities/Register flexibility potential**

Information sent:

<i>Business object</i>	<i>Instance name</i>	<i>Instance description</i>
Flexibility Potential	Flexibility Potential	

- 1.7. Send necessary information for grid impact assessment

**Business section: Prequalification of the Flexibility Service Providers and their flexibilities/Send necessary information for grid impact assessment**

Flexibility Platform sends required level of information necessary for grid impact assessment to the different System Operators concerned (both TSOs and DSOs).

This activity leads to registering restrictions if there are congestions. But equally, these congestions could lead to the identification of needs for additional flexibility, feeding back to the early stage. This sort of feedback will be essential to optimizing exploitation of flexibility

Information sent:

<i>Business object</i>	<i>Instance name</i>	<i>Instance description</i>
------------------------	----------------------	-----------------------------

Any Data	Any Data	
----------	----------	--

- 1.8. Forward necessary information for grid impact assessment

**Business section: Prequalification of the Flexibility Service Providers and their flexibilities/Forward necessary information for grid impact assessment**

Information sent:

<i>Business object</i>	<i>Instance name</i>	<i>Instance description</i>
Any Data	Any Data	

- 1.9. Assess grid impact

**Business section: Prequalification of the Flexibility Service Providers and their flexibilities/Assess grid impact**

System Operators assess the impact of flexibility activations in their grid in order to avoid congestions due to these activations.

System Operators provide the results of grid impact assessment setting restrictions on the activation of flexibilities which would cause congestion in their grids.

Information sent:

<i>Business object</i>	<i>Instance name</i>	<i>Instance description</i>
Congestion Matrix	Results of grid validation	

- 1.10. Forward results of grid impact assessment

**Business section: Prequalification of the Flexibility Service Providers and their flexibilities/Forward results of grid impact assessment**

Information sent:

<i>Business object</i>	<i>Instance name</i>	<i>Instance description</i>
Congestion Matrix	Results of grid validation	

- 1.12. Set long-term restrictions

**Business section: Prequalification of the Flexibility Service Providers and their flexibilities/Set long-term restrictions**

If the results of grid impact assessment showed that there are congestions identified, then long-term restrictions are set on the Flexibility Platform for such Flexibility Service Provider.

Information sent:

<i>Business object</i>	<i>Instance name</i>	<i>Instance description</i>
Network Restriction	Long-Term Restriction	

- 1.13. Register long-term restrictions

**Business section: Prequalification of the Flexibility Service Providers and their flexibilities/Register long-term restrictions**

Information sent:

<b>Business object</b>	<b>Instance name</b>	<b>Instance description</b>
Network Restriction	Long-Term Restriction	

- 1.15. Publish the results of prequalification with additional restrictions information

**Business section: Prequalification of the Flexibility Service Providers and their flexibilities/Publish the results of prequalification with additional restrictions information**

Information sent:

<b>Business object</b>	<b>Instance name</b>	<b>Instance description</b>
Any Data	Any Data	

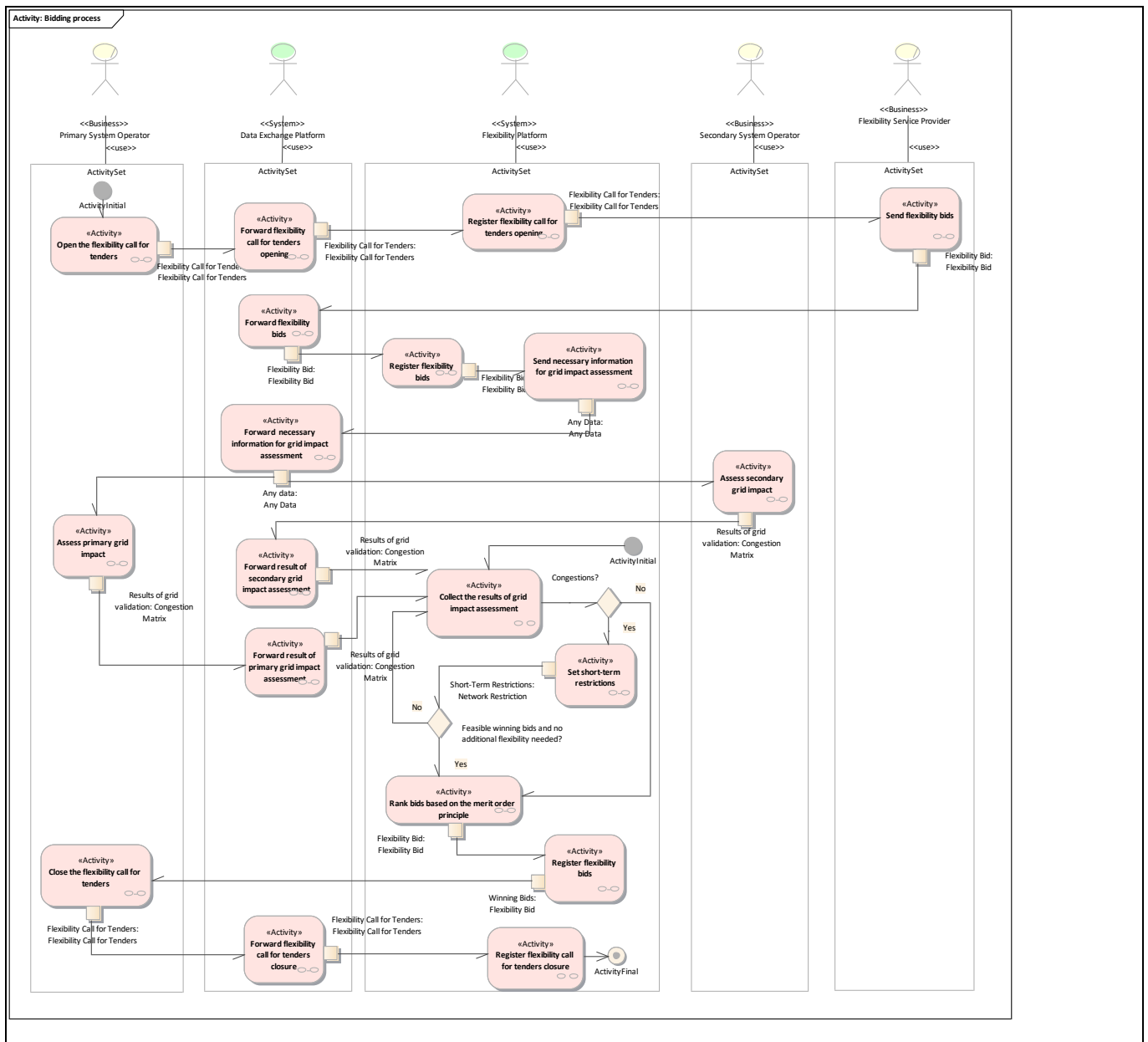
## 2. Bidding process

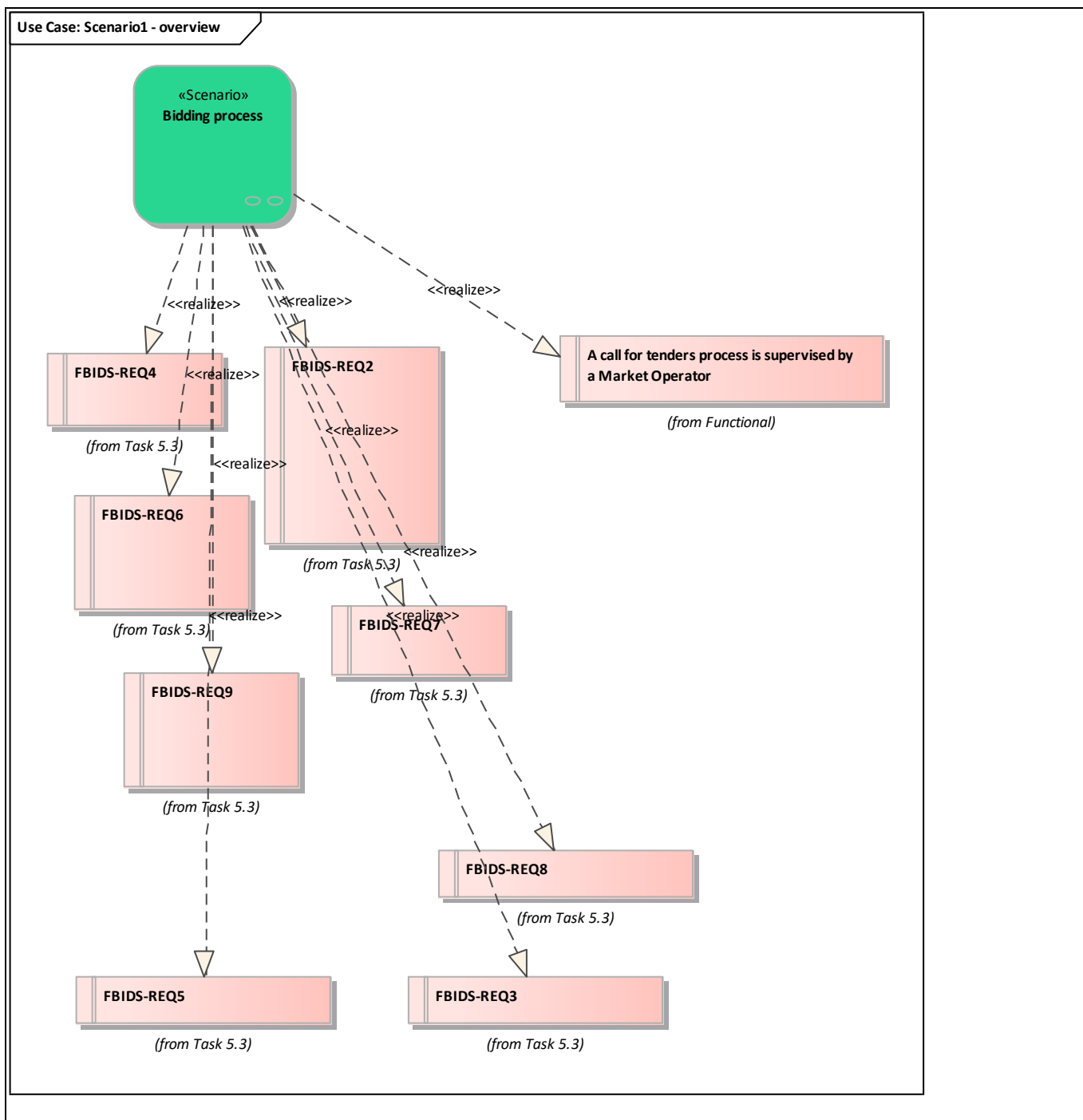
The Flexibility Platform should allow many parallel calls for tender in which  $n$  Flexibility Service Providers offer flexibilities for  $m$  flexibility products, previously defined with System Operators and possibly standardized, and, on the buyers' side, there are  $x$  System Operators looking for the cheapest products. This means that it may happen that more than one System Operator will be willing to buy same flexibility. It may also mean that it is not necessarily the cheapest flexibility which would bring highest socio-economic value.

System Operators mutually coordinate the flexibility buying before the final selection of bids. The Flexibility Platform should therefore have an arbitration mechanism that indicates the System Operator to whom the flexibility will be allocated. This mechanism should take into account the maximum global benefit. This coordination is out of the scope of this use case.

<b>Requirement list (refer to "Requirement" section for more information)</b>	
<b>Requirement R-ID</b>	<b>Requirement name</b>
Cat1.Reg1	A call for tenders process is supervised by a Market Operator
Cat2.Reg6	FBIDS-REQ4
Cat2.Reg5	FBIDS-REQ2
Cat2.Reg4	FBIDS-REQ6
Cat2.Reg2	FBIDS-REQ9
Cat2.Reg3	FBIDS-REQ7
Cat2.Reg7	FBIDS-REQ8
Cat2.Reg8	FBIDS-REQ5
Cat2.Reg9	FBIDS-REQ3







### Scenario step by step analysis

Scenario								
Scenario name		Bidding process						
Step No	Event	Name of process/activity	Description of process/activity	Service	Information producer (actor)	Information receiver (actor)	Information exchanged (IDs)	Requirement, R-IDs

2.1		Open the flexibility call for tenders	A call for tenders of flexibility services relies on specific products and covers specific periods (week ahead, day ahead, intraday, etc.). The call for tenders is opened by the Primary System Operator. The Primary System Operator is the operator who needs the flexibility service.		<u>Primary System Operator</u>	<u>Data Exchange Platform</u>	Info6-Flexibility Call for Tenders	
2.2		Forward flexibility call for tenders opening			<u>Data Exchange Platform</u>	<u>Flexibility Platform</u>	Info6-Flexibility Call for Tenders	
2.3		Register flexibility call for tenders opening	Secondary System Operators and FSPs should receive information about call for tenders opening from via Flexibility Platform (not directly from Primary System Operator).		<u>Flexibility Platform</u>	<u>Flexibility Service Provider</u>	Info6-Flexibility Call for Tenders	
2.4		Send flexibility bids			<u>Flexibility Service Provider</u>	<u>Data Exchange Platform</u>	Info7-Flexibility Bid	
2.5		Forward flexibility bids			<u>Data Exchange Platform</u>	<u>Flexibility Platform</u>	Info7-Flexibility Bid	
2.6		Register flexibility bids	In addition to flexibility bids received from Flexibility Service Providers, the Flexibility Platform also registers flexibility coming from European/regional/national platforms and systems like MARI, PICASSO or COBA (Common Baltic balancing Area). These platforms are used to collect the bids for some flexibility services (e.g. mFRR). The value of Flexibility Platform is to bring different information together and making it available to different flexibility buyers. Flexibility bids are ranked on merit order principle and location.		<u>Flexibility Platform</u>	<u>Flexibility Platform</u>	Info7-Flexibility Bid	
2.7		Send necessary information for grid impact assessment	Flexibility Platform sends required level of information necessary for grid impact assessment to		<u>Flexibility Platform</u>	<u>Data Exchange Platform</u>	Info3-Any Data	

			System Operators concerned					
2.8		Forward necessary information for grid impact assessment	DEP forwards necessary information to both Primary System Operator and Secondary System Operator.		<u>Data Exchange Platform</u>	<u>Primary System Operator, Secondary System Operator</u>	Info3-Any Data	
2.9		Assess primary grid impact	Primary System Operator assesses the impact of flexibility activations in its grid in order to avoid congestions due to these activations. Primary System Operator provides the results of grid impact assessment setting restrictions on the activation of flexibilities which would cause congestion in its grids.		<u>Primary System Operator</u>	<u>Data Exchange Platform</u>	<u>Info4-Congestion Matrix</u>	
2.10		Forward result of primary grid impact assessment			<u>Data Exchange Platform</u>	<u>Flexibility Platform</u>	<u>Info4-Congestion Matrix</u>	
2.11		Assess secondary grid impact	Secondary System Operator assesses the impact of flexibility activations in its grid in order to avoid congestions due to these activations. Secondary System Operator provides the results of grid impact assessment setting restrictions on the activation of flexibilities which would cause congestion in its grids.		<u>Secondary System Operator</u>	<u>Data Exchange Platform</u>	<u>Info4-Congestion Matrix</u>	
2.12		Forward result of secondary grid impact assessment			<u>Data Exchange Platform</u>	<u>Flexibility Platform</u>	<u>Info4-Congestion Matrix</u>	
2.13		Collect the results of grid impact assessment	Flexibility Platform collects the results of grid impact assessment of the flexibility bids with respect to grid congestions from all concerned System Operators. This activity leads to registering restrictions if there are congestions. But equally, these congestions could lead to the identification of needs for additional flexibility,		<u>Flexibility Platform</u>			

			feeding back to the early stage. This sort of feedback will be essential to optimize exploitation of flexibility. The impact assessment is a continuous process, i.e. even if the bid is included in a merit order list at one point of time, the same bid may be excluded at next point of time.					
2.14		Set short-term restrictions	If the results of grid impact assessment showed that there are congestions identified, then short-term restrictions are set on the Flexibility Platform for such flexibility bids.		<u>Flexibility Platform</u>	<u>Flexibility Platform</u> , <u>Flexibility Platform</u>	Info5- Network Restriction	
2.15		Rank bids based on the merit order principle			<u>Flexibility Platform</u>	<u>Flexibility Platform</u>	Info7- Flexibility Bid	<u>Cat1.Reg10</u>
2.16		Register flexibility bids			<u>Flexibility Platform</u>	<u>Primary System Operator</u>	Info7- Flexibility Bid	
2.17		Close the flexibility call for tenders			<u>Primary System Operator</u>	<u>Data Exchange Platform</u>	Info6- Flexibility Call for Tenders	
2.18		Forward flexibility call for tenders closure			<u>Data Exchange Platform</u>	<u>Flexibility Platform</u>	Info6- Flexibility Call for Tenders	
2.19		Register flexibility call for tenders closure			<u>Flexibility Platform</u>			

- 2.1. Open the flexibility call for tenders

**Business section: Bidding process/Open the flexibility call for tenders**

A call for tenders of flexibility services relies on specific products and covers specific periods (week ahead, day ahead, intraday, etc).

The call for tenders is opened by the Primary System Operator. The Primary System Operator is the operator who needs the flexibility service.

Information sent:

<b><i>Business object</i></b>	<b><i>Instance name</i></b>	<b><i>Instance description</i></b>
Flexibility Call for Tenders	Flexibility Call for Tenders	

- 2.2. Forward flexibility call for tenders opening

**Business section: Bidding process/Forward flexibility call for tenders opening**

Information sent:

<b>Business object</b>	<b>Instance name</b>	<b>Instance description</b>
Flexibility Call for Tenders	Flexibility Call for Tenders	

- 2.3. Register flexibility call for tenders opening

**Business section: Bidding process/Register flexibility call for tenders opening**

Secondary System Operators and FSPs should receive information about call for tenders opening from via Flexibility Platform (not directly from Primary System Operator).

Information sent:

<b>Business object</b>	<b>Instance name</b>	<b>Instance description</b>
Flexibility Call for Tenders	Flexibility Call for Tenders	

- 2.4. Send flexibility bids

**Business section: Bidding process/Send flexibility bids**

Information sent:

<b>Business object</b>	<b>Instance name</b>	<b>Instance description</b>
Flexibility Bid	Flexibility Bid	

- 2.5. Forward flexibility bids

**Business section: Bidding process/Forward flexibility bids**

Information sent:

<b>Business object</b>	<b>Instance name</b>	<b>Instance description</b>
Flexibility Bid	Flexibility Bid	

- 2.6. Register flexibility bids

**Business section: Bidding process/Register flexibility bids**

In addition to flexibility bids received from Flexibility Service Providers, the Flexibility Platform also registers flexibility coming from European/regional/national platforms and systems like MARI, PICASSO or COBA (Common Baltic balancing Area). These platforms are used to collect the bids for some flexibility services (e.g. mFRR). The value of Flexibility Platform is to bring different information together and making it available to different flexibility buyers.

Flexibility bids are ranked on merit order principle and location.

Information sent:

<b>Business object</b>	<b>Instance name</b>	<b>Instance description</b>
Flexibility Bid	Flexibility Bid	

- 2.7. Send necessary information for grid impact assessment

**Business section: Bidding process/Send necessary information for grid impact assessment**

Flexibility Platform sends required level of information necessary for grid impact assessment to System Operators concerned

Information sent:

<b>Business object</b>	<b>Instance name</b>	<b>Instance description</b>
Any Data	Any Data	

- 2.8. Forward necessary information for grid impact assessment

**Business section: Bidding process/Forward necessary information for grid impact assessment**

DEP forwards necessary information to both Primary System Operator and Secondary System Operator.  
Information sent:

<b>Business object</b>	<b>Instance name</b>	<b>Instance description</b>
Any Data	Any data	

- 2.9. Assess primary grid impact

**Business section: Bidding process/Assess primary grid impact**

Primary System Operator assesses the impact of flexibility activations in its grid in order to avoid congestions due to these activations.

Primary System Operator provides the results of grid impact assessment setting restrictions on the activation of flexibilities which would cause congestion in its grids.

Information sent:

<b>Business object</b>	<b>Instance name</b>	<b>Instance description</b>
Congestion Matrix	Results of grid validation	

- 2.10. Forward result of primary grid impact assessment

**Business section: Bidding process/Forward result of primary grid impact assessment**

Information sent:

<b>Business object</b>	<b>Instance name</b>	<b>Instance description</b>
Congestion Matrix	Results of grid validation	

- 2.11. Assess secondary grid impact

**Business section: Bidding process/Assess secondary grid impact**

Secondary System Operator assesses the impact of flexibility activations in its grid in order to avoid congestions due to these activations.

Secondary System Operator provides the results of grid impact assessment setting restrictions on the activation of flexibilities which would cause congestion in its grids.

Information sent:

<b>Business object</b>	<b>Instance name</b>	<b>Instance description</b>
Congestion Matrix	Results of grid validation	

- 2.12. Forward result of secondary grid impact assessment

**Business section: Bidding process/Forward result of secondary grid impact assessment**

Information sent:

<b>Business object</b>	<b>Instance name</b>	<b>Instance description</b>
------------------------	----------------------	-----------------------------

Congestion Matrix	Results of grid validation	
-------------------	----------------------------	--

- 2.14. Set short-term restrictions

**Business section: Bidding process/Set short-term restrictions**

If the results of grid impact assessment showed that there are congestions identified, then short-term restrictions are set on the Flexibility Platform for such flexibility bids.

Information sent:

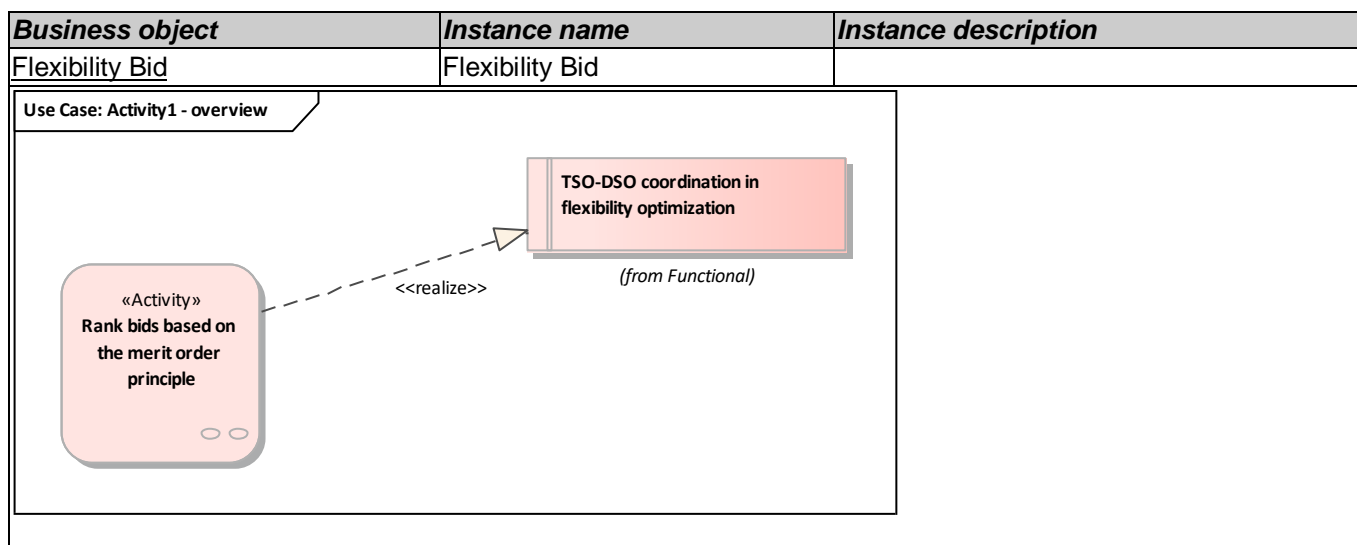
Business object	Instance name	Instance description
Network Restriction	Short-Term Restrictions	

- 2.15. Rank bids based on the merit order principle

**Business section: Bidding process/Rank bids based on the merit order principle**

Requirement list (refer to "Requirement" section for more information)	
Requirement R-ID	Requirement name
Cat1.Reg10	TSO-DSO coordination in flexibility optimisation

Information sent:



- 2.16. Register flexibility bids

**Business section: Bidding process/Register flexibility bids**

Information sent:

Business object	Instance name	Instance description
Flexibility Bid	Winning Bids	

- 2.17. Close the flexibility call for tenders



### **Business section: Bidding process/Close the flexibility call for tenders**

Information sent:

<b>Business object</b>	<b>Instance name</b>	<b>Instance description</b>
Flexibility Call for Tenders	Flexibility Call for Tenders	

- 2.18. Forward flexibility call for tenders closure

### **Business section: Bidding process/Forward flexibility call for tenders closure**

Information sent:

<b>Business object</b>	<b>Instance name</b>	<b>Instance description</b>
Flexibility Call for Tenders	Flexibility Call for Tenders	

## **5. Information exchanged**

<b>Information exchanged</b>			
<b>Information exchanged, ID</b>	<b>Name of information</b>	<b>Description of information exchanged</b>	<b>Requirement, R-IDs</b>
Info1	Flexibility Need		
Info2	Flexibility Potential		
Info3	Any Data		
Info4	Congestion Matrix	Congestion matrices are provided by System Operators and stored in Flexibility Platforms. It consists in a matrix based on grid models. Flexibility bids are inserted into the matrix, in order to check whether congestions would occur.	
Info5	Network Restriction		
Info6	Flexibility Call for Tenders		
Info7	Flexibility Bid		

## **6. Requirements (optional)**

<b>Requirements (optional)</b>		
<b>Categories ID</b>	<b>Category name for requirements</b>	<b>Category description</b>
Cat1	Functional	Functional requirements
<b>Requirement R-ID</b>	<b>Requirement name</b>	<b>Requirement description</b>
Req1	A call for tenders process is supervised by a Market Operator	
Req10	TSO-DSO coordination in flexibility optimisation	Flexibilities must be studied and validated by TSOs and DSOs in a coordinated manner before activation requests can be submitted to Flexibility Service Providers.
<b>Requirements (optional)</b>		
<b>Categories ID</b>	<b>Category name for requirements</b>	<b>Category description</b>

Cat2	Task 5.3	Requirements integrated from Task 5.3.
<b>Requirement R-ID</b>	<b>Requirement name</b>	<b>Requirement description</b>
Req2	FBIDS-REQ9	Calculation of grid impacts (congestion, imbalance)
Req3	FBIDS-REQ7	Selection of successful bids
Req4	FBIDS-REQ6	Flexibility platform's ability to collect bids from FSPs
Req5	FBIDS-REQ2	Ability to exchange information on System Operators' flexibility need and FSPs' flexibility potential through flexibility platform (and DEP)
Req6	FBIDS-REQ4	Algorithm for prequalification of flexibility providers
Req7	FBIDS-REQ8	Flexibility platform's ability to collect grid validation results from SOs
Req8	FBIDS-REQ5	Automated exchange of bids is possible
Req9	FBIDS-REQ3	Auction process supervised by Market Operator

## 7. Common terms and definitions

## 8. Custom information (optional)

### 9.13 MANAGE FLEXIBILITY BIDS - ALTERNATIVE 2

## Manage flexibility bids - Alternative 2

Based on IEC 62559-2 edition 1  
Generated from UML Use Case Repository with Modsarus® (EDF R&D Tool)

### 1. Description of the use case

#### 1. Name of use case

<b>Use case identification</b>		
<b>ID</b>	<b>Area(s)/Domain(s)/Zone(s)</b>	<b>Name of use case</b>
	Market for flexibilities	Manage flexibility bids - Alternative 2

#### 2. Version management

<b>Version management</b>				
<b>Version No.</b>	<b>Date</b>	<b>Name of author(s)</b>	<b>Changes</b>	<b>Approval status</b>
1	2019-09-02	Wiebke Albers (innogy SE)	alternative SUC	
2	2020-06-16	Eric Suignard (EDF)	innogy's and Elering's review	

#### 3. Scope and objectives of use case

<b>Scope and objectives of use case</b>	
<b>Scope</b>	Describing the pre-qualification and bidding processes on the flexibility services market and defining required data flow to support management of pre-qualification of Flexibility Service Providers and management of flexibility bids.
<b>Objective(s)</b>	Explanation regarding the exchange of information supporting the pre-qualification and bidding processes in the Flexibility Services Market.

<b>Related business case(s)</b>	
---------------------------------	--

#### 4. Narrative of Use Case

<b>Narrative of use case</b>	
<b>Short description</b>	
<p>The use case describes the process of pre-qualification of the Flexibility Service Providers (aggregators and individual consumption, generation and storage units) and the bidding process ending with the selection of flexibility bids, leading to the initiation of activation in case of energy bids or the reservation of capacity in case of capacity bids. Implementation of these processes takes place on the Flexibility Platform (flexibility register), which gathers flexibility needs provided by System Operators as well as flexibility potentials, and registers flexibility bids provided by Flexibility Service Providers.</p> <p>According to EU-SysFlex WP3 suggestion, the function of grid impact assessment and hosting of Grid Validation System could be taken over by Optimisation Operator role from the Primary and Secondary System Operator roles.</p>	
<b>Complete description</b>	
<p style="text-align: center;"><u>Summary of use case</u></p> <ul style="list-style-type: none"> <li> <u>Prequalification of the Flexibility Service Providers and their flexibilities</u>  <u>Description:</u> Prequalification of both Flexibility Service Providers themselves and the technical feasibility of the flexibility ('product prequalification') as well as the assessment if the flexibilities can cause congestions in the grid ('grid prequalification').           <ul style="list-style-type: none"> <li>               Publish prequalification criteria  <u>Description:</u> Each System Operator defines services and publishes the definition of these services on the flexibility platform.             </li> <li>               Publish flexibility potential  <u>Description:</u> Each Flexibility Service Provider registers its flexibility potential on the Flexibility Platform with respect to the need of a System Operator.             </li> <li>               Forward prequalification criteria  <u>Description:</u> </li> <li>               Register prequalification criteria  <u>Description:</u> </li> <li>               Forward flexibility potential  <u>Description:</u> </li> <li>               Register flexibility potential  <u>Description:</u> </li> <li>               Initiate Prequalification of Flexibility Service Provider (product and provider prequalification)  <u>Description:</u> Based on the information submitted in Flexibility Service Providers' flexibility potential, Flexibility Platform prequalifies the ability of Flexibility Service Providers to deliver flexibility with respect to System Operators' needs.             </li> <li>               Send necessary information for grid impact assessment  <u>Description:</u> Flexibility Platform sends required level of information necessary for grid impact assessment to the different System Operators concerned (both TSOs and DSOs). This activity leads to registering whether grid assessment is necessary during the bidding phase in case of balancing products.             </li> </ul> </li> </ul>	

- Compare prequalification criteria and flexibility potential  
Description:
- Forward necessary information for grid impact assessment  
Description:
- Assess grid impact (grid prequalification)  
Description: Secondary System Operators assess the impact of flexibility activations in their grid in order to avoid congestions due to these activations.  
Secondary System Operators provide the results of grid impact assessment to the Primary System Operator setting the need for asking the Secondary System Operator for grid impact assessment during the bidding/procurement phase.
- Registers secondary grid assessment results (grid prequalification)  
Description: The PSO registers whether the flexibility in the SSO grid can be procured and activated in a certain time frame or whether for every procurement/activation the grid impact assessment of SSO has to be taken into account.
- Send the results of prequalification to FSP and PSO  
Description:
- Forward the results of product prequalification  
Description:
- Receive results of product prequalification  
Description:
- Receive product and provider prequalification results  
Description:
- Bidding process  
Description: The Flexibility Platform should allow many parallel calls for tender in which  $n$  Flexibility Service Providers offer flexibilities for  $m$  flexibility products, previously defined with System Operators and possibly standardized, and, on the buyers' side, there are  $x$  System Operators looking for the cheapest products.  
This means that it may happen that more than one System Operator will be willing to buy same flexibility. It may also mean that it is not necessarily the cheapest flexibility which would bring highest socio-economic value.  
System Operators mutually coordinate the flexibility buying before the final selection of bids. This coordination is out of the scope of this use case.
- Open the flexibility call for tenders  
Description: A call for tenders of flexibility services relies on specific products and covers specific periods (week ahead, day ahead, intraday, etc.).  
The call for tenders is opened by the Primary System Operator. The Primary System Operator is the operator who needs the flexibility service.
- Register flexibility call for tenders opening  
Description: Secondary System Operators and FSPs should receive information about call for tenders opening from via Flexibility Platform (not directly from Primary System Operator).
- Send flexibility bids  
Description:
- Forward flexibility bids  
Description:

- Register flexibility bids  
Description: In addition to flexibility bids received from Flexibility Service Providers, the Flexibility Platform also registers flexibility coming from European/regional/national platforms and systems like MARI, PICASSO or COBA (Common Baltic balancing Area). These platforms are used to collect the bids for some flexibility services (e.g. mFRR). The value of Flexibility Platform is to bring different information together and making it available to different flexibility buyers. Flexibility bids are ranked on merit order principle and location.
- Rank bids based on merit order principle and location  
Description: Locational ranking principles to be agreed between Primary System Operator and Flexibility Platform.
- Send flexibility bids from Flexibility Platform to Secondary system operator  
Description: Flexibility Platform sends flexibility bids from Flexibility Platform to Secondary system operator via DEP.
- Assess secondary grid impact and cluster flexibility bids (according to PSO/SSO agreement)  
Description: Secondary System Operator performs grid impact assessment of bids to avoid congestions in its grid.  
If order book was opened for congestion management, Secondary System Operator informs Primary System Operator about the efficiency of the flexibilities to solve their congestions (sensitivities).  
Additionally, bids in the SSO grid are being clustered according to the criteria (e.g. cost minimization for PSO based on close to real time grid situation) agreed by the PSO and SSO. SSO sends results to PSO.
- Select flexibility bid or cluster and close the flexibility call for tenders  
Description: PSO selects the bid or cluster that serves the need based on the merit order list provided by the FP. With the bid selection the call for tender is closed.
- Decluster selected flexibility bid cluster and inform FP and PSO  
Description: Secondary System Operator declusters flexibility bid cluster and selects best flexibilities. SSO informs FP and PSO
- Register flexibility bid selection  
Description:
- Forward Flexibility bid selection to FP  
Description:
- Register flexibility bid selection and call for tenders closure  
Description:

## 5. Key performance indicators (KPI)

## 6. Use case conditions

Use case conditions	
Assumptions	
1	Scenario 2 assumes a call for tenders-based process for matching flexibility bids to demands of flexibility: Alternative market processes, e.g. for real time bid/offer price matching are also possible. A mixed model (e.g. periodic calls for tenders to buy “baseload” flexibility plus a real time spot market) is also feasible.
2	PSO and SSO define the framework for clustering bids, such as based on which criteria (e.g. price and sensitivity) and within which range. : Clustering leads to more cost-efficient bid selection since there can be a

	time gap between the need of the PSO to know the flexibility potential in underlying grids and the final bid selection/bid activation. Due to this time gap, the underlying grid situation can change so that finally the SSO can decide on which bid to select in order to cope with the changed grid situation. The advantage is the reduction of bid limitations by the SSO.
3	Grid prequalification is carried out to check whether a flexibility can cause a new congestion in the grid. : If this is the case, the bidding/procurement process can be eased by avoiding this check in case of the use of the flexibility for balancing purposes.
4	Grid prequalification only makes sense if the SSO's grid assessment during the following bidding phase can be avoided. : For congestion management products, current sensitivities (mainly depending on switching procedures) are necessary so that the SSO grid assessment is always necessary.
5	Scenario 2 assumes that the flexibility platform runs an order book where system operators can select the appropriate bids to fulfil their needs depending on where the flexibility is connected to. : It might be possible that the flexibility platform ranks the bids based on price and location as stated by the PSO in the call for tender. However, it is up to the PSO to select the individual bids or cluster of bids based on its individual needs (e.g. best sensitivity of a bid towards a congestion) and the information received by the SSO (limitations, sensitivities).
6	The use case assumes a single market place operated by a Flexibility Platform: 'Single' stands for concept where different flexibility buyers and sellers can trade. However, flexibility platforms are part of the competitive domain, so that also many different flexibility platforms could exist next to each other, whereas competition leads to the most efficient solution. Especially, since the challenges of the future electricity system lie in local congestions, decentralised flexibility platforms could also be a solution.
7	Each System Operator has the same right to participate in the flexibility platform: The System Operator who initiates the call for tenders is a leading operator. There is no single lead operator. The flexibility platform should accept several parallel calls for tenders initiated by different System Operators. The scenarios do not depict how synergies across system operators are lifted.
8	A flexibility market design gathers TSOs and DSOs
9	Data exchange occurs as a result of business processes. The method of implementing business processes depends on the architecture of the flexibility services market
<b>Prerequisites</b>	
1	Flexibility Service Providers should be prevented from gambling and influencing the load flow to create high revenues for them or for associated flexibilities, whereas the System Operators must manage these congestions and pay for them: To achieve this prerequisite, Flexibility Service Providers as a default do not see the reason for being selected. However, it can be possible to publish aggregated historical information to incentivize the offering of flexibility bids. Regulators might be able to review samples of bid selections to ensure the non-discriminatory selection by system operators.
2	Flexibility Service Providers and System Operators need their own applications to connect to the flexibility platform.
3	In some cases, provision for bi-lateral flexibility contracts to be negotiated would be useful, in order to trial new and innovative flexibility products before they can be specified fully for call for tenders
4	Before entering bidding process scenario, service providers should undergo a process of prequalification and their infrastructure including application should meet technical requirements, the fulfilment of which is a condition for positive certification
5	Flexibility Platform holds the information about which Primary System Operator is linked to which Secondary System Operator.: However, this information does not include the current switching state of individual grid assets.
6	The entry barrier for Flexibility Service Providers should be as low as possible
7	Communication standards must be established
8	In the prequalification process, the grid impact assessment and the grid prequalification follow only if product prequalification (matching the SO's need and FSP's potential) is successful.

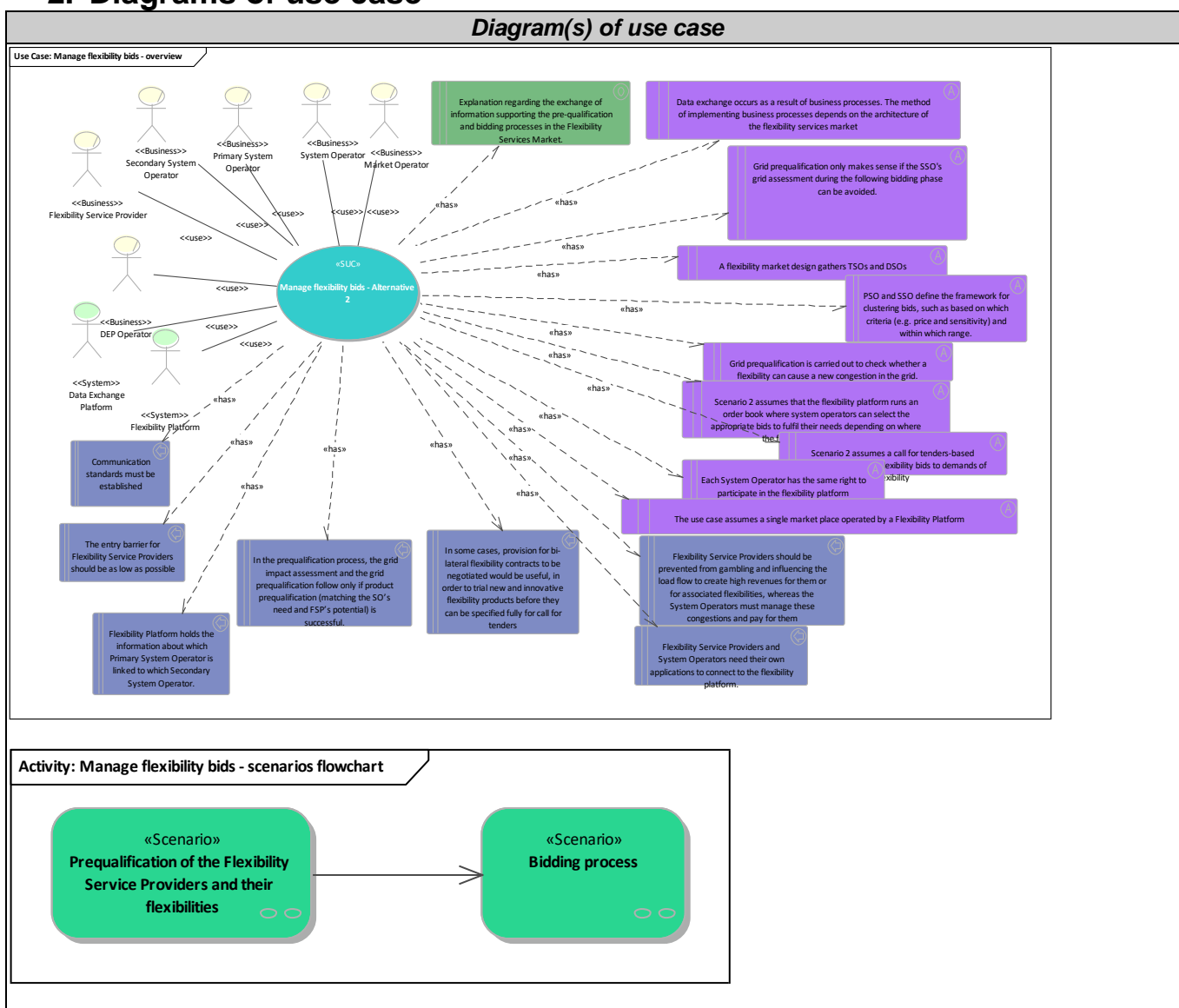
## 7. Further information to the use case for classification/mapping

<b>Classification information</b>
<b>Relation to other use cases</b>
<b>Level of depth</b>
<b>Prioritisation</b>

<b>Generic, regional or national relation</b>
<b>Nature of the use case</b>
SUC
<b>Further keywords for classification</b>

## 8. General remarks

### 2. Diagrams of use case



### 3. Technical details

#### 1. Actors

Actors	
Grouping (e.g. domains, zones)	Group description



<b>Actor name</b>	<b>Actor type</b>	<b>Actor description</b>	<b>Further information specific to this use case</b>
Grid Validation System	System	System hosted by Optimisation Operators and used for the power grid congestion assessment, including grid validation if activation will cause congestion.	
Primary System Operator	Business	Initiates the call for tenders and initiates the activation of a flexibility. It also can operate the power grid on which a flexibility service unit is connected or this unit may otherwise impact its grid. In this case, it assesses the impact on its network of the flexibility to be procured because the activation of such flexibility may potentially cause congestion in its grid.	
Market Operator	Business	A market operator is a party that provides a service whereby the offers to sell electricity are matched with bids to buy electricity (cf. ENTSOE-EFET-ebIX harmonized role model 2019). In EU-SysFlex project, a market operator not only trades electricity but also flexibility services. Organize auctions (continuous auctions, discrete auctions, calls for tender) between buyers and sellers of electricity-related products in the markets, and more generally publish the corresponding prices, for assets connected to power grid. Manage/operate the platform for trading (where bids and offers are collected). Clear the market and communicate results. (cf. definition in T3.3 deliverable)	
Secondary System Operator	Business	Operates the power grid on which a flexibility service unit is connected or this unit may otherwise impact its grid. Assesses the impact on its network of the flexibility to be procured because the activation of such flexibility may potentially cause congestion in its grid.	
Flexibility Platform	System	Flexibility Platform (FP) for System Operators and Flexibility Service Providers that enables the trading of different flexibility products and services. A FP is operated by a Market Operator.  Available to System Operators and Flexibility Services Providers. It is used to support the prequalification, the bidding, the activation and the verification processes, ensuring coordination between activities undertaken by several operators using the same flexible resources. Several national and regional FPs may exist.	
Flexibility Service Provider	Business	Can be a Distribution Network Flexibility Provider or a Transmission Network Flexibility Provider (cf. definitions in T3.3 deliverable). Similar to Flexibility Aggregator. Can be both aggregator and individual consumer/generator. Type of Energy Service Provider.	
System Operator	Business	System Operator means a natural or legal person responsible for operating, ensuring the maintenance of and, if necessary, developing the system in a given area and, where applicable, its interconnections with other systems, and for ensuring the long-term ability of the system to meet reasonable demands for the distribution or transmission of electricity (cf. ENTSOE-EFET-ebIX harmonized role model 2019). Can be: <ul style="list-style-type: none"> <li>• A Transmission System Operator (cf. definition in T3.3 deliverable), for frequency control, congestion management and voltage control on transmission network,</li> </ul>	



		<ul style="list-style-type: none"> <li>A Distribution System Operator (cf. definition in T3.3 deliverable), for congestion management and voltage control on distribution network.</li> </ul> <p>NB: In some countries (e.g. Germany and Poland), the high voltage network is part of the distribution grid and in other countries (e. g. France and Italy) the high voltage network is part of the transmission grid.</p> <p>A System Operator can be:</p> <ul style="list-style-type: none"> <li>A Primary System Operator,</li> <li>A Secondary System Operator.</li> </ul>	
Data Exchange Platform	System	Data exchange platform (DEP) is a communication platform the basic functionality of which is to secure data transfer (routing) from data providers (e.g. data hubs, flexibility service providers, TSOs, DSOs) to the data users (e.g. TSOs, DSOs, consumers, suppliers, energy service providers). DEP stores data related to its services (e.g. cryptographic hash of the data requested). The DEP does not store core energy data (e.g. meter data, grid data, market data) while these data can be stored by data hubs. Several DEPs may exist in different countries and inside one country.	
Optimisation Operator	Business	Optimise and select the bids, where relevant in combination with switching measures; clear the market for auctions or select individual bids in the order book organised by the MO taking into account the grid data (constraints and sensitivities/topology if needed) provided by DS_O and TS_O ; communicate results (rewarded offers and prices) to the MO. The OO role can be carried out by a system operator, market operator or a third party. (cf. definition in T3.2 deliverable)	
DEP Operator	Business	Data exchange platform operator owns and operates a communication system which basic functionality is data transfer.	

## 2. References

### 4. Step by step analysis of use case

#### 1. Overview of scenarios

Scenario conditions						
No.	Scenario name	Scenario description	Primary actor	Triggering event	Pre-condition	Post-condition
1	Prequalification of the Flexibility Service Providers and their flexibilities	Prequalification of both Flexibility Service Providers themselves and the technical feasibility of the flexibility ('product prequalification') as well as the assessment if the flexibilities can cause congestions in the grid ('grid prequalification').			Before entering bidding process scenario, service providers should undergo a process of prequalification and their infrastructure including application should meet technical requirements, the fulfilment of which is a condition for positive certification In some cases, provision for bi-lateral flexibility contracts to be negotiated	

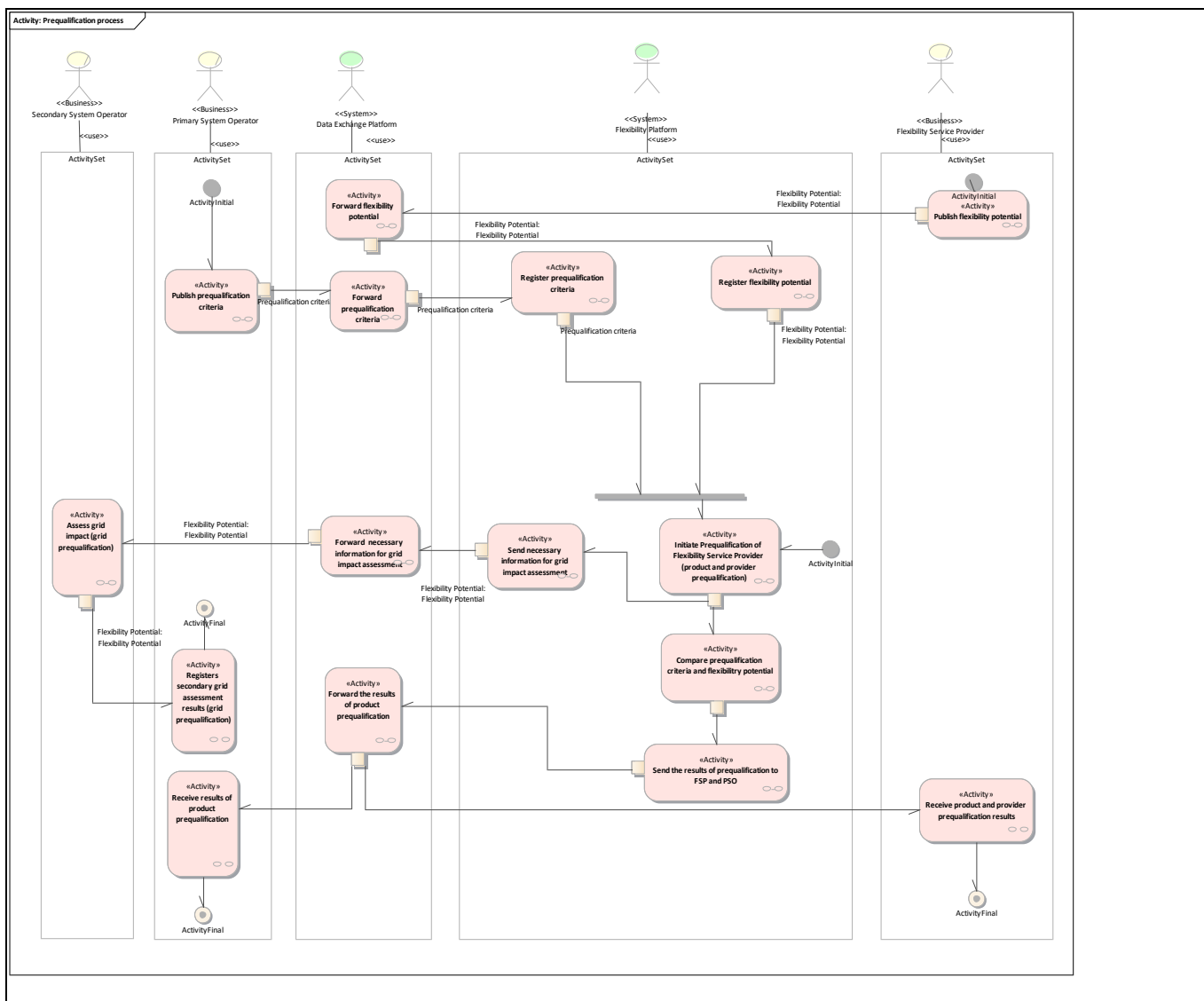
					would be useful, in order to trial new and innovative flexibility products before they can be specified fully for call for tenders The entry barrier for Flexibility Service Providers should be as low as possible Communication standards must be established	
2	Bidding process	<p>The Flexibility Platform should allow many parallel calls for tender in which <math>n</math> Flexibility Service Providers offer flexibilities for <math>m</math> flexibility products, previously defined with System Operators and possibly standardized, and, on the buyers' side, there are <math>x</math> System Operators looking for the cheapest products.</p> <p>This means that it may happen that more than one System Operator will be willing to buy same flexibility. It may also mean that it is not necessarily the cheapest flexibility which would bring highest socio-economic value.</p> <p>System Operators mutually coordinate the flexibility buying before the final selection of bids. This coordination is out of the scope of this use case.</p>				

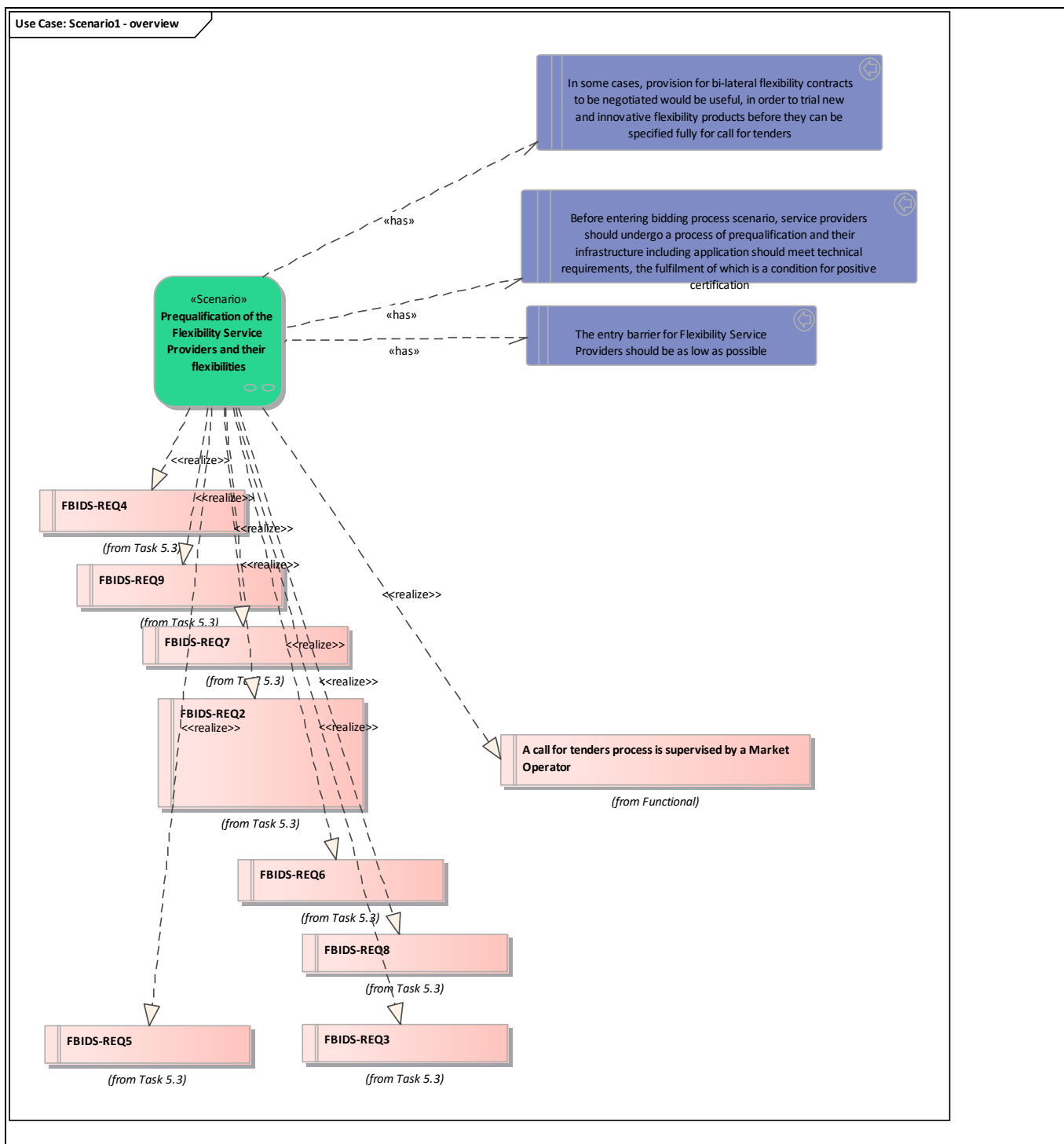
## 2. Steps - Scenarios

### 1. Prequalification of the Flexibility Service Providers and their flexibilities

Prequalification of both Flexibility Service Providers themselves and the technical feasibility of the flexibility ('product prequalification') as well as the assessment if the flexibilities can cause congestions in the grid ('grid prequalification').

Requirement list (refer to "Requirement" section for more information)	
Requirement R-ID	Requirement name
Cat1.Reg1	A call for tenders process is supervised by a Market Operator
Cat2.Reg2	FBIDS-REQ4
Cat2.Reg3	FBIDS-REQ9
Cat2.Reg4	FBIDS-REQ7
Cat2.Reg5	FBIDS-REQ2
Cat2.Reg6	FBIDS-REQ6
Cat2.Reg7	FBIDS-REQ8
Cat2.Reg8	FBIDS-REQ5
Cat2.Reg9	FBIDS-REQ3





## Scenario step by step analysis

Scenario								
Scenario name		Prequalification of the Flexibility Service Providers and their flexibilities						
Step No	Event	Name of process/activity	Description of process/activity	Service producer (actor)	Information producer (actor)	Information receiver (actor)	Information exchanged (IDs)	Requirement, R-IDs

1.1		Publish prequalification criteria	Each System Operator defines services and publishes the definition of these services on the flexibility platform.		<u>Primary System Operator, System Operator</u>	<u>Data Exchange Platform</u>		
1.2		Publish flexibility potential	Each Flexibility Service Provider registers its flexibility potential on the Flexibility Platform with respect to the need of a System Operator.		<u>Flexibility Service Provider</u>	<u>Data Exchange Platform</u>	Info1-Flexibility Potential	
1.3		Forward prequalification criteria			<u>Data Exchange Platform</u>	<u>Flexibility Platform</u>		
1.4		Register prequalification criteria			<u>Flexibility Platform</u>	<u>Flexibility Platform</u>		
1.5		Forward flexibility potential			<u>Data Exchange Platform</u>	<u>Flexibility Platform</u>	Info1-Flexibility Potential	
1.6		Register flexibility potential			<u>Flexibility Platform</u>	<u>Flexibility Platform</u>	Info1-Flexibility Potential	
1.7		Initiate Prequalification of Flexibility Service Provider (product and provider prequalification)	Based on the information submitted in Flexibility Service Providers' flexibility potential, Flexibility Platform prequalifies the ability of Flexibility Service Providers to deliver flexibility with respect to System Operators' needs.		<u>Flexibility Platform</u>	<u>Flexibility Platform</u>		
1.8		Send necessary information for grid impact assessment	Flexibility Platform sends required level of information necessary for grid impact assessment to the different System Operators concerned (both TSOs and DSOs). This activity leads to registering whether grid assessment is necessary during the bidding phase in case of balancing products.		<u>Flexibility Platform</u>	<u>Data Exchange Platform</u>	Info1-Flexibility Potential	
1.9		Compare prequalification criteria and flexibility potential			<u>Flexibility Platform</u>	<u>Flexibility Platform</u>		

1.10		Forward necessary information for grid impact assessment			<u>Data Exchange Platform</u>	<u>Secondary System Operator</u>	Info1-Flexibility Potential	
1.11		Assess grid impact (grid prequalification)	Secondary System Operators assess the impact of flexibility activations in their grid in order to avoid congestions due to these activations. Secondary System Operators provide the results of grid impact assessment to the Primary System Operator setting the need for asking the Secondary System Operator for grid impact assessment during the bidding/procurement phase.		<u>Secondary System Operator</u>	<u>Primary System Operator, System Operator</u>	Info1-Flexibility Potential	
1.12		Registers secondary grid assessment results (grid prequalification)	The PSO registers whether the flexibility in the SSO grid can be procured and activated in a certain time frame or whether for every procurement/activation the grid impact assessment of SSO has to be taken into account.		<u>Primary System Operator, System Operator</u>		Info2-Any Data	
1.13		Send the results of prequalification to FSP and PSO			<u>Flexibility Platform</u>	<u>Data Exchange Platform</u>		
1.14		Forward the results of product prequalification			<u>Data Exchange Platform</u>	<u>Primary System Operator, System Operator, Flexibility Service Provider</u>		
1.15		Receive results of product prequalification			<u>Primary System Operator, System Operator</u>			
1.16		Receive product and provider prequalification results			<u>Flexibility Service Provider</u>			

- 1.2. Publish flexibility potential

**Business section: Prequalification of the Flexibility Service Providers and their flexibilities/Publish flexibility potential**

Each Flexibility Service Provider registers its flexibility potential on the Flexibility Platform with respect to the need of a System Operator.

Information sent:

<i>Business object</i>	<i>Instance name</i>	<i>Instance description</i>
Flexibility Potential	Flexibility Potential	

- 1.5. Forward flexibility potential

**Business section: Prequalification of the Flexibility Service Providers and their flexibilities/Forward flexibility potential**

Information sent:

<i>Business object</i>	<i>Instance name</i>	<i>Instance description</i>
Flexibility Potential	Flexibility Potential	

- 1.6. Register flexibility potential

**Business section: Prequalification of the Flexibility Service Providers and their flexibilities/Register flexibility potential**

Information sent:

<i>Business object</i>	<i>Instance name</i>	<i>Instance description</i>
Flexibility Potential	Flexibility Potential	

- 1.8. Send necessary information for grid impact assessment

**Business section: Prequalification of the Flexibility Service Providers and their flexibilities/Send necessary information for grid impact assessment**

Flexibility Platform sends required level of information necessary for grid impact assessment to the different System Operators concerned (both TSOs and DSOs).

This activity leads to registering whether grid assessment is necessary during the bidding phase in case of balancing products.

Information sent:

<i>Business object</i>	<i>Instance name</i>	<i>Instance description</i>
Flexibility Potential	Flexibility Potential	

- 1.9. Forward necessary information for grid impact assessment

**Business section: Prequalification of the Flexibility Service Providers and their flexibilities/Forward necessary information for grid impact assessment**

Information sent:

<i>Business object</i>	<i>Instance name</i>	<i>Instance description</i>
Flexibility Potential	Flexibility Potential	

- 1.10. Assess grid impact (grid prequalification)

**Business section: Prequalification of the Flexibility Service Providers and their flexibilities/Assess grid impact (grid prequalification)**

Secondary System Operators assess the impact of flexibility activations in their grid in order to avoid congestions due to these activations.

Secondary System Operators provide the results of grid impact assessment to the Primary System Operator setting the need for asking the Secondary System Operator for grid impact assessment during the bidding/procurement phase.

Information sent:

<i>Business object</i>	<i>Instance name</i>	<i>Instance description</i>
<u>Flexibility Potential</u>	Flexibility Potential	

- 1.11. Registers secondary grid assessment results (grid prequalification)

**Business section: Prequalification of the Flexibility Service Providers and their flexibilities/Registers secondary grid assessment results (grid prequalification)**

The PSO registers whether the flexibility in the SSO grid can be procured and activated in a certain time frame or whether for every procurement/activation the grid impact assessment of SSO has to be taken into account.

Information sent:

<i>Business object</i>	<i>Instance name</i>	<i>Instance description</i>
<u>Any Data</u>	Any Data	

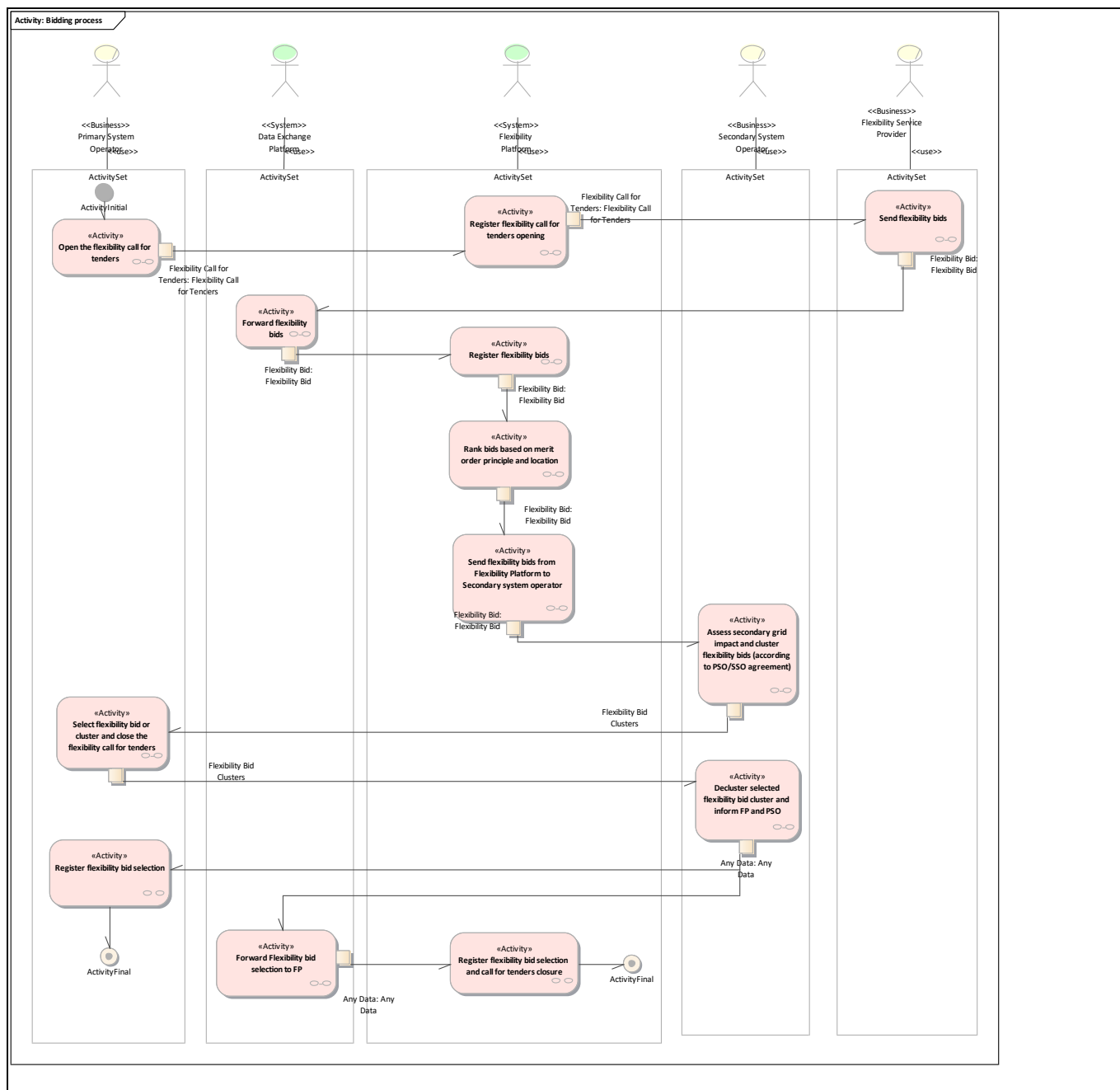
## 2. Bidding process

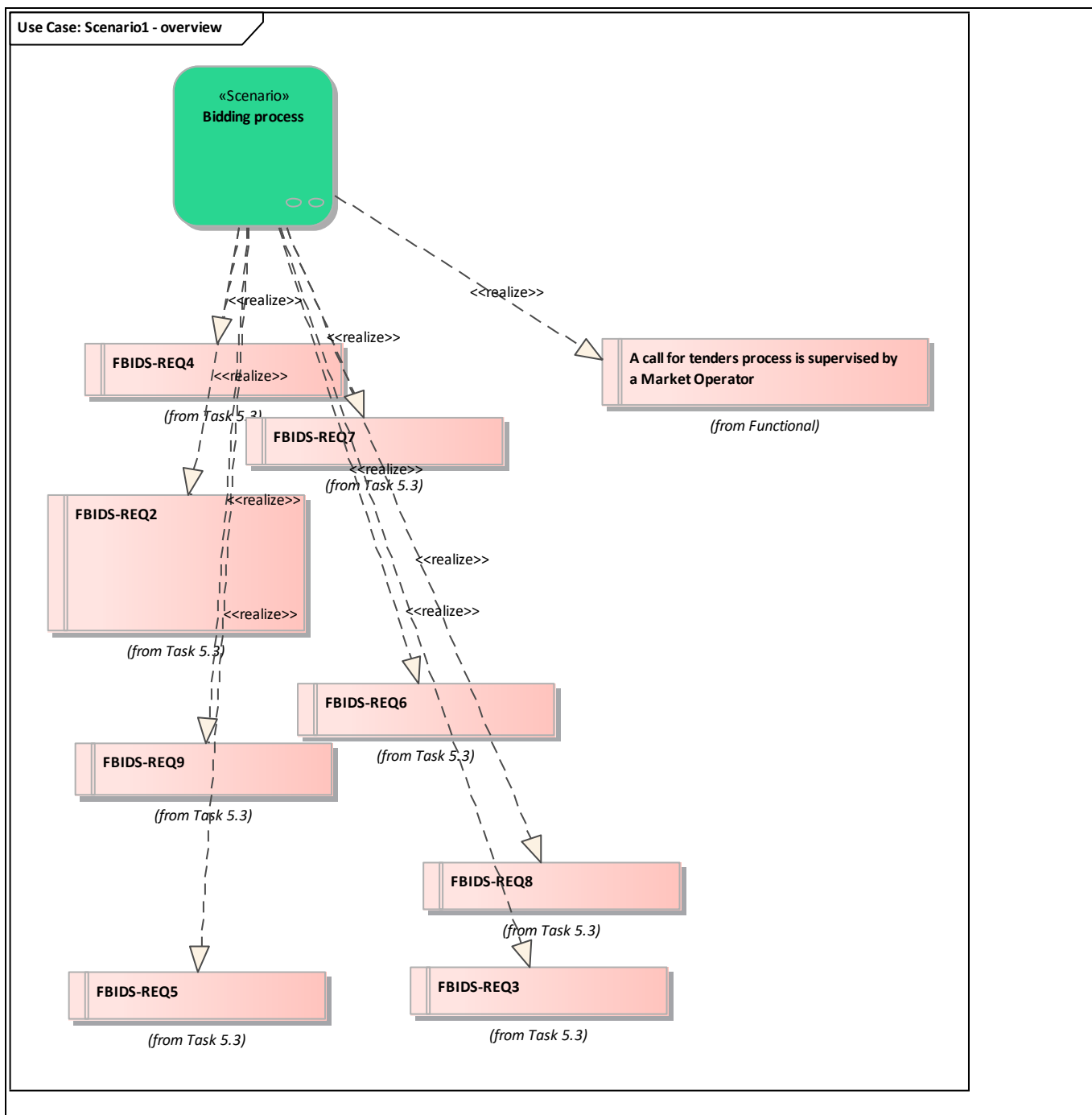
The Flexibility Platform should allow many parallel calls for tender in which  $n$  Flexibility Service Providers offer flexibilities for  $m$  flexibility products, previously defined with System Operators and possibly standardized, and, on the buyers' side, there are  $x$  System Operators looking for the cheapest products. This means that it may happen that more than one System Operator will be willing to buy same flexibility. It may also mean that it is not necessarily the cheapest flexibility which would bring highest socio-economic value.

System Operators mutually coordinate the flexibility buying before the final selection of bids. This coordination is out of the scope of this use case.

<i>Requirement list (refer to "Requirement" section for more information)</i>	
<i>Requirement R-ID</i>	<i>Requirement name</i>
<u>Cat1.Reg1</u>	A call for tenders process is supervised by a Market Operator
<u>Cat2.Reg2</u>	FBIDS-REQ4
<u>Cat2.Reg4</u>	FBIDS-REQ7
<u>Cat2.Reg5</u>	FBIDS-REQ2
<u>Cat2.Reg6</u>	FBIDS-REQ6
<u>Cat2.Reg3</u>	FBIDS-REQ9
<u>Cat2.Reg7</u>	FBIDS-REQ8
<u>Cat2.Reg8</u>	FBIDS-REQ5
<u>Cat2.Reg9</u>	FBIDS-REQ3







## Scenario step by step analysis

Scenario								
Scenario name		Bidding process						
Step No	Event	Name of process/activity	Description of process/activity	Service	Information producer (actor)	Information receiver (actor)	Information exchanged (IDs)	Requirement R-IDs

2.1		Open the flexibility call for tenders	A call for tenders of flexibility services relies on specific products and covers specific periods (week ahead, day ahead, intraday, etc.). The call for tenders is opened by the Primary System Operator. The Primary System Operator is the operator who needs the flexibility service.		<u>Primary System Operator</u>	<u>Flexibility Platform</u>	Info3-Flexibility Call for Tenders	
2.2		Register flexibility call for tenders opening	Secondary System Operators and FSPs should receive information about call for tenders opening from via Flexibility Platform (not directly from Primary System Operator).		<u>Flexibility Platform</u>	<u>Flexibility Service Provider</u>	Info3-Flexibility Call for Tenders	
2.3		Send flexibility bids			<u>Flexibility Service Provider</u>	<u>Data Exchange Platform</u>	Info4-Flexibility Bid	
2.4		Forward flexibility bids			<u>Data Exchange Platform</u>	<u>Flexibility Platform</u>	Info4-Flexibility Bid	
2.5		Register flexibility bids	In addition to flexibility bids received from Flexibility Service Providers, the Flexibility Platform also registers flexibility coming from European/regional/national platforms and systems like MARI, PICASSO or COBA (Common Baltic balancing Area). These platforms are used to collect the bids for some flexibility services (e.g. mFRR). The value of Flexibility Platform is to bring different information together and making it available to different flexibility buyers. Flexibility bids are ranked on merit order principle and location.		<u>Flexibility Platform</u>	<u>Flexibility Platform</u>	Info4-Flexibility Bid	
2.6		Rank bids based on merit order principle and location	Locational ranking principles to be agreed between Primary System Operator and Flexibility Platform.		<u>Flexibility Platform</u>	<u>Flexibility Platform</u>	Info4-Flexibility Bid	
2.7		Send flexibility bids from Flexibility Platform to	Flexibility Platform sends flexibility bids from Flexibility Platform to		<u>Flexibility Platform</u>	<u>Secondary System Operator</u>	Info4-Flexibility Bid	

		Secondary system operator	Secondary system operator via DEP.					
2.8		Assess secondary grid impact and cluster flexibility bids (according to PSO/SSO agreement)	Secondary System Operator performs grid impact assessment of bids to avoid congestions in its grid. If order book was opened for congestion management, Secondary System Operator informs Primary System Operator about the efficiency of the flexibilities to solve their congestions (sensitivities). Additionally, bids in the SSO grid are being clustered according to the criteria (e.g. cost minimization for PSO based on close to real time grid situation) agreed by the PSO and SSO. SSO sends results to PSO.		<u>Secondary System Operator</u>	<u>Primary System Operator</u>		
2.9		Select flexibility bid or cluster and close the flexibility call for tenders	PSO selects the bid or cluster that serves the need based on the merit order list provided by the FP. With the bid selection the call for tender is closed.		<u>Primary System Operator</u>	<u>Secondary System Operator</u>		
2.10		Declassify selected flexibility bid cluster and inform FP and PSO	Secondary System Operator declassifies flexibility bid cluster and selects best flexibilities. SSO informs FP and PSO		<u>Secondary System Operator</u>	<u>Primary System Operator, Data Exchange Platform</u>	Info2-Any Data	
2.11		Register flexibility bid selection			<u>Primary System Operator</u>			
2.12		Forward Flexibility bid selection to FP			<u>Data Exchange Platform</u>	<u>Flexibility Platform</u>	Info2-Any Data	
2.13		Register flexibility bid selection and call for tenders closure			<u>Flexibility Platform</u>			

- 2.1. Open the flexibility call for tenders

**Business section: Bidding process/Open the flexibility call for tenders**

A call for tenders of flexibility services relies on specific products and covers specific periods (week ahead, day ahead, intraday, etc.).

The call for tenders is opened by the Primary System Operator. The Primary System Operator is the

operator who needs the flexibility service.

Information sent:

<b>Business object</b>	<b>Instance name</b>	<b>Instance description</b>
Flexibility Call for Tenders	Flexibility Call for Tenders	

- 2.2. Register flexibility call for tenders opening

**Business section: Bidding process/Register flexibility call for tenders opening**

Secondary System Operators and FSPs should receive information about call for tenders opening from via Flexibility Platform (not directly from Primary System Operator).

Information sent:

<b>Business object</b>	<b>Instance name</b>	<b>Instance description</b>
Flexibility Call for Tenders	Flexibility Call for Tenders	

- 2.3. Send flexibility bids

**Business section: Bidding process/Send flexibility bids**

Information sent:

<b>Business object</b>	<b>Instance name</b>	<b>Instance description</b>
Flexibility Bid	Flexibility Bid	

- 2.4. Forward flexibility bids

**Business section: Bidding process/Forward flexibility bids**

Information sent:

<b>Business object</b>	<b>Instance name</b>	<b>Instance description</b>
Flexibility Bid	Flexibility Bid	

- 2.5. Register flexibility bids

**Business section: Bidding process/Register flexibility bids**

In addition to flexibility bids received from Flexibility Service Providers, the Flexibility Platform also registers flexibility coming from European/regional/national platforms and systems like MARI, PICASSO or COBA (Common Baltic balancing Area). These platforms are used to collect the bids for some flexibility services (e.g. mFRR). The value of Flexibility Platform is to bring different information together and making it available to different flexibility buyers.

Flexibility bids are ranked on merit order principle and location.

Information sent:

<b>Business object</b>	<b>Instance name</b>	<b>Instance description</b>
Flexibility Bid	Flexibility Bid	

- 2.6. Rank bids based on merit order principle and location

**Business section: Bidding process/Rank bids based on merit order principle and location**

Locational ranking principles to be agreed between Primary System Operator and Flexibility Platform.

Information sent:

<i>Business object</i>	<i>Instance name</i>	<i>Instance description</i>
Flexibility Bid	Flexibility Bid	

- 2.7. Send flexibility bids from Flexibility Platform to Secondary system operator

**Business section: Bidding process/Send flexibility bids from Flexibility Platform to Secondary system operator**

Flexibility Platform sends flexibility bids from Flexibility Platform to Secondary system operator via DEP.

Information sent:

<i>Business object</i>	<i>Instance name</i>	<i>Instance description</i>
Flexibility Bid	Flexibility Bid	

- 2.10. Decluster selected flexibility bid cluster and inform FP and PSO

**Business section: Bidding process/Decluster selected flexibility bid cluster and inform FP and PSO**

Secondary System Operator declusters flexibility bid cluster and selects best flexibilities. SSO informs FP and PSO

Information sent:

<i>Business object</i>	<i>Instance name</i>	<i>Instance description</i>
Any Data	Any Data	

- 2.12. Forward Flexibility bid selection to FP

**Business section: Bidding process/Forward Flexibility bid selection to FP**
Information sent:

<i>Business object</i>	<i>Instance name</i>	<i>Instance description</i>
Any Data	Any Data	

## 5. Information exchanged

<i>Information exchanged</i>			
<i>Information exchanged, ID</i>	<i>Name of information</i>	<i>Description of information exchanged</i>	<i>Requirement, R-IDs</i>
Info1	Flexibility Potential		
Info2	Any Data		
Info3	Flexibility Call for Tenders		
Info4	Flexibility Bid		

## 6. Requirements (optional)

<i>Requirements (optional)</i>		
<i>Categories ID</i>	<i>Category name for requirements</i>	<i>Category description</i>
Cat1	Functional	Functional requirements

Requirement R-ID	Requirement name	Requirement description
Req1	A call for tenders process is supervised by a Market Operator	
Requirements (optional)		
Categories ID	Category name for requirements	Category description
Cat2	Task 5.3	Requirements integrated from Task 5.3.
Requirement R-ID	Requirement name	Requirement description
Req2	FBIDS-REQ4	Algorithm for prequalification of flexibility providers
Req3	FBIDS-REQ9	Calculation of grid impacts (congestion, imbalance)
Req4	FBIDS-REQ7	Selection of successful bids
Req5	FBIDS-REQ2	Ability to exchange information on System Operators' flexibility need and FSPs' flexibility potential through flexibility platform (and DEP)
Req6	FBIDS-REQ6	Flexibility platform's ability to collect bids from FSPs
Req7	FBIDS-REQ8	Flexibility platform's ability to collect grid validation results from SOs
Req8	FBIDS-REQ5	Automated exchange of bids is possible
Req9	FBIDS-REQ3	Auction process supervised by Market Operator

## 7. Common terms and definitions

## 8. Custom information (optional)

### 9.14 MANAGE SUB-METER DATA

## Manage sub-meter data

Based on IEC 62559-2 edition 1  
Generated from UML Use Case Repository with Modsarus® (EDF R&D Tool)

### 1. Description of the use case

#### 1. Name of use case

Use case identification		
ID	Area(s)/Domain(s)/Zone(s)	Name of use case
	Access to data,Market for flexibilities,Operational planning and forecasting,Services related to end customers	Manage sub-meter data

#### 2. Version management

Version management				
Version No.	Date	Name of author(s)	Changes	Approval status
1	2018-04-12	Kalle Kukk (Eling)		
2	2018-05-07	Kalle Kukk (Eling), Ricardo Jover (EDF), Eric Suignard (EDF)		

3	2018-08-11	Kalle Kukk (Elering), Graham Oakes (Upside), Mitchell Curtis (Upside)		
4	2018-05-17	Ricardo Jover (EDF), Eric Suignard (EDF)		
5	2018-05-25	Kalle Kukk (Elering), Olav Rossøy (Enoco)		
6	2018-06-06	Ricardo Jover (EDF), Eric Suignard (EDF)		
7	2018-08-02	Eric Suignard (EDF)		
8	2018-09-21	Eric Suignard (EDF), Ricardo Jover (EDF)	Remarks from Innogy, Elering and EirGrid.	
9	2018-10-04	Eric Suignard (EDF)	Version post WP5&9 physical meeting in Tallinn	
10	2018-10-17	Eric Suignard (EDF)	Version reviewed by WP5&9 partners	
11	2019-05-07	Eric Suignard (EDF)	WP6-7-8 demos alignment and miscellaneous changes	
12	2020-06-16	Eric Suignard (EDF)	innogy's and Elering's review	

### 3. Scope and objectives of use case

Scope and objectives of use case	
<b>Scope</b>	Using data exchange platform for exchanging sub-meter data. A sub-meter data is a data measured by a non-revenue grade meter and related to tariffs.
<b>Objective(s)</b>	Support easy access to sub-meter data
<b>Related business case(s)</b>	

### 4. Narrative of Use Case

Narrative of use case	
<b>Short description</b>	
Communication with different energy consuming and producing devices should be enabled in an organized way to satisfy the needs of different stakeholders. Customers need to monitor and control their devices. Flexibility service providers (flexibility aggregators) and other energy service providers need access for service provision based on these devices. TSOs and DSOs need information for flexibility settlement.	
<b>Complete description</b>	
<p style="text-align: center;"><u>Summary of use case</u></p> <ul style="list-style-type: none"> <li>• <u>Collect sub-meter data</u> Description:               <ul style="list-style-type: none"> <li>▪ Send sub-meter data Description:</li> <li>▪ Check sub-meter data quality Description:</li> <li>▪ Store sub-meter data Description:</li> </ul> </li> <li>• <u>Ensure data collection from sub-meter level devices to be made available over DEP</u> Description:</li> </ul>	



- Forward sub-meter data  
Description:
- Process data request  
Description:
- Receive sub-meter data  
Description:
- Receive sub-meter data  
Description:
- Request specific consumption or generation data of devices  
Description:
- Request specific consumption or generation data of devices  
Description:
- Check existence of valid consent  
Description:
- Forward request on sub-meter data  
Description:
- Send sub-meter data  
Description:
- Enable sending control signals to devices over DEP  
Description:
  - Send activation order  
Description: Customer (consumer/generator) can order directly the Sub-Meter Data Operator to activate his/her devices.
  - Send activation order  
Description: An activation order can be sent by Energy Service Provider to Sub-Meter Data Operator (operating Automation Controller), based on the defined coordination mechanisms and TSO's or DSO's request to activate some flexibility.
  - Check existence of valid consent  
Description:
  - Forward control signal  
Description:
  - Send control signal  
Description:

## 5. Key performance indicators (KPI)

## 6. Use case conditions

Use case conditions	
Assumptions	
1	Every individual and organization has the right to make the decisions regarding the data of their devices, incl. easy access to these data by themselves and granting access to third parties.

2	If the DEP maintains local copies of data or audit logs of transfers, then these are also subject to suitable data and privacy protections.
3	Rules for data protection and privacy are in place (authentication of users, consent management).
4	Most of the meter readings will be sent by certified meters. But certified meter data is not always enough: one may need more granular data (e.g. measurements on device level, measurements per second/minute) and take advantage of finer grained sub-meters
<b>Prerequisites</b>	
1	Sub-meter data operator is needed.
2	Cross-border service provision is required. : This assumes access by energy service provider of one country to sub-meter devices in another country.
3	Standardized/harmonized rules to communicate with the devices.

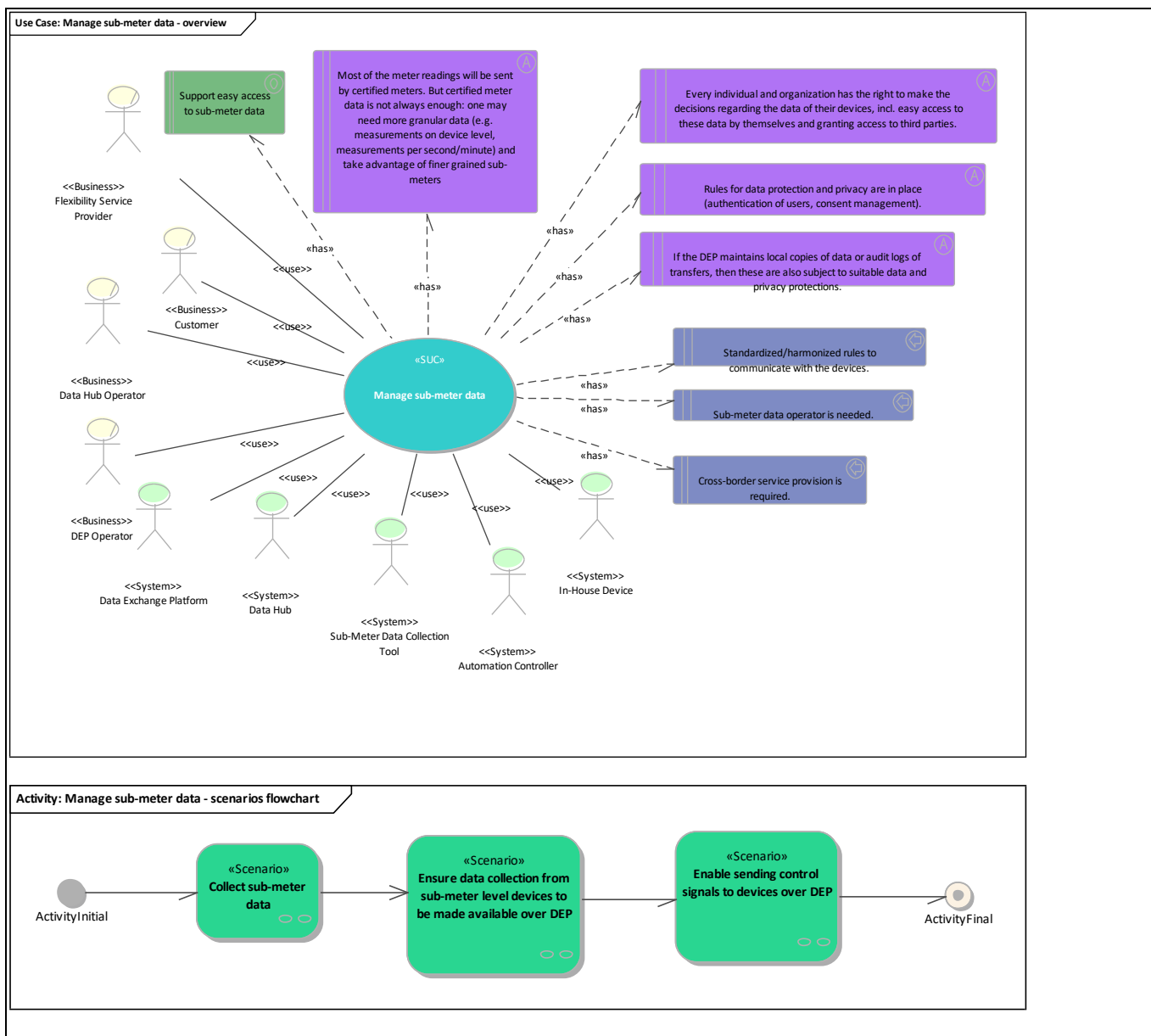
## 7. Further information to the use case for classification/mapping

<b>Classification information</b>
<b>Relation to other use cases</b>
<b>Level of depth</b>
<b>Prioritisation</b>
<b>Generic, regional or national relation</b>
<b>Nature of the use case</b>
SUC
<b>Further keywords for classification</b>

## 8. General remarks

### 2. Diagrams of use case

<b>Diagram(s) of use case</b>
-------------------------------



### 3. Technical details

#### 1. Actors

Actors			
Grouping (e.g. domains, zones)		Group description	
Actor name	Actor type	Actor description	Further information specific to this use case
Customer	Business	Consumer, generator or storage facility owner.	
Sub-Meter Data Collection Tool	System	Sub-Meter Data Collection Tool is an information system which main functionality is to collect measurements from In-House Devices. Data is published to Sub-Meter Data Collection Tool, not requested by the tool.	

Data Exchange Platform	System	Data exchange platform (DEP) is a communication platform the basic functionality of which is to secure data transfer (routing) from data providers (e.g. data hubs, flexibility service providers, TSOs, DSOs) to the data users (e.g. TSOs, DSOs, consumers, suppliers, energy service providers). DEP stores data related to its services (e.g. cryptographic hash of the data requested). The DEP does not store core energy data (e.g. meter data, grid data, market data) while these data can be stored by data hubs. Several DEPs may exist in different countries and inside one country.	
Automation Controller	System	Automation Controller is an information system which main functionality is to send activation signals to In-House Devices.	
In-House Device	System	Any kind of electrical device installed at a customer's location. E.g. heat pump, water boiler, EV charger.	
Data Hub	System	Data Hub is an information system which main functionality is to store and make available measurements (e.g. meter data, operational data) and associated master data. Data Hubs are not necessarily centralized in a country or in a region.	
Flexibility Service Provider	Business	Can be a Distribution Network Flexibility Provider or a Transmission Network Flexibility Provider (cf. definitions in T3.3 deliverable). Similar to Flexibility Aggregator. Can be both aggregator and individual consumer/generator. Type of Energy Service Provider.	
Energy Service Provider	Business	A party offering energy-related services to any other party (adapted from ENTSOE-EFET-ebIX harmonized role model). Energy service provider (ESCO – energy service company) is a market-based role which is responsible for delivering energy services to the customers (or to other parties of behalf of the customers). In case these services necessitate the access to customer's data, the consent of this customer is required. Examples of the executors of this role include aggregator, flexibility service provider, energy efficiency provider, energy monitoring provider. Can also be an Aggregator or a Generator (cf. definitions in T3.3 deliverable).	
Data Hub Operator	Business	Data hub operator owns and operates an information system which main functionality is to store and make available electricity (also gas, heat) metering data and associated master data. Can be : <ul style="list-style-type: none"> <li>• Grid Data Hub Operator in the sphere of a System Operator</li> <li>• Market Data Hub Operator in the sphere of a Market Operator</li> <li>• Meter Data Hub Operator in the sphere of a Metered Data Operator</li> <li>• Sub-meter Data Hub Operator in the sphere of an Energy Service Provider</li> </ul>	
DEP Operator	Business	Data exchange platform operator owns and operates a communication system which basic functionality is data transfer.	

## 2. References

### 4. Step by step analysis of use case

#### 1. Overview of scenarios

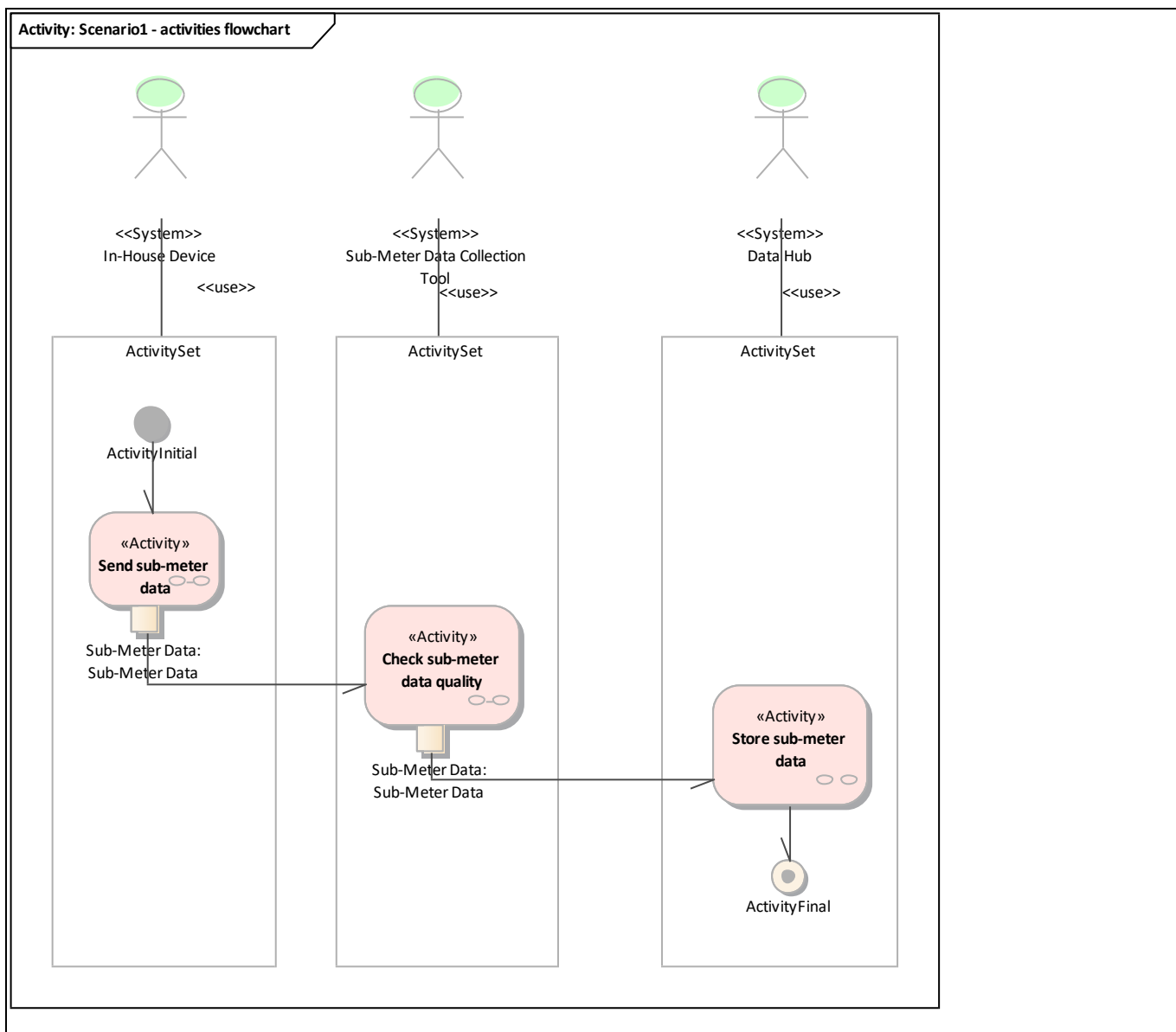
Scenario conditions						
No.	Scenario name	Scenario description	Primary actor	Triggering event	Pre-condition	Post-condition

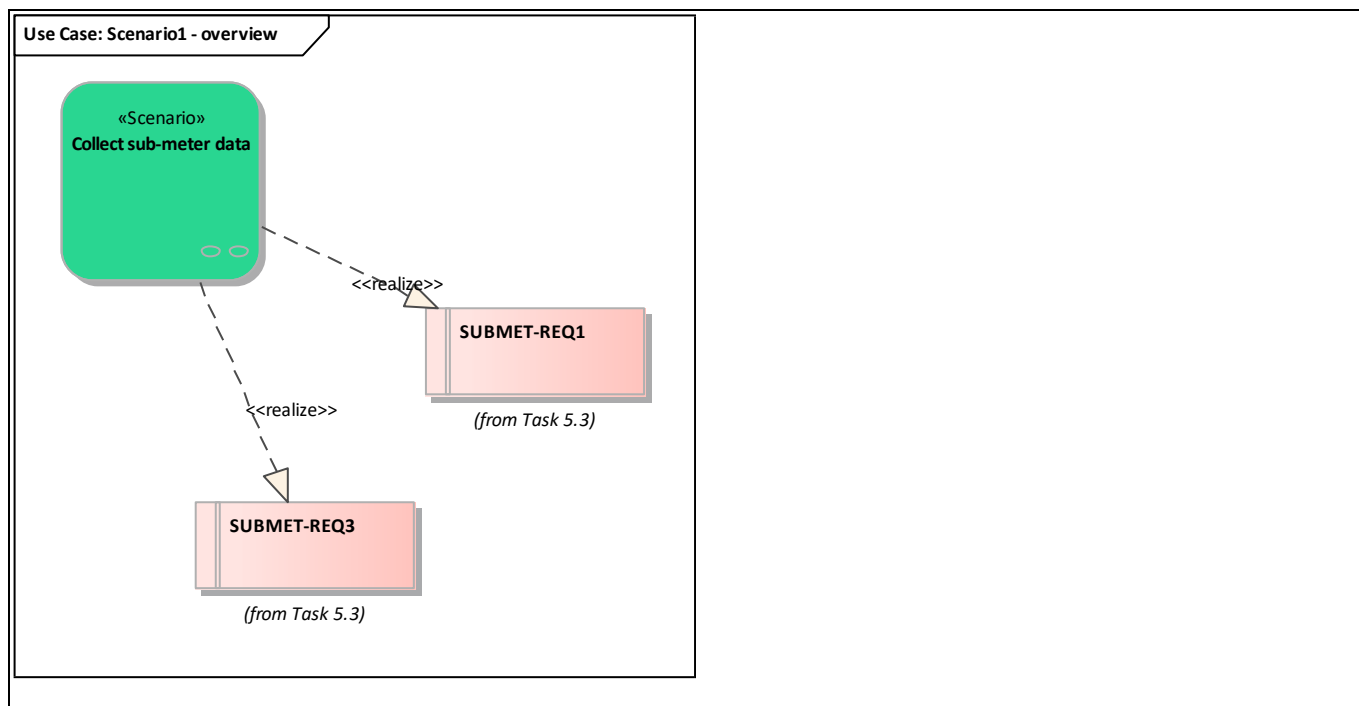
1	Collect sub-meter data					
2	Ensure data collection from sub-meter level devices to be made available over DEP				* A contract must exist between customer and flexibility service provider: i. Either customer finds the flexibility service provider in the list on DEP ii. Or flexibility service provider contacts potential customer directly * Sub-meter data collection tool must be already registered on DEP as an energy service provider application – see SUC ‘Integrate new application’ * Sub-meter data collection tool must appear in the list of applications on DEP – see SUC ‘Provide list of suppliers and ESCOs’	
3	Enable sending control signals to devices over DEP					

## 2. Steps - Scenarios

### 1. Collect sub-meter data

<i>Requirement list (refer to "Requirement" section for more information)</i>	
<i>Requirement R-ID</i>	<i>Requirement name</i>
Cat1.Req1	SUBMET-REQ1
Cat1.Req2	SUBMET-REQ3





### Scenario step by step analysis

Scenario								
Scenario name		Collect sub-meter data						
Step No	Event	Name of process/activity	Description of process/activity	Service	Information producer (actor)	Information receiver (actor)	Information exchanged (IDs)	Requirement, R-IDs
1.1		Send sub-meter data			In-House Device	Sub-Meter Data Collection Tool	Info1-Sub-Meter Data	
1.2		Check sub-meter data quality			Sub-Meter Data Collection Tool	Data Hub	Info1-Sub-Meter Data	
1.3		Store sub-meter data			Data Hub			

#### 1.1. Send sub-meter data

##### Business section: Collect sub-meter data/Send sub-meter data

Information sent:

Business object	Instance name	Instance description
Sub-Meter Data	Sub-Meter Data	

#### 1.2. Check sub-meter data quality

### **Business section: Collect sub-meter data/Check sub-meter data quality**

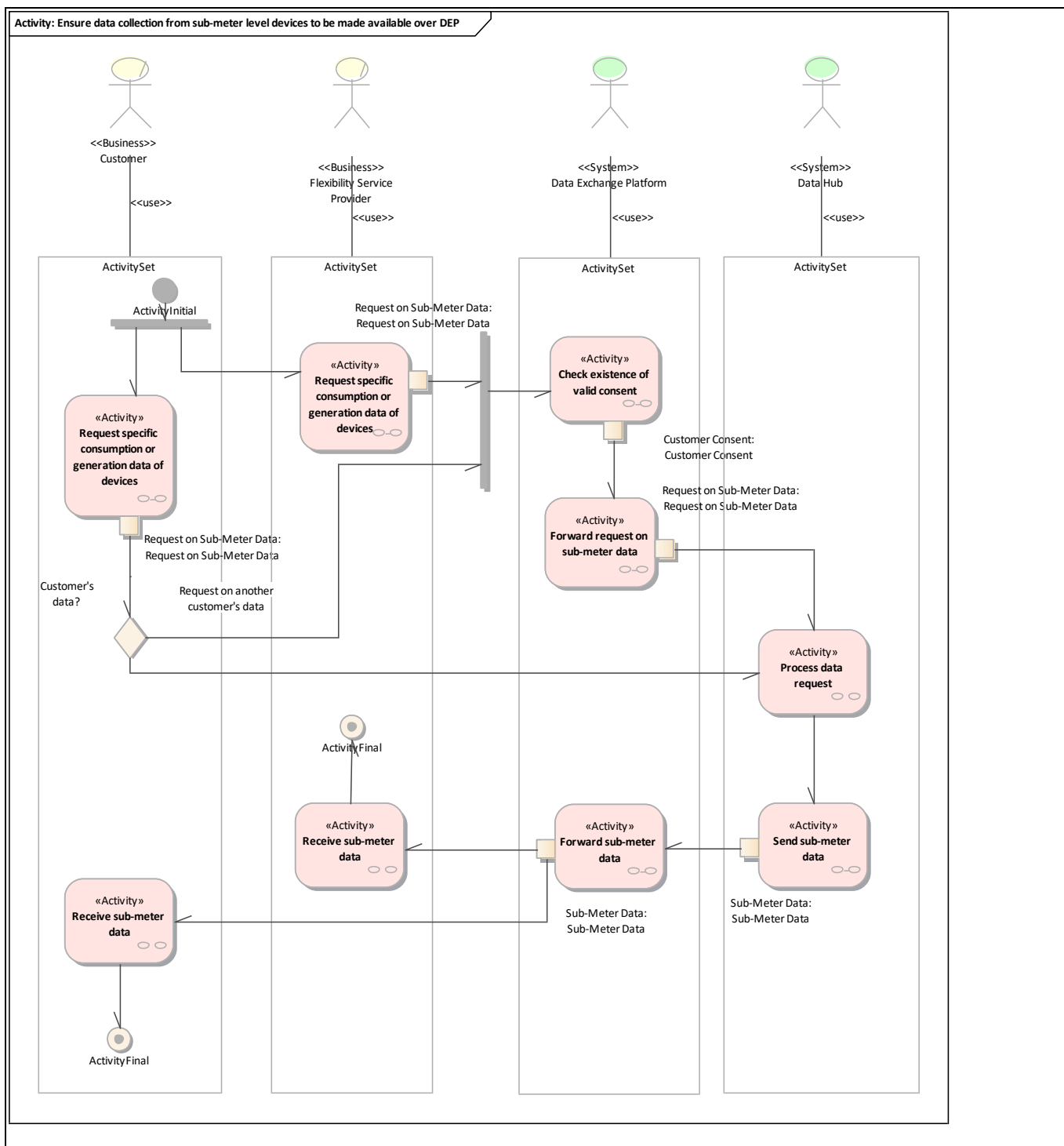
Information sent:

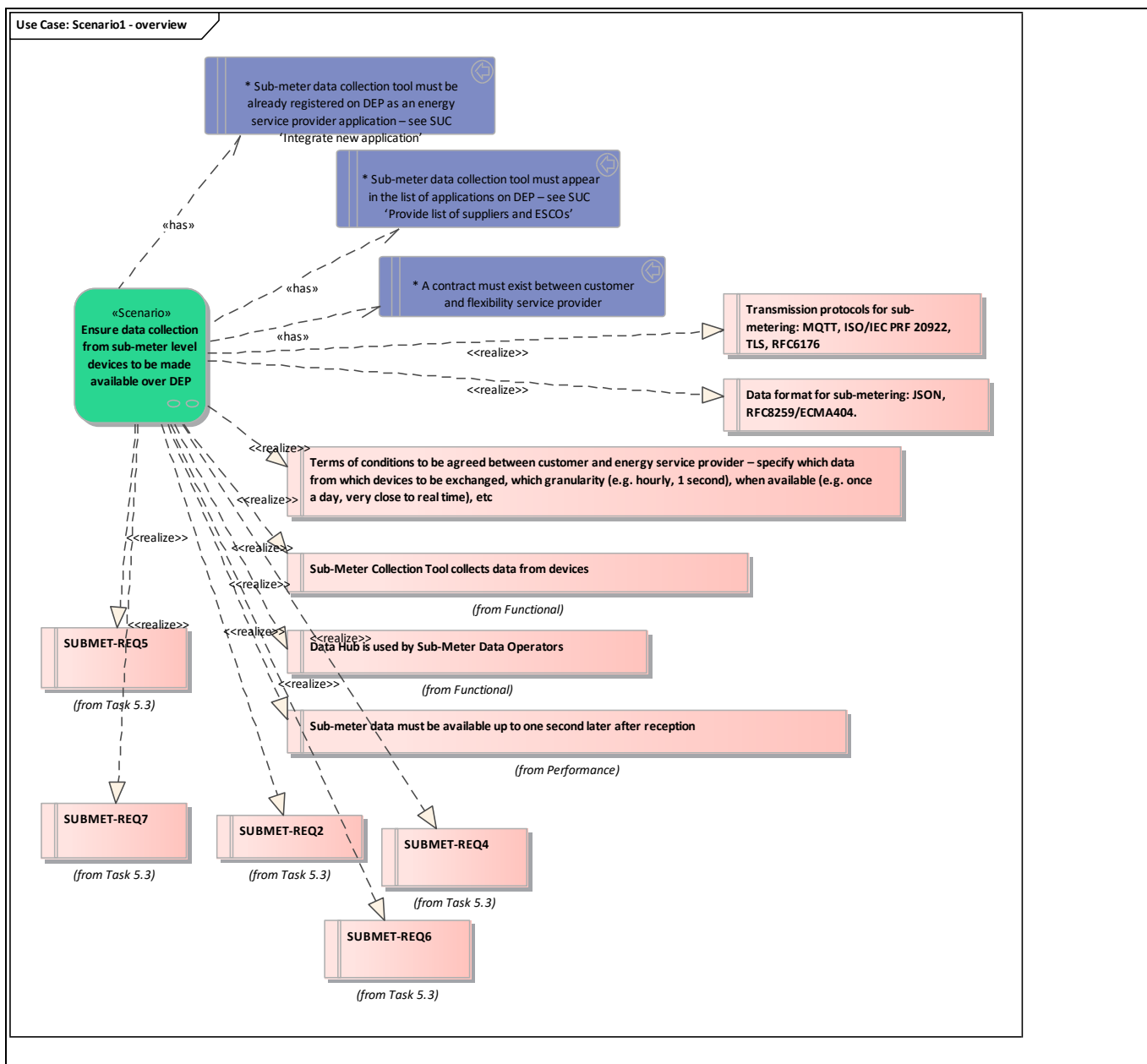
<b><i>Business object</i></b>	<b><i>Instance name</i></b>	<b><i>Instance description</i></b>
Sub-Meter Data	Sub-Meter Data	

## **2. Ensure data collection from sub-meter level devices to be made available over DEP**

<b><i>Requirement list (refer to "Requirement" section for more information)</i></b>	
<b><i>Requirement R-ID</i></b>	<b><i>Requirement name</i></b>
<u>Cat2 Req3</u>	Sub-Meter Collection Tool collects data from devices
<u>Cat3 Req4</u>	Sub-meter data must be available up to one second later after reception
<u>Cat2 Req5</u>	Data Hub is used by Sub-Meter Data Operators
<u>Req6</u>	Data format for sub-metering: JSON, RFC8259/ECMA404.
<u>Req7</u>	Transmission protocols for sub-metering: MQTT, ISO/IEC PRF 20922, TLS, RFC6176
<u>Req8</u>	Terms of conditions to be agreed between customer and energy service provider – specify which data from which devices to be exchanged, which granularity (e.g. hourly, 1 second), when available (e.g. once a day, very close to real time), etc.
<u>Cat1 Req9</u>	SUBMET-REQ5
<u>Cat1 Req10</u>	SUBMET-REQ7
<u>Cat1 Req11</u>	SUBMET-REQ2
<u>Cat1 Req12</u>	SUBMET-REQ4
<u>Cat1 Req13</u>	SUBMET-REQ6







## Scenario step by step analysis

Scenario								
Scenario name		Ensure data collection from sub-meter level devices to be made available over DEP						
Step No	Event	Name of process/activity	Description of process/activity	Service	Information producer (actor)	Information receiver (actor)	Information exchanged (IDs)	Requirement, R-IDs
2.1		Forward sub-meter data			Data Exchange Platform	Flexibility Service Provider, Customer	Info1-Sub-Meter Data	
2.2		Process data request			Data Hub			

2.3		Receive sub-meter data			<u>Flexibility Service Provider</u>			
2.4		Receive sub-meter data			<u>Customer</u>			
2.5		Request specific consumption or generation data of devices			<u>Flexibility Service Provider</u>	<u>Data Exchange Platform</u>	Info2-Request on Sub-Meter Data	
2.6		Request specific consumption or generation data of devices			<u>Customer</u>	<u>Data Hub, Data Exchange Platform</u>	Info2-Request on Sub-Meter Data	
2.7		Check existence of valid consent			<u>Data Exchange Platform</u>	<u>Data Exchange Platform</u>	Info3-Customer Consent	
2.8		Forward request on sub-meter data			<u>Data Exchange Platform</u>	<u>Data Hub</u>	Info2-Request on Sub-Meter Data	
2.9		Send sub-meter data			<u>Data Hub</u>	<u>Data Exchange Platform</u>	Info1-Sub-Meter Data	

- 2.1. Forward sub-meter data

**Business section: Ensure data collection from sub-meter level devices to be made available over DEP/Forward sub-meter data**

Information sent:

<b><i>Business object</i></b>	<b><i>Instance name</i></b>	<b><i>Instance description</i></b>
<u>Sub-Meter Data</u>	Sub-Meter Data	

- 2.5. Request specific consumption or generation data of devices

**Business section: Ensure data collection from sub-meter level devices to be made available over DEP/Request specific consumption or generation data of devices**

Information sent:

<b><i>Business object</i></b>	<b><i>Instance name</i></b>	<b><i>Instance description</i></b>
<u>Request on Sub-Meter Data</u>	Request on Sub-Meter Data	

- 2.6. Request specific consumption or generation data of devices

**Business section: Ensure data collection from sub-meter level devices to be made available over DEP/Request specific consumption or generation data of devices**

Information sent:

<b><i>Business object</i></b>	<b><i>Instance name</i></b>	<b><i>Instance description</i></b>
<u>Request on Sub-Meter Data</u>	Request on Sub-Meter Data	

- 2.7. Check existence of valid consent

**Business section: Ensure data collection from sub-meter level devices to be made available over DEP/Check existence of valid consent**

Information sent:

<b><i>Business object</i></b>	<b><i>Instance name</i></b>	<b><i>Instance description</i></b>
Customer Consent	Customer Consent	

- 2.8. Forward request on sub-meter data

**Business section: Ensure data collection from sub-meter level devices to be made available over DEP/Forward request on sub-meter data**

Information sent:

<b><i>Business object</i></b>	<b><i>Instance name</i></b>	<b><i>Instance description</i></b>
Request on Sub-Meter Data	Request on Sub-Meter Data	

- 2.9. Send sub-meter data

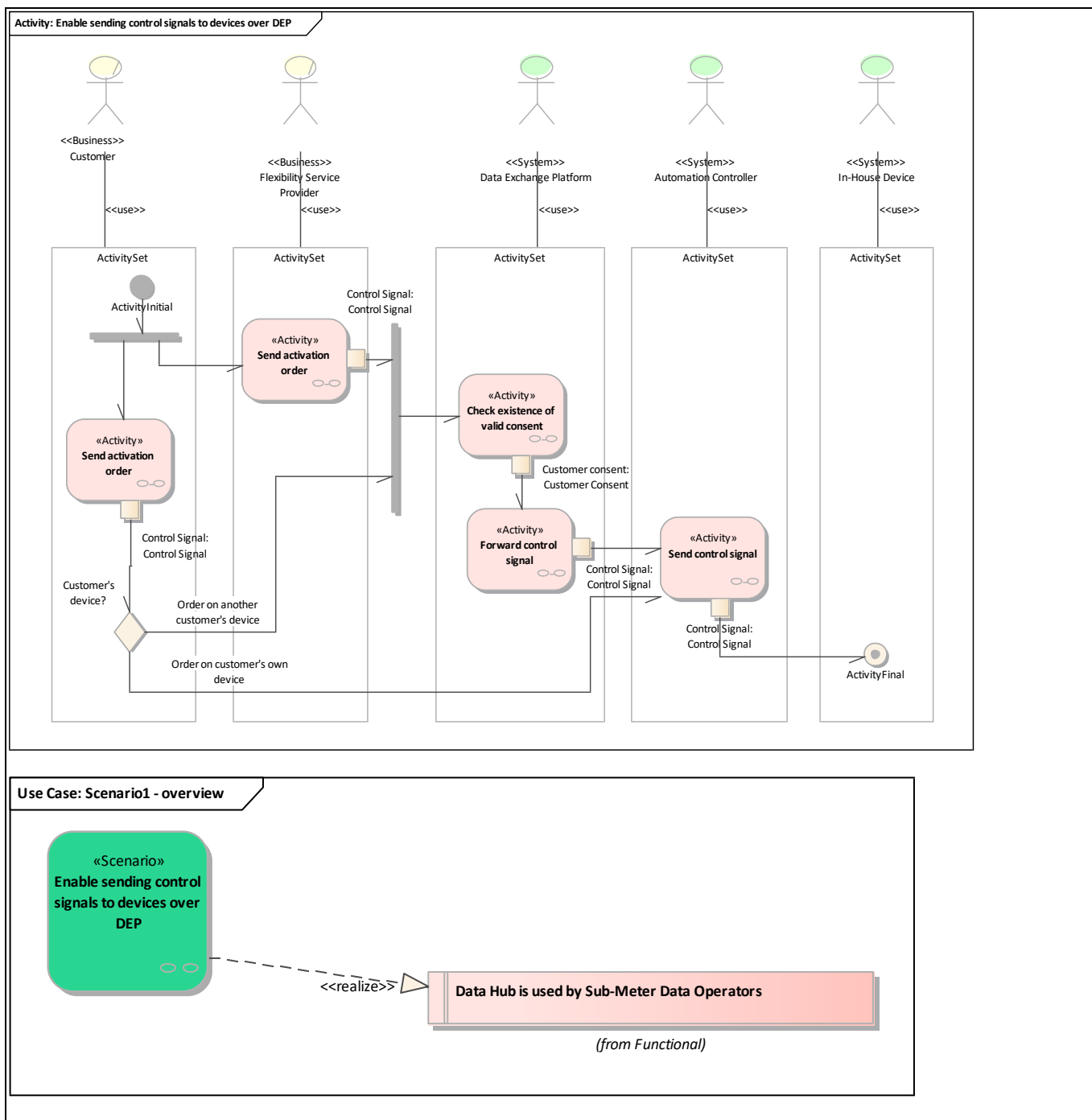
**Business section: Ensure data collection from sub-meter level devices to be made available over DEP/Send sub-meter data**

Information sent:

<b><i>Business object</i></b>	<b><i>Instance name</i></b>	<b><i>Instance description</i></b>
Sub-Meter Data	Sub-Meter Data	

### 3. Enable sending control signals to devices over DEP

<b><i>Requirement list (refer to "Requirement" section for more information)</i></b>	
<b><i>Requirement R-ID</i></b>	<b><i>Requirement name</i></b>
Cat2.Reg5	Data Hub is used by Sub-Meter Data Operators



## Scenario step by step analysis

Scenario								
Scenario name		Enable sending control signals to devices over DEP						
Step No	Event	Name of process/activity	Description of process/activity	Service	Information producer (actor)	Information receiver (actor)	Information exchanged (IDs)	Requirement, R-IDs
3.1		Send activation order	Customer (consumer/generator) can order directly the		Customer	Automation Controller, Data	Info4-Control Signal	

			Sub-Meter Data Operator to activate his/her devices.			<u>Exchange Platform</u>		
3.2		Send activation order	An activation order can be sent by Energy Service Provider to Sub-Meter Data Operator (operating Automation Controller), based on the defined coordination mechanisms and TSO's or DSO's request to activate some flexibility.		<u>Flexibility Service Provider</u>	<u>Data Exchange Platform</u>	Info4-Control Signal	
3.3		Check existence of valid consent			<u>Data Exchange Platform</u>	<u>Data Exchange Platform</u>	Info3-Customer Consent	
3.4		Forward control signal			<u>Data Exchange Platform</u>	<u>Automation Controller</u>	Info4-Control Signal	
3.5		Send control signal			<u>Automation Controller</u>	<u>In-House Device</u>	Info4-Control Signal	

- 3.1. Send activation order

**Business section: Enable sending control signals to devices over DEP/Send activation order**

Customer (consumer/generator) can order directly the Sub-Meter Data Operator to activate his/her devices.  
Information sent:

<b><i>Business object</i></b>	<b><i>Instance name</i></b>	<b><i>Instance description</i></b>
<u>Control Signal</u>	Control Signal	

- 3.2. Send activation order

**Business section: Enable sending control signals to devices over DEP/Send activation order**

An activation order can be sent by Energy Service Provider to Sub-Meter Data Operator (operating Automation Controller), based on the defined coordination mechanisms and TSO's or DSO's request to activate some flexibility.

Information sent:

<b><i>Business object</i></b>	<b><i>Instance name</i></b>	<b><i>Instance description</i></b>
<u>Control Signal</u>	Control Signal	

- 3.3. Check existence of valid consent

**Business section: Enable sending control signals to devices over DEP/Check existence of valid consent**

Information sent:

<b><i>Business object</i></b>	<b><i>Instance name</i></b>	<b><i>Instance description</i></b>
<u>Customer Consent</u>	Customer consent	

- 3.4. Forward control signal

**Business section: Enable sending control signals to devices over DEP/Forward control signal**

Information sent:

<i>Business object</i>	<i>Instance name</i>	<i>Instance description</i>
Control Signal	Control Signal	

- 3.5. Send control signal

**Business section: Enable sending control signals to devices over DEP/Send control signal**

Information sent:

<i>Business object</i>	<i>Instance name</i>	<i>Instance description</i>
Control Signal	Control Signal	

## 5. Information exchanged

<i>Information exchanged</i>			
<i>Information exchanged, ID</i>	<i>Name of information</i>	<i>Description of information exchanged</i>	<i>Requirement, R-IDs</i>
Info1	Sub-Meter Data	Time resolution:1 second. Content: energy, active power, reactive power, time-stamp, sub-meter ID, type of device behind the sub-meter (e.g. car charger, heating facility), energy flow direction (generation or consumption).	
Info2	Request on Sub-Meter Data		
Info3	Customer Consent		
Info4	Control Signal		

## 6. Requirements (optional)

<i>Requirements (optional)</i>		
<i>Categories ID</i>	<i>Category name for requirements</i>	<i>Category description</i>
Cat1	Task 5.3	Requirements integrated from Task 5.3.
<i>Requirement R-ID</i>	<i>Requirement name</i>	<i>Requirement description</i>
Req1	SUBMET-REQ1	Collection of data from sub-meters
Req2	SUBMET-REQ3	Storing sub-meter data in a data hub
Req9	SUBMET-REQ5	Transmission protocols of sub-metering
Req10	SUBMET-REQ7	Ability of DEP to forward activation orders from a customer (data owner) or application (energy service provider) to devices
Req11	SUBMET-REQ2	Ability of DEP to forward sub-meter data from data hub to customer (data owner) and application (energy service provider)
Req12	SUBMET-REQ4	Data format of sub-metering
Req13	SUBMET-REQ6	SLA between customer and energy service provider
<i>Requirements (optional)</i>		

Categories ID	Category name for requirements	Category description
Cat2	Functional	Functional requirements
Requirement R-ID	Requirement name	Requirement description
Req3	Sub-Meter Collection Tool collects data from devices	Data is published to Sub-Meter Collection Tool, not requested by it. Sub-Meter Data Collection Tool checks quality of received data: check within the scope of the device, e.g. that data packets are well formed and within reasonable bounds for the device, and across multiple devices, e.g. that readings from sub-meters are consistent with the aggregate reading from the main meter in the location. This quality check is very dependent on the geometry/setup of the sub meters (sub-meters of sub-meters, generated power, thermal energy...). Validation is therefore highly application/use case specific. Then, Sub-Meter Collection Tool sends data to Data Hub for storing.
Req5	Data Hub is used by Sub-Meter Data Operators	
Requirements (optional)		
Categories ID	Category name for requirements	Category description
Cat3	Performance	
Requirement R-ID	Requirement name	Requirement description
Req4	Sub-meter data must be available up to one second later after reception	
Requirements (optional)		
Categories ID	Category name for requirements	Category description
Requirement R-ID	Requirement name	Requirement description
Req6	Data format for sub-metering: JSON, RFC8259/ECMA404.	
Req7	Transmission protocols for sub-metering: MQTT, ISO/IEC PRF 20922, TLS, RFC6176	
Req8	Terms of conditions to be agreed between customer and energy service provider – specify which data from which devices to be exchanged, which granularity (e.g. hourly, 1 second), when available (e.g. once a day, very close to real time), etc	

## 7. Common terms and definitions

## 8. Custom information (optional)

### 9.15 PREDICT FLEXIBILITY AVAILABILITY

## Predict flexibility availability

Based on IEC 62559-2 edition 1  
 Generated from UML Use Case Repository with Modsarus® (EDF R&D Tool)



## 1. Description of the use case

### 1. Name of use case

Use case identification		
ID	Area(s)/Domain(s)/Zone(s)	Name of use case
	Market for flexibilities	Predict flexibility availability

### 2. Version management

Version management				
Version No.	Date	Name of author(s)	Changes	Approval status
1	2018-05-08			
2	2018-05-08	Mitchell Curtis (Upside), Graham Oakes (Upside)	First Draft	
3	2018-07-04	Ricardo Jover (EDF), Eric Suignard (EDF)		
4	2018-07-10	Ricardo Jover (EDF), Eric Suignard (EDF)	Changes from Mitchell Curtis	
5	2018-08-02	Eric Suignard (EDF)		
6	2018-09-21	Eric Suignard (EDF)	Remarks from Innogy.	
7	2018-10-04	Eric Suignard (EDF)	Version post WP5&9 physical meeting in Tallinn	
8	2018-10-17	Eric Suignard (EDF)	Version reviewed by WP5&9 partners	
9	2019-05-07	Eric Suignard (EDF)	WP6-7-8 demos alignment and miscellaneous changes	
10	2019-06-05	Ricardo Jover (EDF), Eric Suignard (EDF)	Changes following WP5&9 workshop in Chatou	
11	2020-06-16	Eric Suignard (EDF)	innogy's and Elering's review	

### 3. Scope and objectives of use case

Scope and objectives of use case	
Scope	The scope of this use case is the prediction of flexibility product availability.
Objective(s)	The objective of this use case is to detail how the prediction of flexibility product availability is undertaken.
Related business case(s)	

### 4. Narrative of Use Case

Narrative of use case
<p><b>Short description</b></p> <p>This use case describes how the prediction of flexibility availability is undertaken. Flexibility products are described as either slow (e.g. Manual Frequency Restoration Reserve (mFRR) and the UK Short Term Operating Reserve (STOR)) or semi-fast (e.g. Automatic Frequency Restoration Reserve (aFRR)) or fast (e.g. Frequency Containment Reserves (FCR) and Fast Frequency Response (FFR)) and can provide services for balancing and congestion management at local and national levels for TSOs and DSOs.</p> <p>The assessment of flexibility availability in this use case is split into three timeframes:</p> <ul style="list-style-type: none"> <li>Investment planning (3+ years ahead) aims to understand future availability and if the predictions highlight insufficient capacity that needs addressing.</li> </ul>

- Operation planning (days to years ahead) aims to predict the short, medium and long term availability of flexible products that have committed to provide service.
- Real time Planning (Intraday operation) aims to predict the current availability of flexible products for balancing and congestion management requirements for that day. This time frame is covered by DER-SCADA, flexibility bidding and flexibility activation SUCs. It relates to understand the real time flexibility availability which could be based on forecasting using historical data on how assets have performed. For example, the flexibility bidding SUC could say that today 10MW had been awarded for usage, the flexibility activation SUC could identify that, when called on, only 9MW responded. This information would be fed into the prediction forecaster, so that in the future it could tell the flexibility bidding SUC that, if it wants 10MW, then it should get 11MW as it is predicted that 10% will not respond.

### Complete description

#### Summary of use case

#### • TSO Predicting Flexibility Availability for Investment Planning

##### Description:

- Assess the levels of expected generation and intermittent electricity supply  
Description: Assessment on transmission network.  
Example for intermittent electricity supply: renewables.
- Assess the levels of expected inflexible and flexible electricity demand  
Description: Assessment on transmission network.  
Example for inflexible electricity demand: lights.  
Example for flexible electricity demand: electric vehicle charging.
- Compare supply and demand assessments across the country and for individual areas  
Description: There should be sufficient capacity and flexibility, in order to maintain agreed KPI's (e.g. having a 10% reserve margin)
- Signal to the market with appropriate mechanisms the national and local requirements  
Description: Examples of a national signal: flexibility market, demanding futures on flexibility
- Forward the national and local requirements  
Description:
- Register flexibility needs  
Description: National and local requirements to register:
  - Amount of firm electricity supply required
  - Amount of intermittent electricity supply required
  - Amount of fast (seconds response rate) flexibility product required
  - Amount of slow (minutes response rate) flexibility product required

#### • DSO Predicting Flexibility Availability for Investment Planning

##### Description:

- Assess the levels of expected generation connected to the distribution grid, inflexible and flexible electricity demand across all areas of its distribution network  
Description: Assessment on distribution network.  
Example for inflexible electricity demand: lights.  
Example for flexible electricity demand: electric vehicle charging.  
Examples of areas of distribution network: street, town, region.
- Assess the levels of expected distributed generation across all areas of its distribution network  
Description: Assessment on distribution network.

Example for expected distributed generation: solar.

Examples of areas of distribution network: street, town, region.

- Use the demand and distributed generation assessment to understand which areas could utilise flexible electricity demand to reduce the need for network reinforcement  
Description: Example for flexible electricity demand: electric vehicle charging

- Signal to the market with appropriate mechanisms the requirements  
Description: Example for signal: DSO flexibility calls for tenders

- Forward local requirements  
Description:

- Register flexibility needs  
Description: Requirements to register for network reinforcement:
  - Amount of reinforcement required that cannot be addressed with flexibility
  - Amount of fast (seconds response rate) flexibility product required
  - Amount of slow (minutes response rate) flexibility product required

- System Operator Predicting Flexibility Availability for Operational Planning

Description: The System Operator can be a TSO or a DSO.

- Publish the results of prequalification with additional restrictions information  
Description:

- Forward prequalification results  
Description:

- Register flexibility needs  
Description:

- Predict fast and slow flexibility product availability for the short-term period  
Description: Based on the flexibility energy that has been awarded to providers. The flexibility energy is adjusted using forecasting models of actual delivery by the providers and historical data

- Predict fast and slow flexibility product availability for the medium-term period  
Description: Based on the flexibility capacity that has been awarded.

- Predict fast and slow flexibility product availability for the long-term period  
Description: Based on the flexibility capacity that has been already awarded and still to be awarded based on their acquisition mechanisms (e.g. capacity market)

- Forward flexibility needs  
Description:

- System Operator Predicting Flexibility Availability for Real Time Planning

Description: The System Operator can be a TSO (imbalance) or a DSO (congestions).

- Send large FSPs real time signals about their current and near-term ability to provide flexibility  
Description: For large producers (FSPs): some data are already exchanged in real time between large producer's SCADA and network operator's SCADA.

- Send small FSPs real time signals about their current and near-term ability to provide flexibility  
Description: For FSPs who do not have a SCADA to exchange data directly with Network Operators. We will consider that data exchanges between small FSPs and system/network operators will be done in real time via Data Exchange Platforms.

- Forward small FSPs real time signals  
Description:
- Receive the flexibility predictions  
Description:
- For small FSPs that cannot provide real time signals, predict their current and near-term ability to provide flexibility availability  
Description: For FSPs that cannot offer real time signals.  
Flexibility availability is based on historical information and prediction parameters (e.g. weather).
- Combine the flexibility predictions  
Description: Done to understand availability over the day for both slow and fast flexibility products.

## 5. Key performance indicators (KPI)

## 6. Use case conditions

<b>Use case conditions</b>	
<b>Assumptions</b>	
1	Operational Planning timeframe requires data on the amount and type of flexibility that has been acquired
2	Real Time timeframe requires receiving high resolution data (e.g. updates every second or minute depending on product) directly from providers and from short term forecasting models when providers cannot provide the high resolution data.: We will consider that data exchanges: <ul style="list-style-type: none"> <li>• Between large producers (FSPs) and System Operators are already done in real time between large producer's SCADA and System Operator's SCADA,</li> <li>• Between small FSPs and System Operators will be done in real time via Data Exchange Platforms.</li> </ul>
3	Investment Planning timeframe requires data about future demand and supply scenarios that are not created in this use case
<b>Prerequisites</b>	
1	Flexibility products have been predefined and are being used
2	DSO obtains data on future (greater than 3 years) electricity demand and localised generation scenarios for all areas under its control
3	Prediction models that can utilise historical availability data must be available
4	System Operator obtains the amount of flexibility required for short-term (days/weeks ahead), medium-term (months ahead), and long-term (years ahead) periods
5	Models of how flexibility products interact with system parameters such as inertia and direction of energy flows are well defined, allowing the need for an impact of flexibility products to be reasonably well understood.: Uncertainty in these underlying models is compensated by provisioning additional flexibility contingency reserve.
6	TSO obtains data on future (greater than 3 years) electricity demand and supply scenarios for the country and individual areas

## 7. Further information to the use case for classification/mapping

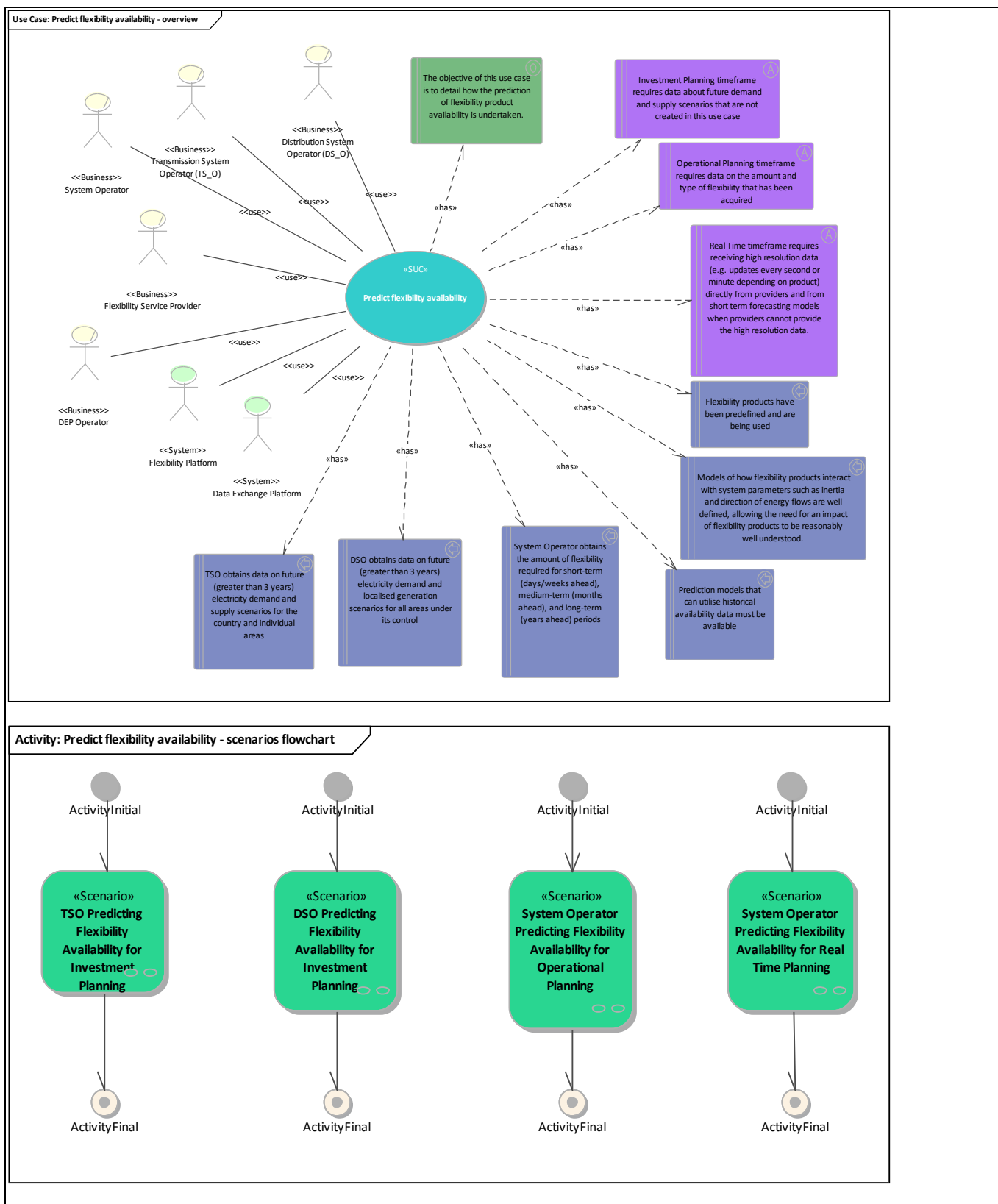
<b>Classification information</b>
<b>Relation to other use cases</b>
<b>Level of depth</b>
<b>Prioritisation</b>
<b>Generic, regional or national relation</b>

<b><i>Nature of the use case</i></b>
SUC
<b><i>Further keywords for classification</i></b>

## 8. General remarks

### 2. Diagrams of use case

<b><i>Diagram(s) of use case</i></b>
--------------------------------------



### 3. Technical details

#### 1. Actors

<b>Actors</b>			
<b>Grouping (e.g. domains, zones)</b>		<b>Group description</b>	
<b>Actor name</b>	<b>Actor type</b>	<b>Actor description</b>	<b>Further information specific to this use case</b>
Data Exchange Platform	System	Data exchange platform (DEP) is a communication platform the basic functionality of which is to secure data transfer (routing) from data providers (e.g. data hubs, flexibility service providers, TSOs, DSOs) to the data users (e.g. TSOs, DSOs, consumers, suppliers, energy service providers). DEP stores data related to its services (e.g. cryptographic hash of the data requested). The DEP does not store core energy data (e.g. meter data, grid data, market data) while these data can be stored by data hubs. Several DEPs may exist in different countries and inside one country.	
Distribution System Operator (DS_O)	Business	<p>Elaborate network development plan (including defining system needs for distribution)</p> <p>Ensure a transparent and non-discriminatory access to the distribution network for each user</p> <p>Operate the distribution grid over a specific region in a secure, reliable and efficient way</p> <p>Optimize system operation distribution grid from planning to real-time, using available levers (grid expansion, flexibility activation,...)</p> <p>Assess network status of the distribution grid and broadcast selected information of the network status to eligible actors (e.g. aggregators, other system operators)</p> <p>Support the Transmission System Operator in carrying out its responsibilities (including load shedding) and coordinate measures if necessary</p>	
Transmission System Operator (TS_O)	Business	<p>Elaborate network development plan (including defining system needs for transmission)</p> <p>Ensure a transparent and non-discriminatory access to the transmission network for each user</p> <p>Operate the transmission grid over a specific region in a secure, reliable and efficient way</p> <p>Secure and manage in real time the physical generation-consumption balance on a geographical perimeter, including ensuring the frequency control service</p> <p>Optimize transmission system operation from planning to real-time, using available levers (grid expansion, flexibility activation,...)</p> <p>Assess network status of the transmission grid and broadcast selected information of the network status to eligible actors (e.g. aggregators, other system operators)</p> <p>Provide data to the interconnection capacity market operator for the management of cross border transactions</p> <p>In critical situations, implement dedicated actions and deliver alerts during stress events</p> <p>If necessary, implement emergency measures (e.g. system defence plan) including load shedding</p>	
System Operator	Business	System Operator means a natural or legal person responsible for operating, ensuring the maintenance of and, if necessary, developing the system in a given area and, where applicable, its interconnections with other systems, and for ensuring the long-term ability of the	

		<p>system to meet reasonable demands for the distribution or transmission of electricity (cf. ENTSOE-EFET-ebIX harmonized role model 2019).</p> <p>Can be:</p> <ul style="list-style-type: none"> <li>• A Transmission System Operator (cf. definition in T3.3 deliverable), for frequency control, congestion management and voltage control on transmission network,</li> <li>• A Distribution System Operator (cf. definition in T3.3 deliverable), for congestion management and voltage control on distribution network.</li> </ul> <p>NB: In some countries (e.g. Germany and Poland), the high voltage network is part of the distribution grid and in other countries (e. g. France and Italy) the high voltage network is part of the transmission grid.</p> <p>A System Operator can be:</p> <ul style="list-style-type: none"> <li>• A Primary System Operator,</li> <li>• A Secondary System Operator.</li> </ul>	
Flexibility Platform	System	<p>Flexibility Platform (FP) for System Operators and Flexibility Service Providers that enables the trading of different flexibility products and services. A FP is operated by a Market Operator.</p> <p>Available to System Operators and Flexibility Services Providers. It is used to support the prequalification, the bidding, the activation and the verification processes, ensuring coordination between activities undertaken by several operators using the same flexible resources. Several national and regional FPs may exist.</p>	
Flexibility Service Provider	Business	<p>Can be a Distribution Network Flexibility Provider or a Transmission Network Flexibility Provider (cf. definitions in T3.3 deliverable). Similar to Flexibility Aggregator. Can be both aggregator and individual consumer/generator. Type of Energy Service Provider.</p>	
DEP Operator	Business	<p>Data exchange platform operator owns and operates a communication system which basic functionality is data transfer.</p>	

## 2. References

### 4. Step by step analysis of use case

#### 1. Overview of scenarios

Scenario conditions						
No.	Scenario name	Scenario description	Primary actor	Triggering event	Pre-condition	Post-condition
1	TSO Predicting Flexibility Availability for Investment Planning				This scenario should start after the registration of the prequalification results (see "Prequalification of the Flexibility Service Providers and providers per service/product" scenario in "Manage flexibility bids" SUC).	

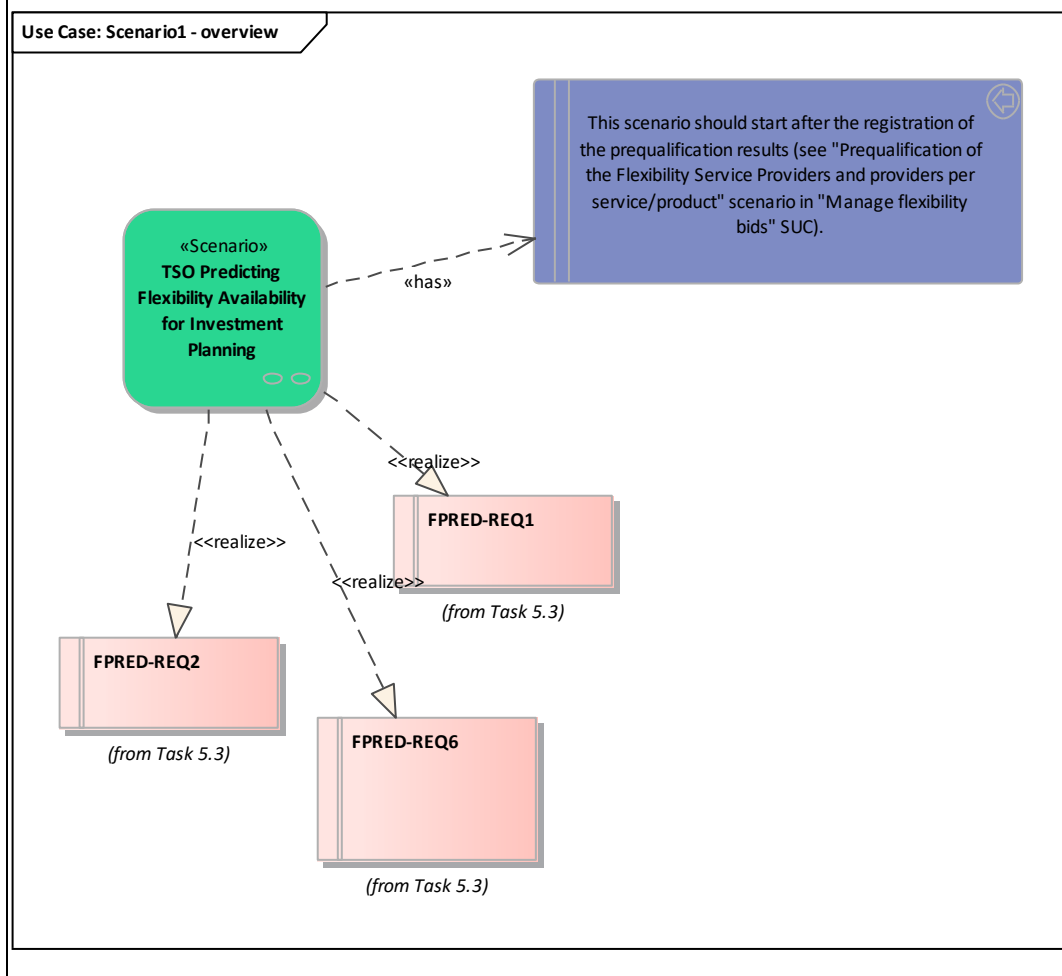
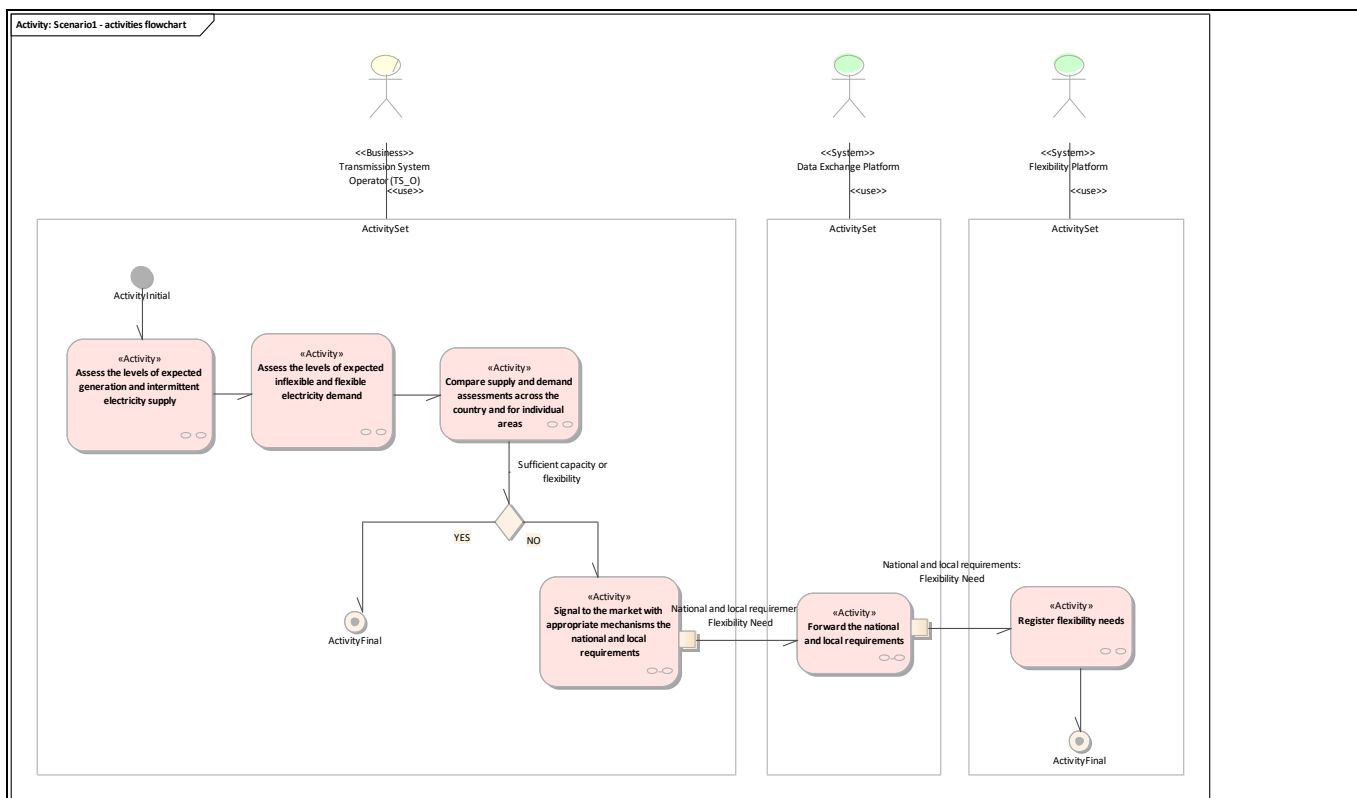


2	DSO Predicting Flexibility Availability for Investment Planning					
3	System Operator Predicting Flexibility Availability for Operational Planning	The System Operator can be a TSO or a DSO.			The scenario should start with "Prequalification results" last activity of the prequalification scenario described in "Manage flexibility bids" SUC.	
4	System Operator Predicting Flexibility Availability for Real Time Planning	The System Operator can be a TSO (imbalance) or a DSO (congestions).				

## 2. Steps - Scenarios

### ▪ TSO Predicting Flexibility Availability for Investment Planning

Requirement list (refer to "Requirement" section for more information)	
Requirement R-ID	Requirement name
Cat1.Req1	FPRED-REQ1
Cat1.Req2	FPRED-REQ2
Cat1.Req3	FPRED-REQ6



## Scenario step by step analysis

Scenario								
Scenario name		TSO Predicting Flexibility Availability for Investment Planning						
Step No	Event	Name of process/activity	Description of process/activity	Service	Information producer (actor)	Information receiver (actor)	Information exchanged (IDs)	Requirement, R-IDs
1.1		Assess the levels of expected generation and intermittent electricity supply	Assessment on transmission network. Example for intermittent electricity supply: renewables.		<u>Transmission System Operator (TSO)</u>			
1.2		Assess the levels of expected inflexible and flexible electricity demand	Assessment on transmission network. Example for inflexible electricity demand: lights. Example for flexible electricity demand: electric vehicle charging.		<u>Transmission System Operator (TSO)</u>			
1.3		Compare supply and demand assessments across the country and for individual areas	There should be sufficient capacity and flexibility, in order to maintain agreed KPI's (e.g. having a 10% reserve margin)		<u>Transmission System Operator (TSO)</u>			
1.4		Signal to the market with appropriate mechanisms the national and local requirements	Examples of a national signal: flexibility market, demanding futures on flexibility		<u>Transmission System Operator (TSO)</u>	<u>Data Exchange Platform</u>	Info1-Flexibility Need	
1.5		Forward the national and local requirements			<u>Data Exchange Platform</u>	<u>Flexibility Platform</u>	Info1-Flexibility Need	
1.6		Register flexibility needs	National and local requirements to register: - Amount of firm electricity supply required - Amount of intermittent electricity supply required - Amount of fast (seconds response rate) flexibility product required - Amount of slow (minutes response		<u>Flexibility Platform</u>			

			rate) flexibility product required					
--	--	--	---------------------------------------	--	--	--	--	--

5. 1.4. Signal to the market with appropriate mechanisms the national and local requirements

**Business section: TSO Predicting Flexibility Availability for Investment Planning /Signal to the market with appropriate mechanisms the national and local requirements**

Examples of a national signal: flexibility market, demanding futures on flexibility

Information sent:

<b><i>Business object</i></b>	<b><i>Instance name</i></b>	<b><i>Instance description</i></b>
Flexibility Need	National and local requirements	

6. 1.5. Forward the national and local requirements

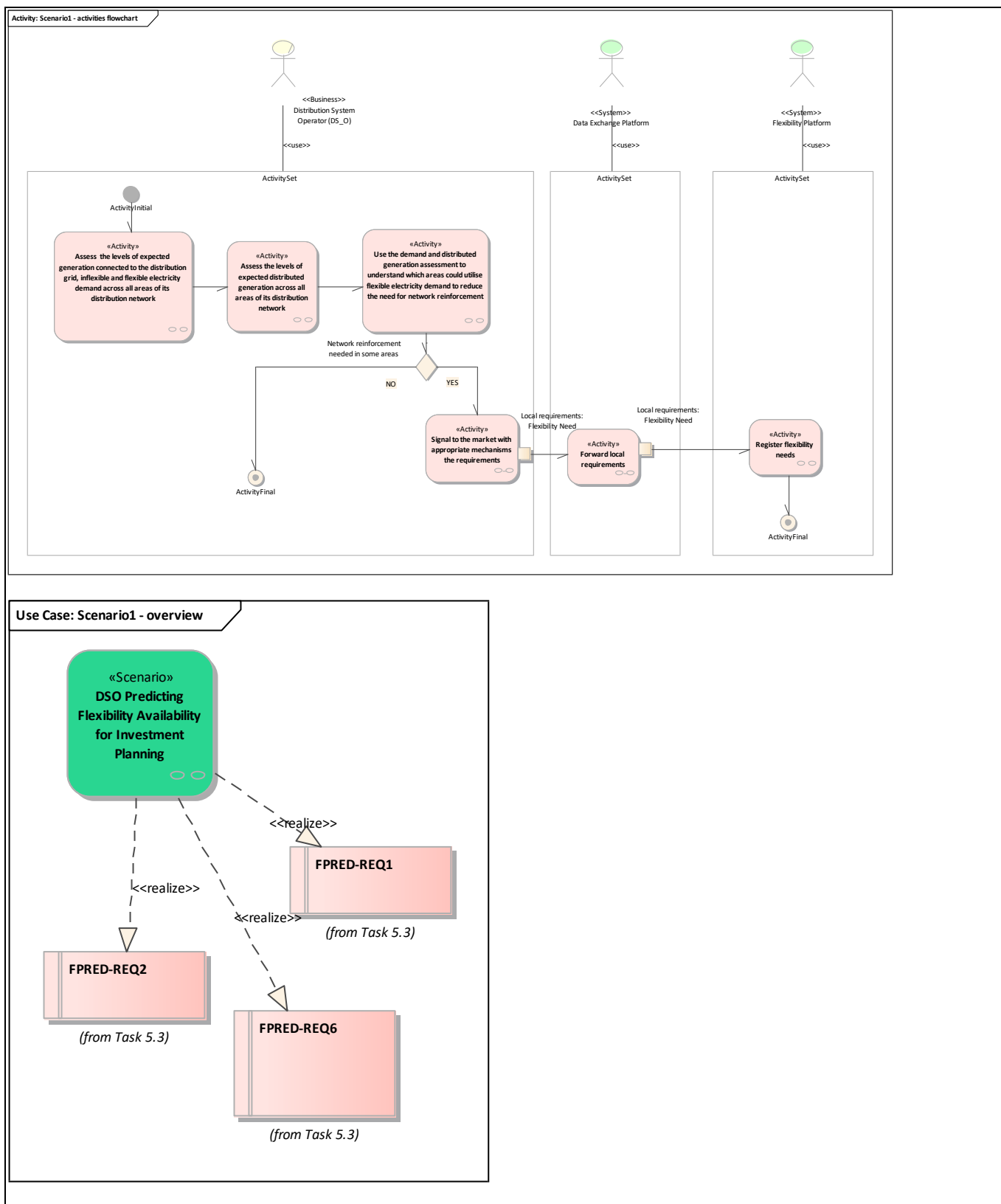
**Business section: TSO Predicting Flexibility Availability for Investment Planning /Forward the national and local requirements**

Information sent:

<b><i>Business object</i></b>	<b><i>Instance name</i></b>	<b><i>Instance description</i></b>
Flexibility Need	National and local requirements	

- **DSO Predicting Flexibility Availability for Investment Planning**

<b><i>Requirement list (refer to "Requirement" section for more information)</i></b>	
<b><i>Requirement R-ID</i></b>	<b><i>Requirement name</i></b>
Cat1.Reg1	FPRED-REQ1
Cat1.Reg3	FPRED-REQ6
Cat1.Reg2	FPRED-REQ2



## Scenario step by step analysis

### Scenario

Scenario name		DSO Predicting Flexibility Availability for Investment Planning						
Step No	Event	Name of process/activity	Description of process/activity	Service	Information producer (actor)	Information receiver (actor)	Information exchanged (IDs)	Requirement, R-IDs
2.1		Assess the levels of expected generation connected to the distribution grid, inflexible and flexible electricity demand across all areas of its distribution network	Assessment on distribution network. Example for inflexible electricity demand: lights. Example for flexible electricity demand: electric vehicle charging. Examples of areas of distribution network: street, town, region.		<u>Distribution System Operator (DS_O)</u>			
2.2		Assess the levels of expected distributed generation across all areas of its distribution network	Assessment on distribution network. Example for expected distributed generation: solar. Examples of areas of distribution network: street, town, region.		<u>Distribution System Operator (DS_O)</u>			
2.3		Use the demand and distributed generation assessment to understand which areas could utilise flexible electricity demand to reduce the need for network reinforcement	Example for flexible electricity demand: electric vehicle charging		<u>Distribution System Operator (DS_O)</u>			
2.4		Signal to the market with appropriate mechanisms the requirements	Example for signal: DSO flexibility calls for tenders		<u>Distribution System Operator (DS_O)</u>	<u>Data Exchange Platform</u>	Info1-Flexibility Need	
2.5		Forward local requirements			<u>Data Exchange Platform</u>	<u>Flexibility Platform</u>	Info1-Flexibility Need	
2.6		Register flexibility needs	Requirements to register for network reinforcement: - Amount of reinforcement required that		<u>Flexibility Platform</u>			

			cannot be addressed with flexibility - Amount of fast (seconds response rate) flexibility product required - Amount of slow (minutes response rate) flexibility product required					
--	--	--	--	--	--	--	--	--

- 2.4. Signal to the market with appropriate mechanisms the requirements

**Business section: DSO Predicting Flexibility Availability for Investment Planning /Signal to the market with appropriate mechanisms the requirements**

Example for signal: DSO flexibility calls for tenders

Information sent:

<b>Business object</b>	<b>Instance name</b>	<b>Instance description</b>
Flexibility Need	Local requirements	

- 2.5. Forward local requirements

**Business section: DSO Predicting Flexibility Availability for Investment Planning /Forward local requirements**

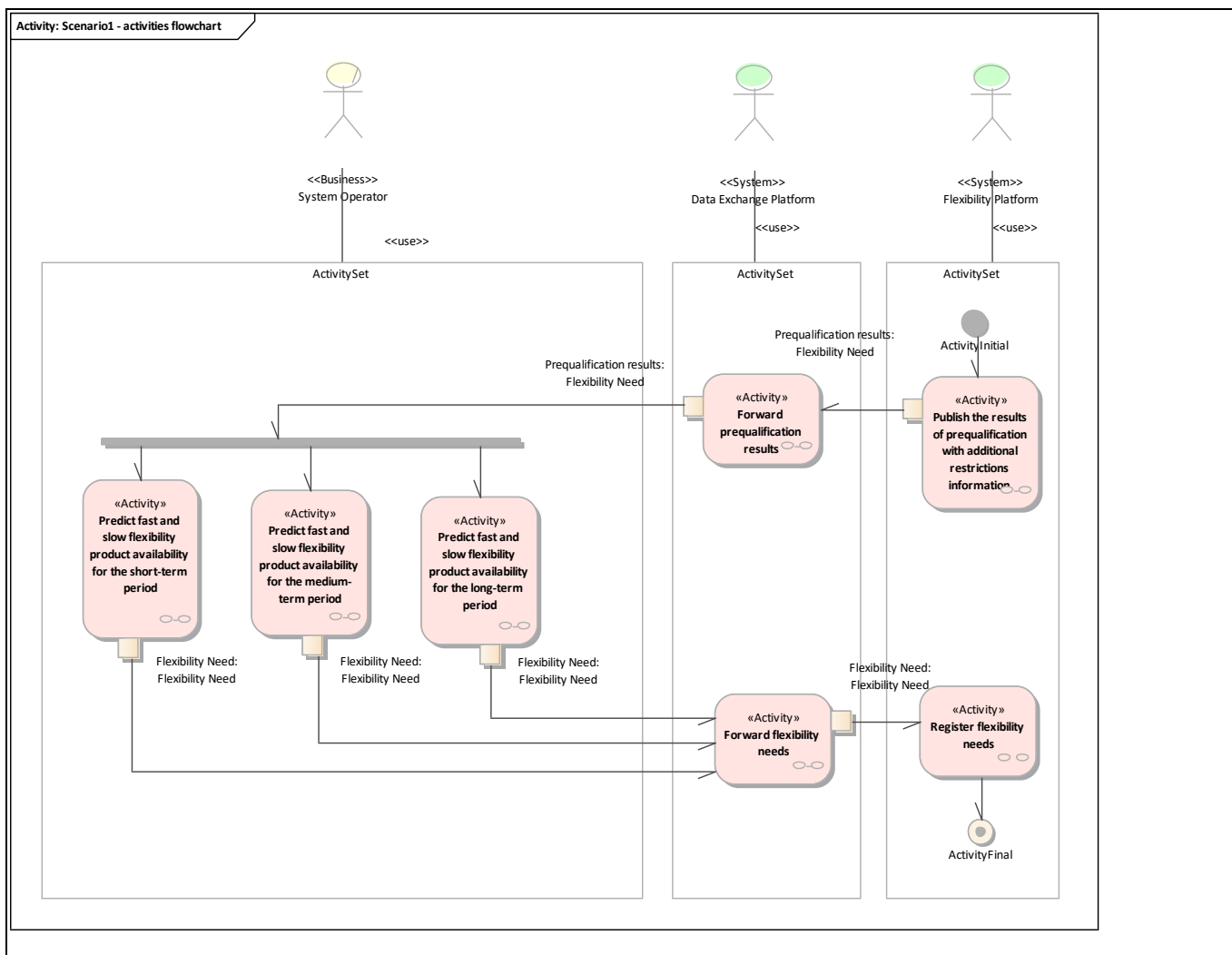
Information sent:

<b>Business object</b>	<b>Instance name</b>	<b>Instance description</b>
Flexibility Need	Local requirements	

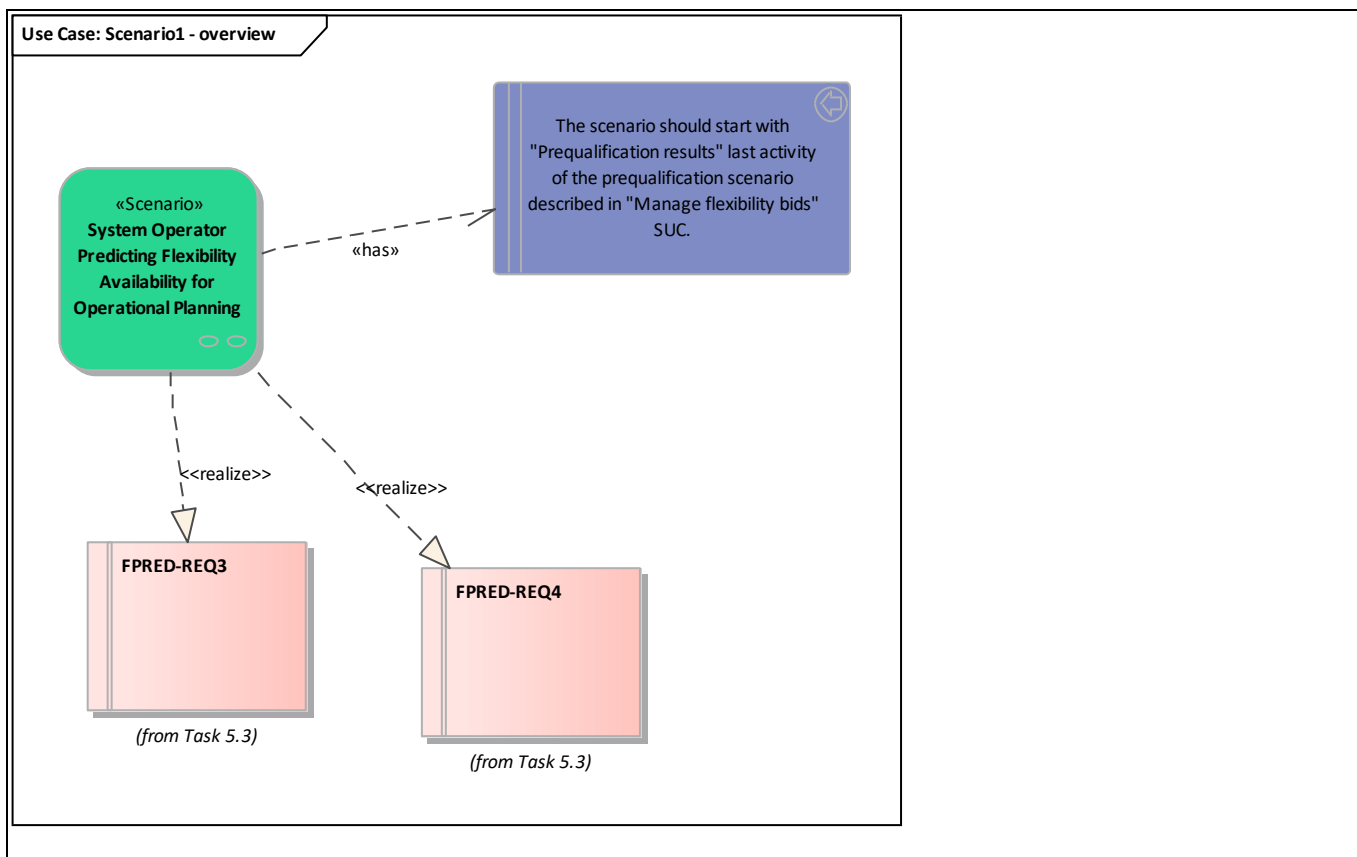
- **System Operator Predicting Flexibility Availability for Operational Planning**

The System Operator can be a TSO or a DSO.

<b>Requirement list (refer to "Requirement" section for more information)</b>	
<b>Requirement R-ID</b>	<b>Requirement name</b>
Cat1.Req4	FPRED-REQ3
Cat1.Req5	FPRED-REQ4







### Scenario step by step analysis

Scenario								
Scenario name		System Operator Predicting Flexibility Availability for Operational Planning						
Step No	Event	Name of process/activity	Description of process/activity	Service	Information producer (actor)	Information receiver (actor)	Information exchanged (IDs)	Requirement, R-IDs
3.1		Publish the results of prequalification with additional restrictions information			Flexibility Platform	Data Exchange Platform	Info1-Flexibility Need	
3.2		Forward prequalification results			Data Exchange Platform	System Operator, System Operator, System Operator	Info1-Flexibility Need	
3.3		Register flexibility needs			Flexibility Platform			
3.4		Predict fast and slow flexibility product availability for the short-term period	Based on the flexibility energy that has been awarded to providers. The flexibility energy is adjusted using		System Operator	Data Exchange Platform	Info1-Flexibility Need	

			forecasting models of actual delivery by the providers and historical data					
3.5		Predict fast and slow flexibility product availability for the medium-term period	Based on the flexibility capacity that has been awarded.		<u>System Operator</u>	<u>Data Exchange Platform</u>	Info1-Flexibility Need	
3.6		Predict fast and slow flexibility product availability for the long-term period	Based on the flexibility capacity that has been already awarded and still to be awarded based on their acquisition mechanisms (e.g. capacity market)		<u>System Operator</u>	<u>Data Exchange Platform</u>	Info1-Flexibility Need	
3.7		Forward flexibility needs			<u>Data Exchange Platform</u>	<u>Flexibility Platform</u>	Info1-Flexibility Need	

- 3.1. Publish the results of prequalification with additional restrictions information

**Business section: System Operator Predicting Flexibility Availability for Operational Planning /Publish the results of prequalification with additional restrictions information**

Information sent:

<b><i>Business object</i></b>	<b><i>Instance name</i></b>	<b><i>Instance description</i></b>
<u>Flexibility Need</u>	Prequalification results	

- 3.2. Forward prequalification results

**Business section: System Operator Predicting Flexibility Availability for Operational Planning /Forward prequalification results**

Information sent:

<b><i>Business object</i></b>	<b><i>Instance name</i></b>	<b><i>Instance description</i></b>
<u>Flexibility Need</u>	Prequalification results	

- 3.4. Predict fast and slow flexibility product availability for the short-term period

**Business section: System Operator Predicting Flexibility Availability for Operational Planning /Predict fast and slow flexibility product availability for the short-term period**

Based on the flexibility energy that has been awarded to providers. The flexibility energy is adjusted using forecasting models of actual delivery by the providers and historical data

Information sent:

<b><i>Business object</i></b>	<b><i>Instance name</i></b>	<b><i>Instance description</i></b>
<u>Flexibility Need</u>	Flexibility Need	

- 3.5. Predict fast and slow flexibility product availability for the medium-term period

**Business section: System Operator Predicting Flexibility Availability for Operational Planning /Predict fast and slow flexibility product availability for the medium-term period**

Based on the flexibility capacity that has been awarded.

Information sent:

<b><i>Business object</i></b>	<b><i>Instance name</i></b>	<b><i>Instance description</i></b>
Flexibility Need	Flexibility Need	

- 3.6. Predict fast and slow flexibility product availability for the long-term period

**Business section: System Operator Predicting Flexibility Availability for Operational Planning /Predict fast and slow flexibility product availability for the long-term period**

Based on the flexibility capacity that has been already awarded and still to be awarded based on their acquisition mechanisms (e.g. capacity market)

Information sent:

<b><i>Business object</i></b>	<b><i>Instance name</i></b>	<b><i>Instance description</i></b>
Flexibility Need	Flexibility Need	

- 3.7. Forward flexibility needs

**Business section: System Operator Predicting Flexibility Availability for Operational Planning /Forward flexibility needs**

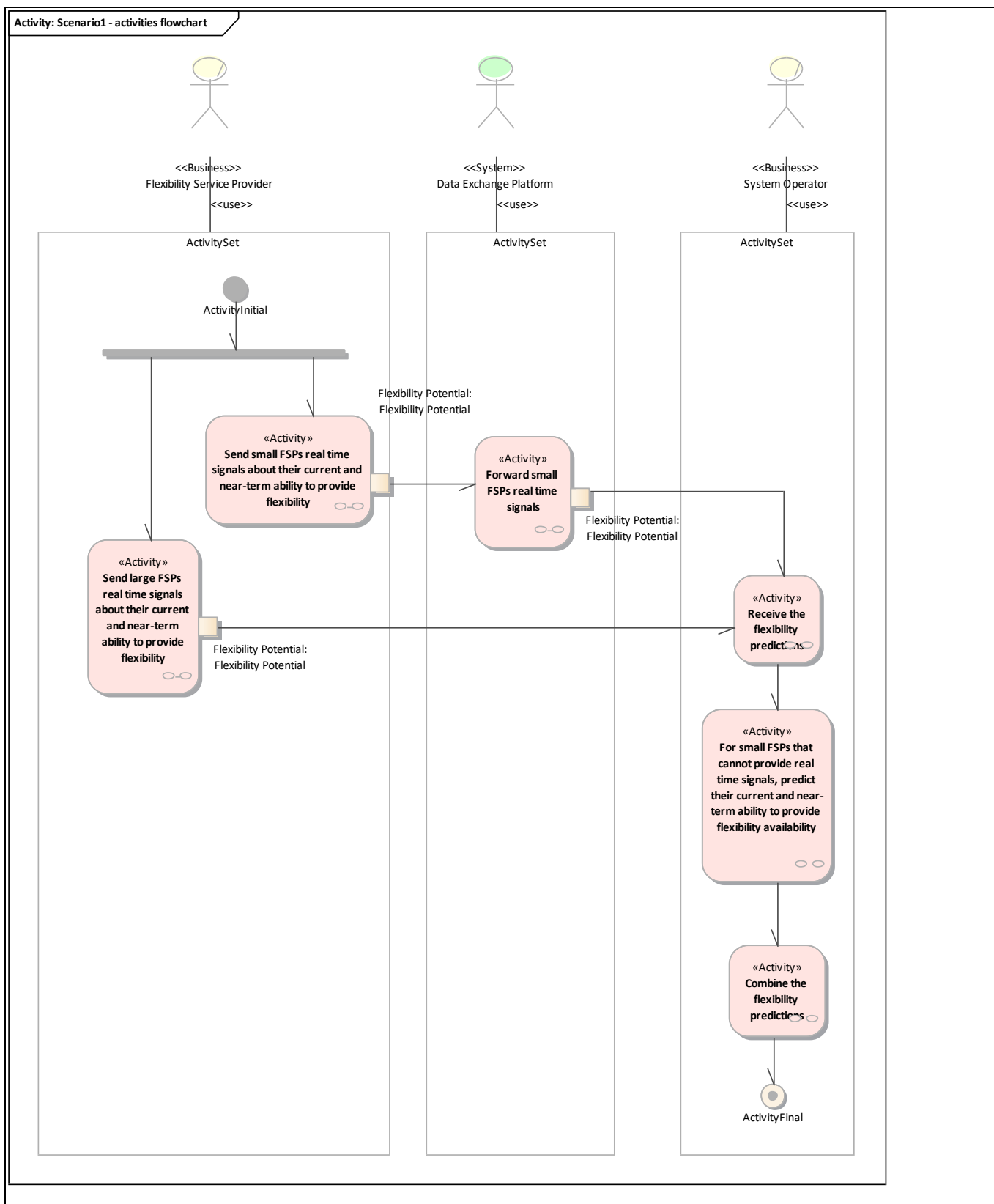
Information sent:

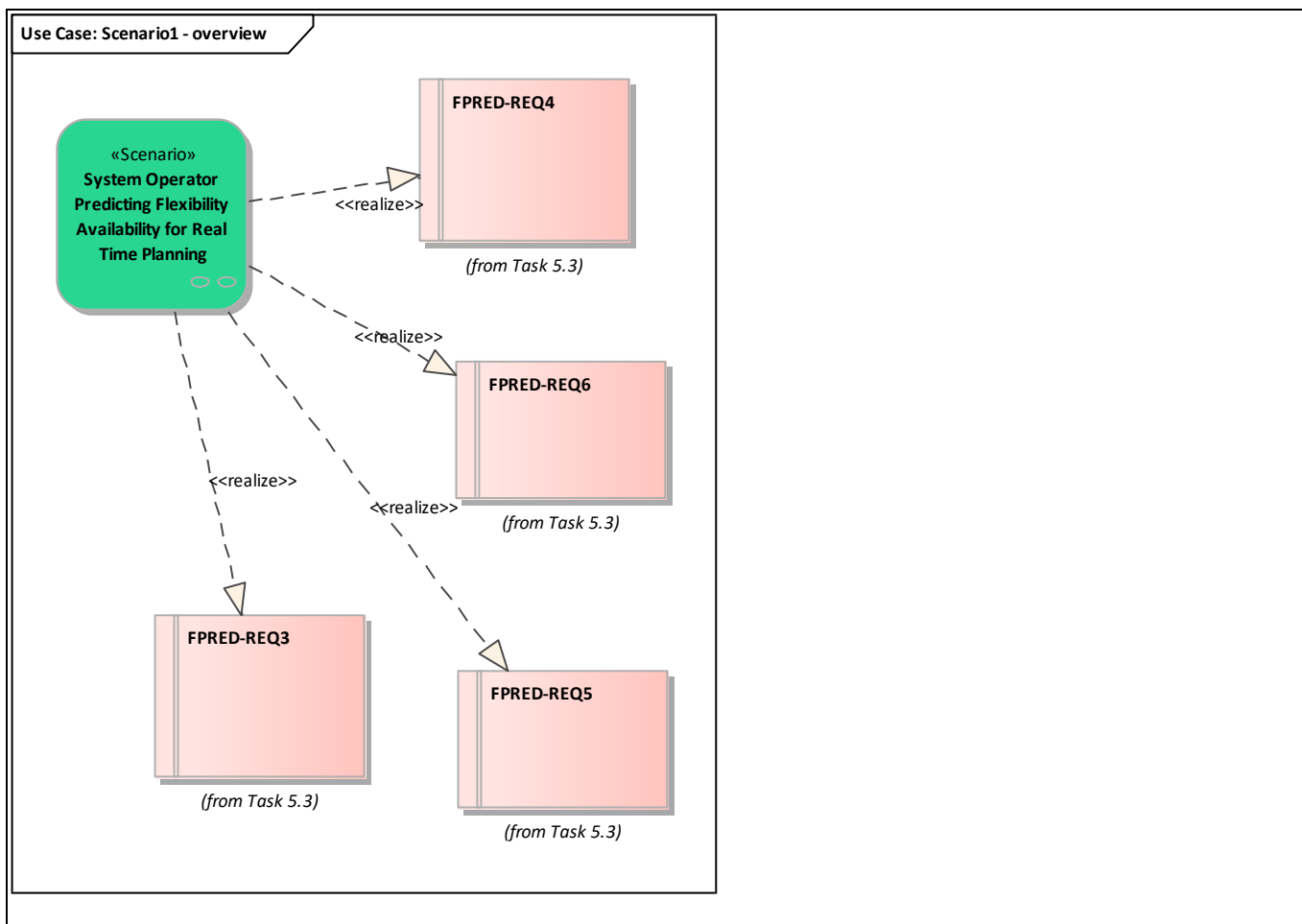
<b><i>Business object</i></b>	<b><i>Instance name</i></b>	<b><i>Instance description</i></b>
Flexibility Need	Flexibility Need	

- **System Operator Predicting Flexibility Availability for Real Time Planning**

The System Operator can be a TSO (imbalance) or a DSO (congestions).

<b><i>Requirement list (refer to "Requirement" section for more information)</i></b>	
<b><i>Requirement R-ID</i></b>	<b><i>Requirement name</i></b>
Cat1.Reg5	FPRED-REQ4
Cat1.Reg3	FPRED-REQ6
Cat1.Reg4	FPRED-REQ3
Cat1.Reg6	FPRED-REQ5





## Scenario step by step analysis

Scenario								
Scenario name		System Operator Predicting Flexibility Availability for Real Time Planning						
Step No	Event	Name of process/activity	Description of process/activity	Service	Information producer (actor)	Information receiver (actor)	Information exchanged (IDs)	Requirement, R-IDs
4.1		Send large FSPs real time signals about their current and near-term ability to provide flexibility	For large producers (FSPs): some data are already exchanged in real time between large producer's SCADA and network operator's SCADA.		Flexibility Service Provider	System Operator	Info2-Flexibility Potential	
4.2		Send small FSPs real time signals about their current and near-term ability to provide flexibility	For FSPs who do not have a SCADA to exchange data directly with Network Operators. We will consider that data exchanges between small FSPs and system/network		Flexibility Service Provider	Data Exchange Platform	Info2-Flexibility Potential	

			operators will be done in real time via Data Exchange Platforms.					
4.3		Forward small FSPs real time signals			Data Exchange Platform	System Operator	Info2-Flexibility Potential	
4.4		Receive the flexibility predictions			System Operator			
4.5		For small FSPs that cannot provide real time signals, predict their current and near-term ability to provide flexibility availability	For FSPs that cannot offer real time signals. Flexibility availability is based on historical information and prediction parameters (e.g. weather).		System Operator			
4.6		Combine the flexibility predictions	Done to understand availability over the day for both slow and fast flexibility products.		System Operator			

- 4.1. Send large FSPs real time signals about their current and near-term ability to provide flexibility

**Business section: System Operator Predicting Flexibility Availability for Real Time Planning/Send large FSPs real time signals about their current and near-term ability to provide flexibility**

For large producers (FSPs): some data are already exchanged in real time between large producer's SCADA and network operator's SCADA.

Information sent:

Business object	Instance name	Instance description
Flexibility Potential	Flexibility Potential	

- 4.2. Send small FSPs real time signals about their current and near-term ability to provide flexibility

**Business section: System Operator Predicting Flexibility Availability for Real Time Planning/Send small FSPs real time signals about their current and near-term ability to provide flexibility**

For FSPs who do not have a SCADA to exchange data directly with Network Operators. We will consider that data exchanges between small FSPs and system/network operators will be done in real time via Data Exchange Platforms.

Information sent:

Business object	Instance name	Instance description
Flexibility Potential	Flexibility Potential	

- 4.3. Forward small FSPs real time signals

**Business section: System Operator Predicting Flexibility Availability for Real Time Planning/Forward small FSPs real time signals**

Information sent:

<b>Business object</b>	<b>Instance name</b>	<b>Instance description</b>
Flexibility Potential	Flexibility Potential	

## 5. Information exchanged

<b>Information exchanged</b>			
<b>Information exchanged, ID</b>	<b>Name of information</b>	<b>Description of information exchanged</b>	<b>Requirement, R-IDs</b>
Info1	Flexibility Need		
Info2	Flexibility Potential		

## 6. Requirements (optional)

<b>Requirements (optional)</b>		
<b>Categories ID</b>	<b>Category name for requirements</b>	<b>Category description</b>
Cat1	Task 5.3	Requirements integrated from Task 5.3.
<b>Requirement R-ID</b>	<b>Requirement name</b>	<b>Requirement description</b>
Req1	FPRED-REQ1	Collection of data for prediction (long term - years)
Req2	FPRED-REQ2	Computation of predictions (long term - years)
Req3	FPRED-REQ6	Computation of predictions (long term - intraday operation)
Req4	FPRED-REQ3	Collection of data for prediction (medium-term - days to years ahead)
Req5	FPRED-REQ4	Computation of predictions ( medium-term - days to years ahead )
Req6	FPRED-REQ5	Collection of data for prediction (short term - intraday operation)

## 7. Common terms and definitions

## 8. Custom information (optional)

### 9.16 PROVIDE LIST OF SUPPLIERS AND ESCOS

# Provide list of suppliers and ESCOs

Based on IEC 62559-2 edition 1  
Generated from UML Use Case Repository with Modsarus® (EDF R&D Tool)

## 1. Description of the use case

### 1. Name of use case

<b>Use case identification</b>
--------------------------------

ID	Area(s)/Domain(s)/Zone(s)	Name of use case
	Market for flexibilities, Services related to end customers, Access to data	Provide list of suppliers and ESCOs

## 2. Version management

Version management				
Version No.	Date	Name of author(s)	Changes	Approval status
1	2018-04-12	Richárd Balog (Mavir)		
2	2018-07-11	Florentin Dam (AKKA)	UML modelling	
3	2018-07-19	Florentin Dam (AKKA)	Fusion of the two initial scenarios Added a new scenario	
4	2018-07-23	Florentin Dam (AKKA)	Added the detailed activities for the second scenario	
5	2018-07-25	Florentin Dam (AKKA)	Added details on the two scenarios, scope and prerequisite	
6	2018-08-02	Eric Suignard (EDF)		
7	2018-09-21	Eric Suignard (EDF)		
8	2018-10-04	Eric Suignard (EDF)	Version post WP5&9 physical meeting in Tallinn	
9	2018-10-17	Eric Suignard (EDF)	Version reviewed by WP5&9 partners	
10	2019-05-07	Eric Suignard (EDF)	WP6-7-8 demos alignment and miscellaneous changes	
11	2019-06-13	Eric Suignard (EDF)	Elering review	
12	2020-06-16	Eric Suignard (EDF)	innogy's and Elering's review	

## 3. Scope and objectives of use case

Scope and objectives of use case	
<b>Scope</b>	Set up, store and share the list of suppliers and service providers.
<b>Objective(s)</b>	To make available the list of suppliers and service providers: through data exchange platform and list of aggregators through flexibility platform to make easier to get in contact for the interested parties.
<b>Related business case(s)</b>	

## 4. Narrative of Use Case

Narrative of use case	
<b>Short description</b>	
1) Set up and share the list of suppliers and service providers to be made available through a data exchange platform for the interested parties. The list is available for authorised parties who can get in contact with suppliers and service provider for any kind of business purpose. 2) Set up and share the list of aggregators to be made available through a flexibility platform for the individual Flexibility Service Providers. Individual Flexibility Service Providers can contact the aggregators in the list and find a suitable one.	
<b>Complete description</b>	
<p style="text-align: center;"><u>Summary of use case</u></p> <ul style="list-style-type: none"> <li><b>Registration on the Data Exchange Platform with verification</b>  <u>Description:</u> A supplier or service provider register to use data exchange platform</li> </ul>	



- Fill in a registration form  
Description:
- Upload necessary documents  
Description:
- Generate user account with all details  
Description:
- Send account, usage and authentication information  
Description:
- Send a notification of refusal to the ESCO  
Description:
- Send a notification of acceptance to the ESCO  
Description:
- Add the ESCO in the list in the DEP of its country  
Description:
- Add the ESCO in the list in the DEP of other countries too  
Description:
- Make the new Energy Service Provider accessible in the list of suppliers and ESCOs.  
Description:
- **Presenting the list of aggregators on flexibility platform**  
Description:
  - Request for being listed in the platform  
Description:
  - Request for being listed in the platform  
Description:
  - Review the request  
Description:
  - Send a notification of refusal to the aggregator  
Description:
  - Include the aggregator in the list and send notification of acceptance  
Description:

## 5. Key performance indicators (KPI)

## 6. Use case conditions

Use case conditions	
Assumptions	
1	The communication channel is protected
2	Some sort of validation is applied (sending sms or email to conform the request):
3	Suppliers and ESCOs: Suppliers can be considered as kinds of ESCOs. A supplier is the party selling energy, whereas an ESCO is a provider of different energy related services.

<i>Prerequisites</i>	
1	The user has to authenticate in order to be able to see the list in the flexibility platform.

## 7. Further information to the use case for classification/mapping

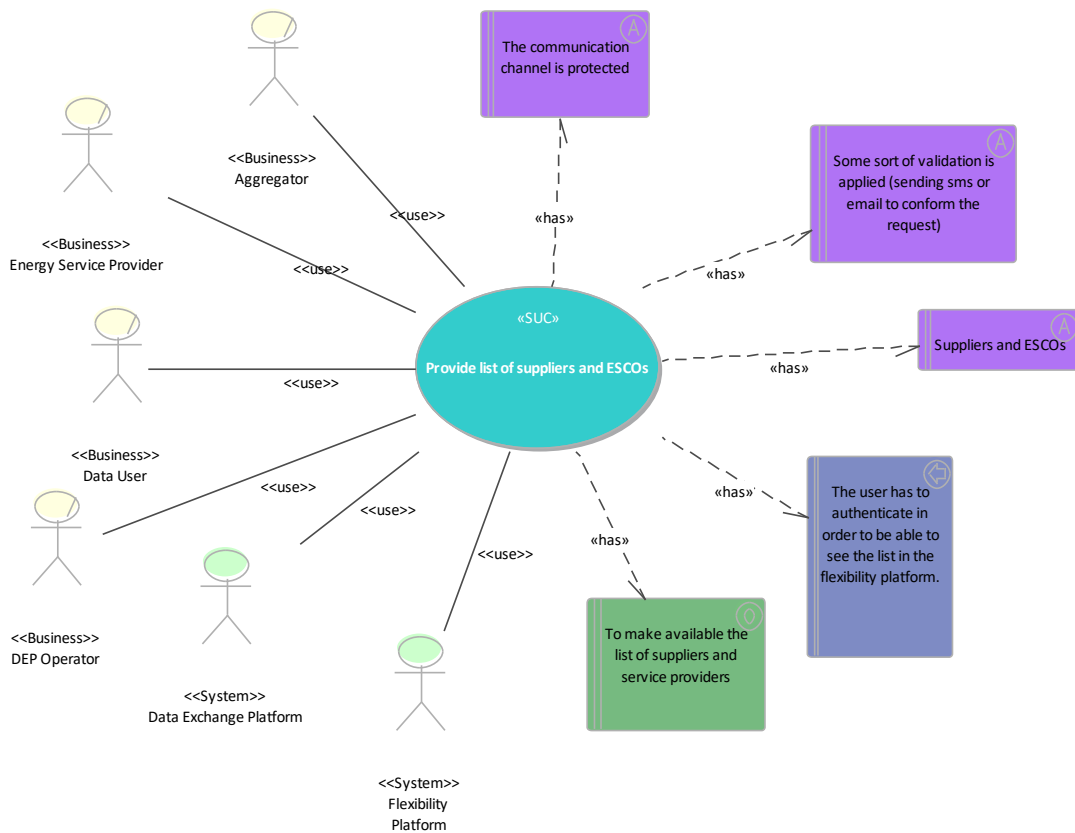
<i>Classification information</i>
<i>Relation to other use cases</i>
<i>Level of depth</i>
<i>Prioritisation</i>
<i>Generic, regional or national relation</i>
<i>Nature of the use case</i>
SUC
<i>Further keywords for classification</i>

## 8. General remarks

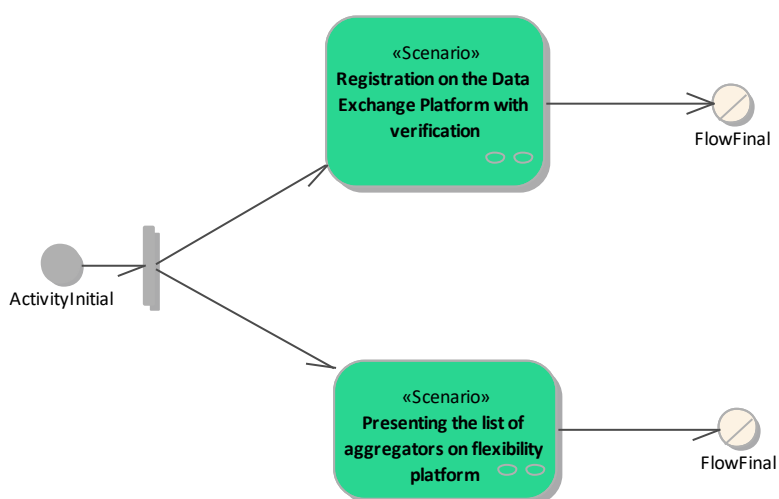
### 2. Diagrams of use case

<i>Diagram(s) of use case</i>
-------------------------------

Use Case: Provide list of suppliers and ESCOs - overview



Activity: Provide list of suppliers and ESCOs - scenarios flowchart



### 3. Technical details

#### 1. Actors

Actors			
Grouping (e.g. domains, zones)		Group description	
Actor name	Actor type	Actor description	Further information specific to this use case
Data Exchange Platform	System	Data exchange platform (DEP) is a communication platform the basic functionality of which is to secure data transfer (routing) from data providers (e.g. data hubs, flexibility service providers, TSOs, DSOs) to the data users (e.g. TSOs, DSOs, consumers, suppliers, energy service providers). DEP stores data related to its services (e.g. cryptographic hash of the data requested). The DEP does not store core energy data (e.g. meter data, grid data, market data) while these data can be stored by data hubs. Several DEPs may exist in different countries and inside one country.	Data exchange platform to share meter data
Aggregator	Business	Aggregate and maximise value of portfolio(s) of resources (cf. definition in T3.3 deliverable).	
Data User	Business	Any person who uses data. Can be a Data Owner or a Data Delegated Third party.	
Energy Service Provider	Business	A party offering energy-related services to any other party (adapted from ENTSOE-EFET-ebIX harmonized role model). Energy service provider (ESCO – energy service company) is a market-based role which is responsible for delivering energy services to the customers (or to other parties of behalf of the customers). In case these services necessitate the access to customer's data, the consent of this customer is required. Examples of the executors of this role include aggregator, flexibility service provider, energy efficiency provider, energy monitoring provider. Can also be an Aggregator or a Generator (cf. definitions in T3.3 deliverable).	
Flexibility Platform	System	Flexibility Platform (FP) for System Operators and Flexibility Service Providers that enables the trading of different flexibility products and services. A FP is operated by a Market Operator.  Available to System Operators and Flexibility Services Providers. It is used to support the prequalification, the bidding, the activation and the verification processes, ensuring coordination between activities undertaken by several operators using the same flexible resources. Several national and regional FPs may exist.	
DEP Operator	Business	Data exchange platform operator owns and operates a communication system which basic functionality is data transfer.	

#### 2. References

### 4. Step by step analysis of use case

#### 1. Overview of scenarios

Scenario conditions						
No.	Scenario name	Scenario description	Primary actor	Triggering event	Pre-condition	Post-condition

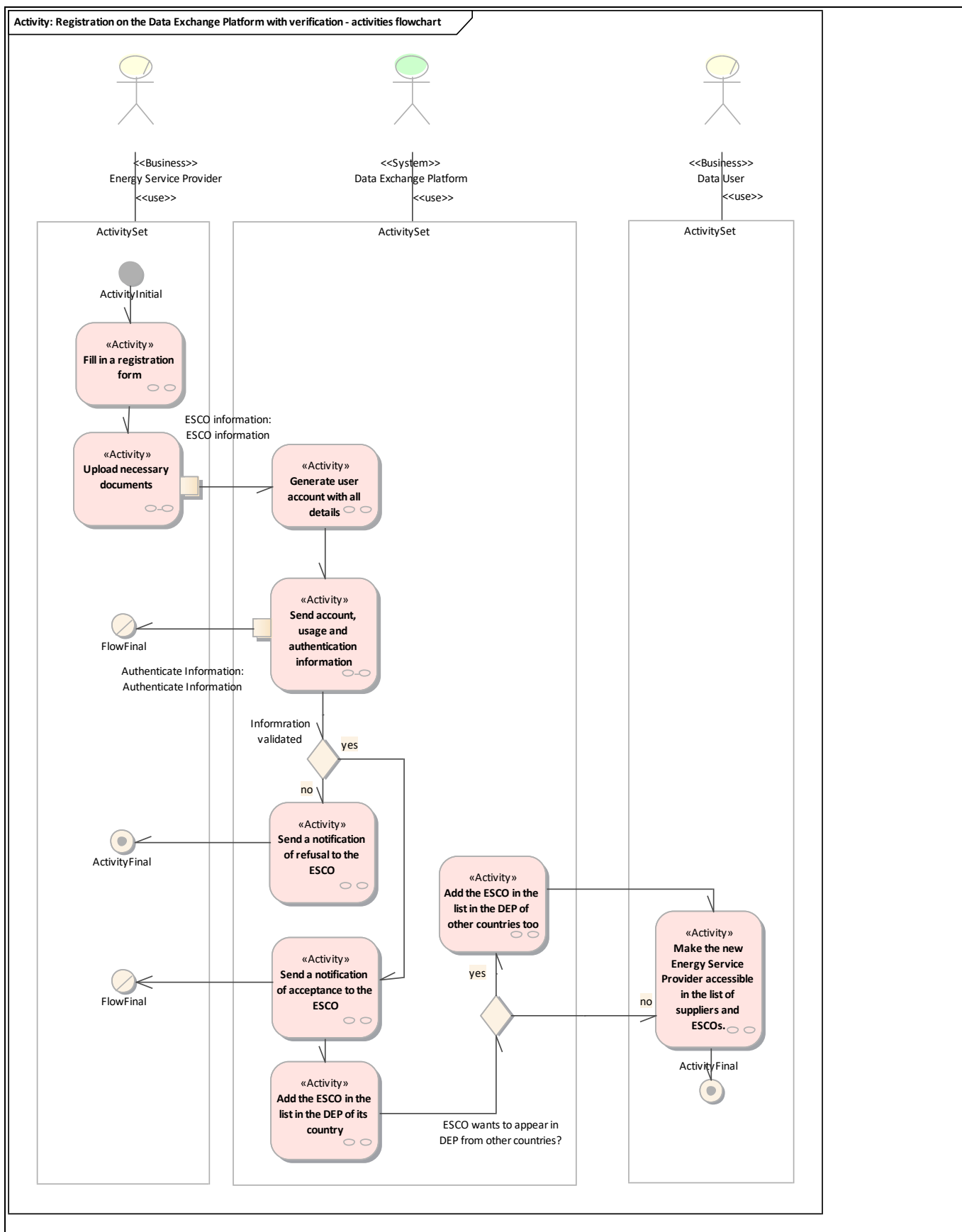
1	Registration on the Data Exchange Platform with verification	A supplier or service provider register to use data exchange platform				
2	Presenting the list of aggregators on flexibility platform					

## 2. Steps - Scenarios

### ▪ Registration on the Data Exchange Platform with verification

A supplier or service provider register to use data exchange platform

<i>Requirement list (refer to "Requirement" section for more information)</i>	
<i>Requirement R-ID</i>	<i>Requirement name</i>
Cat1.Reg1	ESCO-REQ1





### Scenario step by step analysis

Scenario								
Scenario name		Registration on the Data Exchange Platform with verification						
Step No	Event	Name of process/activity	Description of process/activity	Service	Information producer (actor)	Information receiver (actor)	Information exchanged (IDs)	Requirement, R-IDs
1.1		Fill in a registration form			Energy Service Provider			
1.2		Upload necessary documents			Energy Service Provider	Data Exchange Platform	Info1-ESCO information	
1.3		Generate user account with all details			Data Exchange Platform			
1.4		Send account, usage and authentication information			Data Exchange Platform	Energy Service Provider	Info2-Authenticate Information	
1.5		Send a notification of refusal to the ESCO			Data Exchange Platform			
1.6		Send a notification of acceptance to the ESCO			Data Exchange Platform			
1.7		Add the ESCO in the list in the DEP of its country			Data Exchange Platform			
1.8		Add the ESCO in the list in the DEP of other countries too			Data Exchange Platform			
1.9		Make the new Energy Service			Data User			

		Provider accessible in the list of suppliers and ESCOs.						
--	--	---	--	--	--	--	--	--

- 1.2. Upload necessary documents

**Business section: Registration on the Data Exchange Platform with verification/Upload necessary documents**

Information sent:

<i>Business object</i>	<i>Instance name</i>	<i>Instance description</i>
<u>ESCO information</u>	ESCO information	

- 1.4. Send account, usage and authentication information

**Business section: Registration on the Data Exchange Platform with verification/Send account, usage and authentication information**

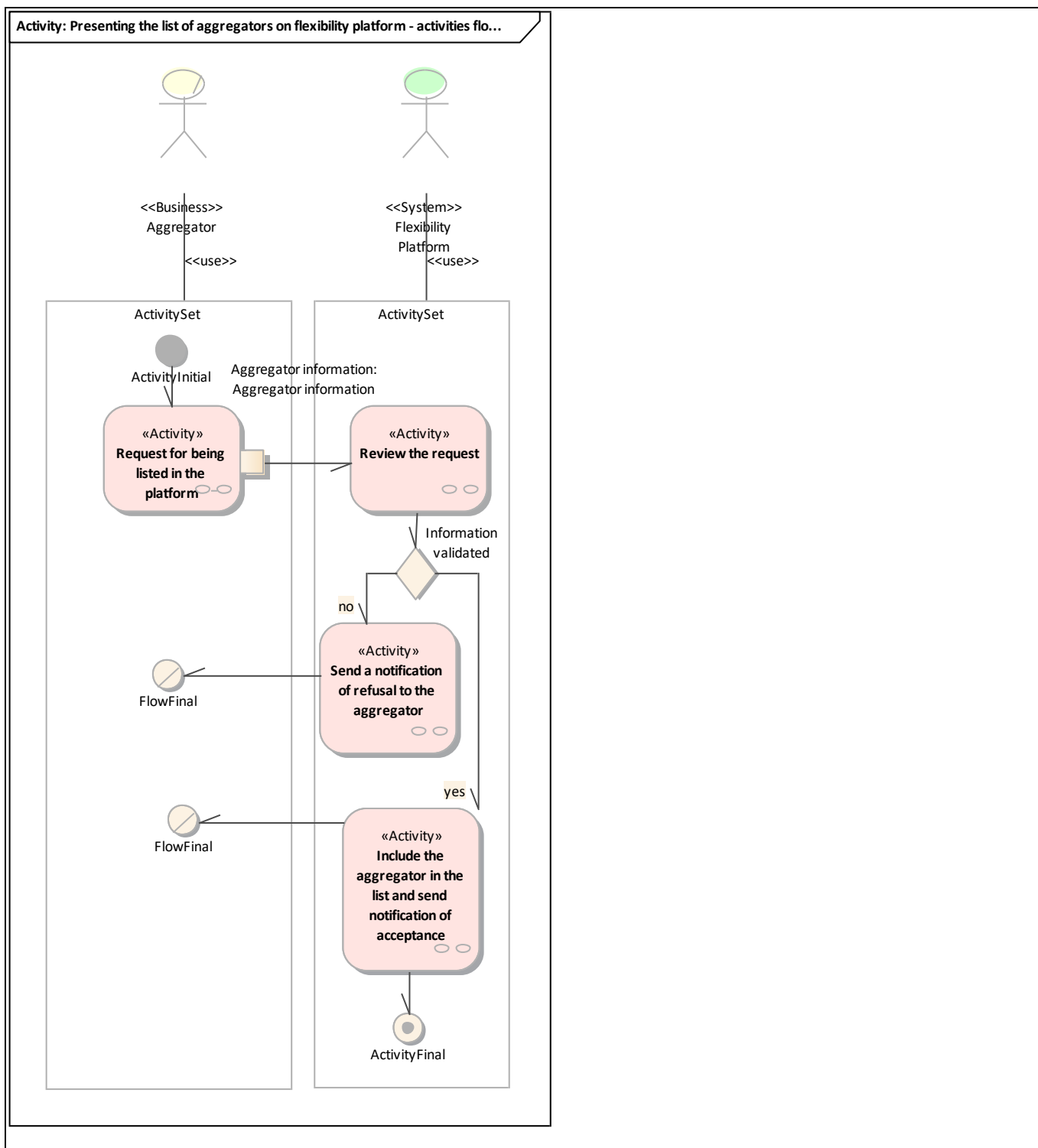
Information sent:

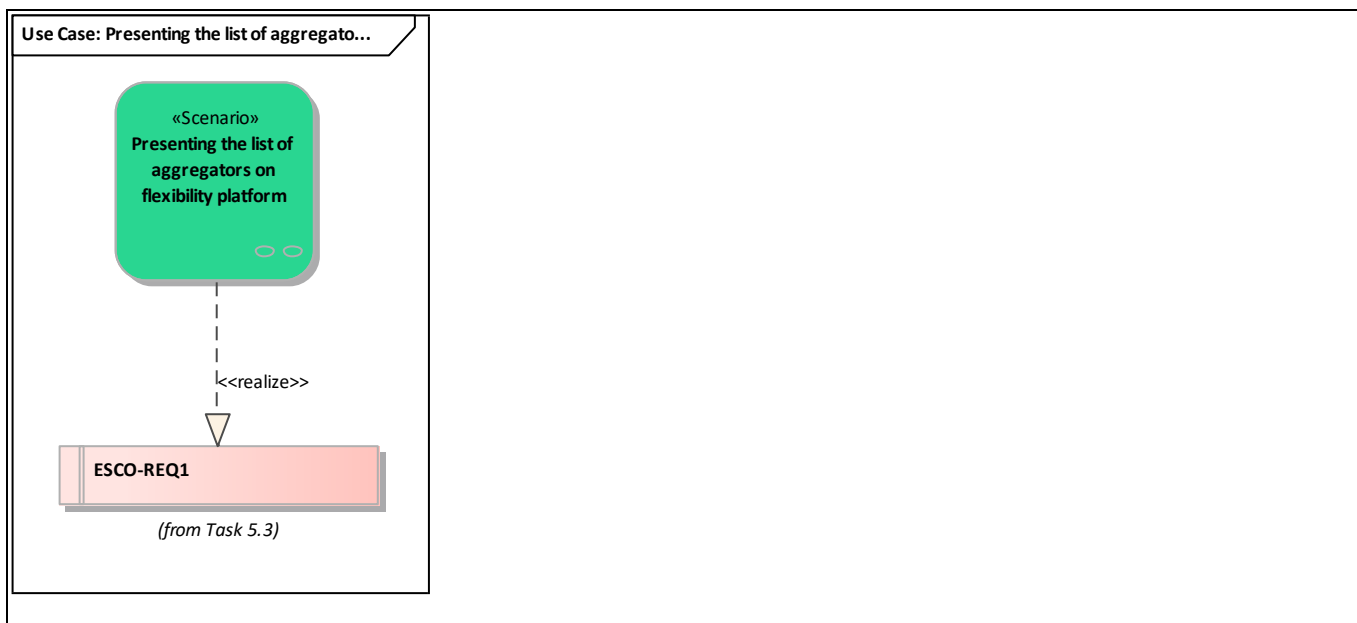
<i>Business object</i>	<i>Instance name</i>	<i>Instance description</i>
<u>Authenticate Information</u>	Authenticate Information	

- Presenting the list of aggregators on flexibility platform

<i>Requirement list (refer to "Requirement" section for more information)</i>	
<i>Requirement R-ID</i>	<i>Requirement name</i>
<u>Cat1.Reg1</u>	ESCO-REQ1







### Scenario step by step analysis

Scenario								
Scenario name		Presenting the list of aggregators on flexibility platform						
Step No	Event	Name of process/activity	Description of process/activity	Service	Information producer (actor)	Information receiver (actor)	Information exchanged (IDs)	Requirement, R-IDs
2.1		Request for being listed in the platform			Aggregator	Flexibility Platform	Info3-Aggregator information	
2.2		Request for being listed in the platform			Aggregator			
2.3		Review the request			Flexibility Platform			
2.4		Send a notification of refusal to the aggregator			Flexibility Platform			
2.5		Include the aggregator in the list and send notification of acceptance			Flexibility Platform			

#### 2.1. Request for being listed in the platform

##### Business section: Presenting the list of aggregators on flexibility platform/Request for being listed in the platform

Information sent:

Business object	Instance name	Instance description
Aggregator information	Aggregator information	

## 5. Information exchanged

Information exchanged			
Information exchanged, ID	Name of information	Description of information exchanged	Requirement, R-IDs
Info1	ESCO information		
Info2	Authenticate Information		
Info3	Aggregator information		

## 6. Requirements (optional)

Requirements (optional)		
Categories ID	Category name for requirements	Category description
Cat1	Task 5.3	Requirements integrated from Task 5.3.
Requirement R-ID	Requirement name	Requirement description
Req1	ESCO-REQ1	List of suppliers and ESCOs is available through DEP; List of aggregators is available through flexibility platform additionally

## 7. Common terms and definitions

## 8. Custom information (optional)

### 9.17 TRANSFER ENERGY DATA

# Transfer energy data

Based on IEC 62559-2 edition 1  
Generated from UML Use Case Repository with Modsarus® (EDF R&D Tool)

## 1. Description of the use case

### 1. Name of use case

Use case identification		
ID	Area(s)/Domain(s)/Zone(s)	Name of use case
	Access to data,Balance management,Market for flexibilities,Operational planning and forecasting,Services related to end customers	Transfer energy data

### 2. Version management

Version management				
Version No.	Date	Name of author(s)	Changes	Approval status

1	2018-04-12	Richárd Balog (Mavir), Kalle Kuk (Elering)		
2	2018-07-13	Ricardo Jover (EDF), Eric Suignard (EDF)		
3	2018-07-19	Ricardo Jover (EDF), Eric Suignard (EDF)		
4	2018-08-02	Eric Suignard (EDF)	Scenario names changed. First scenario restructured.	
5	2018-09-21	Eric Suignard (EDF), Ricardo Jover (EDF)	Remarks from Innogy and EirGrid.	
6	2018-10-04	Eric Suignard (EDF)	Version post WP5&9 physical meeting in Tallinn	
7	2018-10-17	Eric Suignard (EDF)	Version reviewed by WP5&9 partners	
8	2019-05-07	Eric Suignard (EDF)	WP6-7-8 demos alignment and miscellaneous changes	
9	2020-06-16	Eric Suignard (EDF)	innogy's and Elering's review	

### 3. Scope and objectives of use case

<b>Scope and objectives of use case</b>	
<b>Scope</b>	Transfer of different types of energy related data. The system use case describes the data flow through data exchange platform from the data provider (data hub or any other data source) to data user (data owner) or to a third party application (supplier, aggregator, ESCO), who has consent or legal mandate to use the data. Data transfer does not necessarily need a central storage.
<b>Objective(s)</b>	To support business use cases and to ensure access to needed data for the relevant processes.
<b>Related business case(s)</b>	

### 4. Narrative of Use Case

<b>Narrative of use case</b>
<b>Short description</b>
The granularity of data and frequency of data transfer could be different depending on the business use case, but the purpose is the same: ensuring the needed data in order to support business processes. Some other system use cases (data collection, authentication of data users, authorization, anonymization of data, aggregation of data) are strongly connected to this use case, which are considered as preconditions.
<b>Complete description</b>
<p style="text-align: center;"><u>Summary of use case</u></p> <ul style="list-style-type: none"> <li> <b>Request data through DEP API and publish data to subscribed applications</b>  <u>Description:</u> Data can be sent to an application if the application has requested for the data through DEP API or if it has subscribed to publications of this data.           <ul style="list-style-type: none"> <li> <b>Request data</b>  <u>Description:</u> An application requests for data from a Data Source.             </li> <li> <b>Check authorization from data owner to request specific data</b>  <u>Description:</u> According to "Manage access permissions" SUC, an application can receive authorization from a Data Owner to request data from a Data Source.             </li> </ul> </li> </ul>

- Authorization check  
Description:
- Authorization check  
Description:
- Forward request for data  
Description: The Data Exchange Platform forwards to the Data Source the request for data.
- Check the request for data  
Description: The Data Source checks whether there is valid authorization for the requesting application.
- Process the request for data  
Description: The Data Source makes data available to the requesting application, in a "publish-stream" mode.
- Publish data to authorized applications  
Description: The Data Source publishes data to all applications with valid authorization.
- Forward data  
Description: The Data Exchange Platform forwards the published data to authorized applications.
- **Download data through DEP customer portal**  
Description: An authenticated user can check and download the data through DEP from any Data Hub, depending on the type of data (to be defined).
  - Process the request for data  
Description:
  - Authenticate to DEP  
Description: Data users authenticates to Data Exchange Platform via a web-based customer portal or through 3rd party application.
  - Verify authentication information  
Description: The Data Exchange Platform verifies the authentication information and the representation rights.
  - Request data  
Description: Data users request for data via a DEP web-based portal or through 3rd party applications.
  - Process request  
Description: If the Data User and the Data Source are not in the same country, the Data Exchange Platform forwards the request to the Foreign Data Exchange Platform.
  - Process the request for data  
Description: The Data Source can create different kinds of file (e.g. Excel, PDF, XML).

## 5. Key performance indicators (KPI)

## 6. Use case conditions

Use case conditions	
Assumptions	
1	Some sort of data validation is applied: Example: data quality check.

2	Data may come from different data sources (incl. data hubs) validated by data exchange platform operator
3	The communication channel is protected
<b>Prerequisites</b>	
1	The user has the proper authentication to download data
2	Cross border effect: It should be allowed data transfer among data exchange platforms and up to foreign users
3	The selected data are available
4	The granularity and the completeness of the selected data is adequate
5	Applications have subscribed preliminary to request data

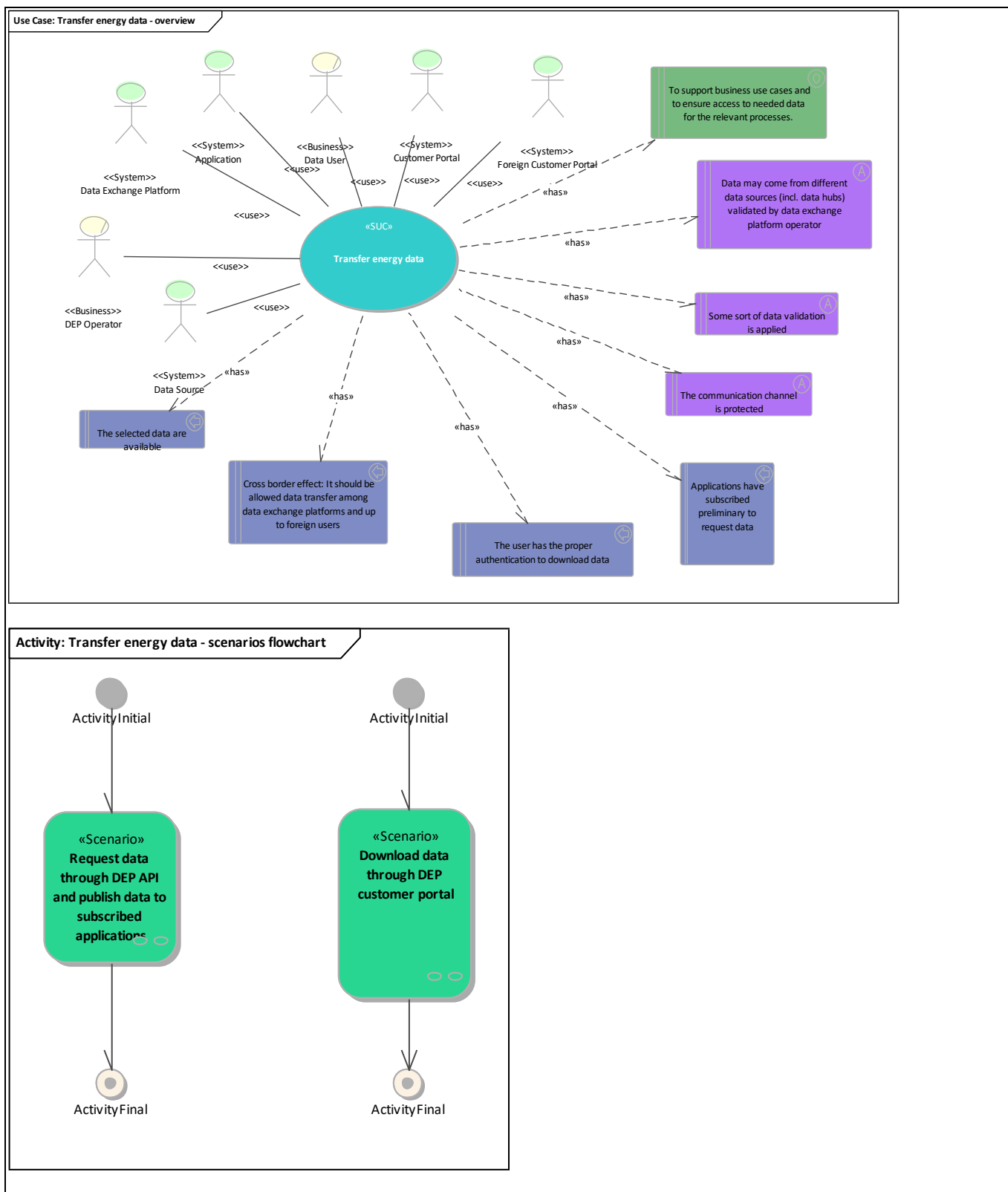
## 7. Further information to the use case for classification/mapping

<b>Classification information</b>
<b>Relation to other use cases</b>
<b>Level of depth</b>
<b>Prioritisation</b>
<b>Generic, regional or national relation</b>
<b>Nature of the use case</b>
SUC
<b>Further keywords for classification</b>

## 8. General remarks

### 2. Diagrams of use case

<b>Diagram(s) of use case</b>
-------------------------------



### 3. Technical details

#### 1. Actors

#### Actors

Grouping (e.g. domains, zones)		Group description	
Actor name	Actor type	Actor description	Further information specific to this use case
Data Exchange Platform	System	Data exchange platform (DEP) is a communication platform the basic functionality of which is to secure data transfer (routing) from data providers (e.g. data hubs, flexibility service providers, TSOs, DSOs) to the data users (e.g. TSOs, DSOs, consumers, suppliers, energy service providers). DEP stores data related to its services (e.g. cryptographic hash of the data requested). The DEP does not store core energy data (e.g. meter data, grid data, market data) while these data can be stored by data hubs. Several DEPs may exist in different countries and inside one country.	
Data Source	System	Any kind of system used to store data (including Data Hub and Flexibility Platform).	
Application	System	Any kind of system connected to a Data Exchange Platform and used by a market participant who wishes to receive data.	
Data User	Business	Any person who uses data. Can be a Data Owner or a Data Delegated Third party.	
Foreign Customer Portal	System	Customer Portal for another country. Can also mean a separate portal in the same country.	
Customer Portal	System	Customer Portal manages data users' authentication, access permissions and data logs. Customer Portals store data related to its services (e.g. authentication information, representation rights, access permissions, data logs).	
DEP Operator	Business	Data exchange platform operator owns and operates a communication system which basic functionality is data transfer.	

## 2. References

### 4. Step by step analysis of use case

#### 1. Overview of scenarios

Scenario conditions						
No.	Scenario name	Scenario description	Primary actor	Triggering event	Pre-condition	Post-condition
1	Request data through DEP API and publish data to subscribed applications	Data can be sent to an application if the application has requested for the data through DEP API or if it has subscribed to publications of this data.				
2	Download data through DEP customer portal	An authenticated user can check and download the data through DEP from any Data Hub, depending on the type of data (to be defined).				

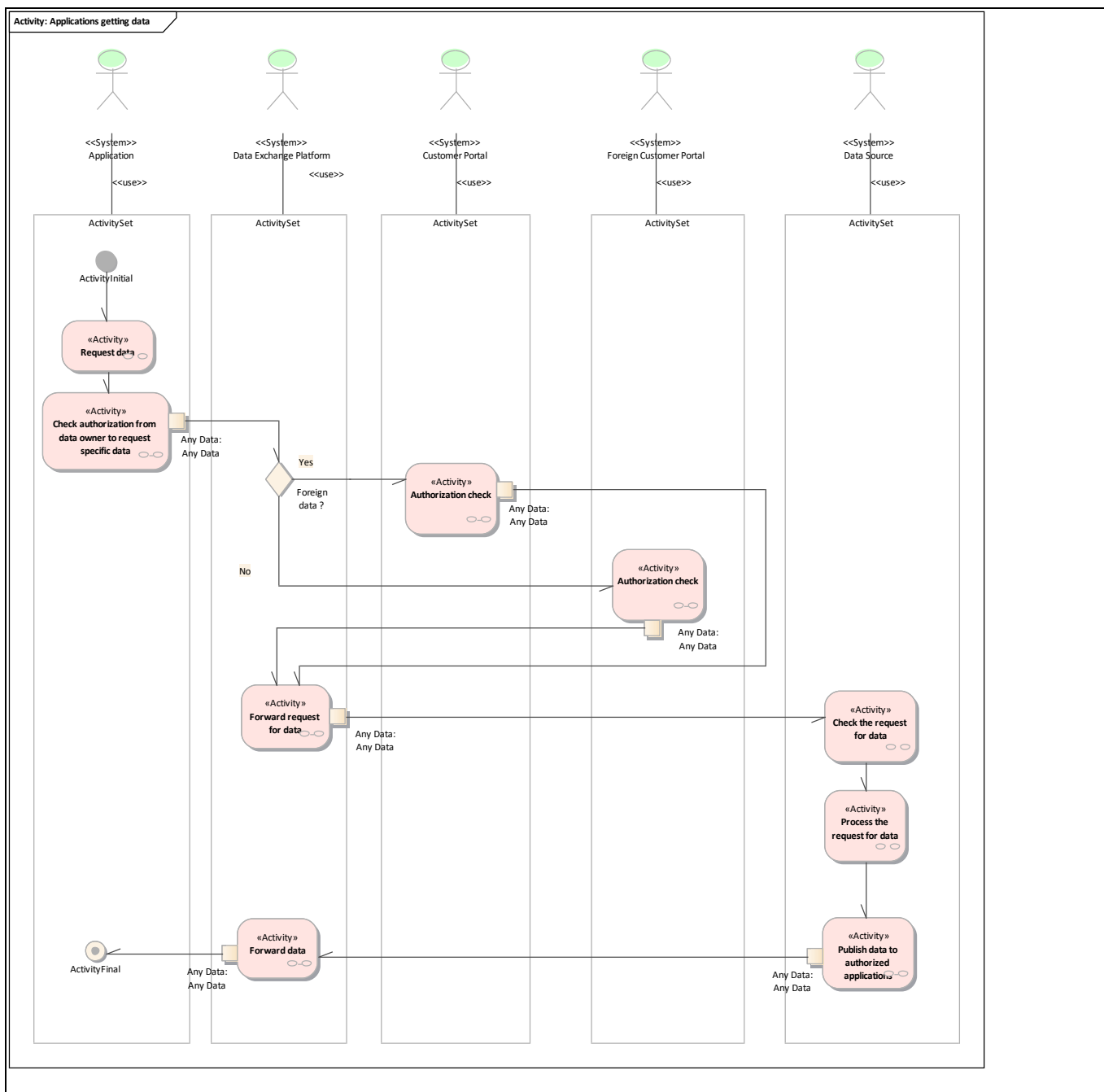
#### 2. Steps - Scenarios

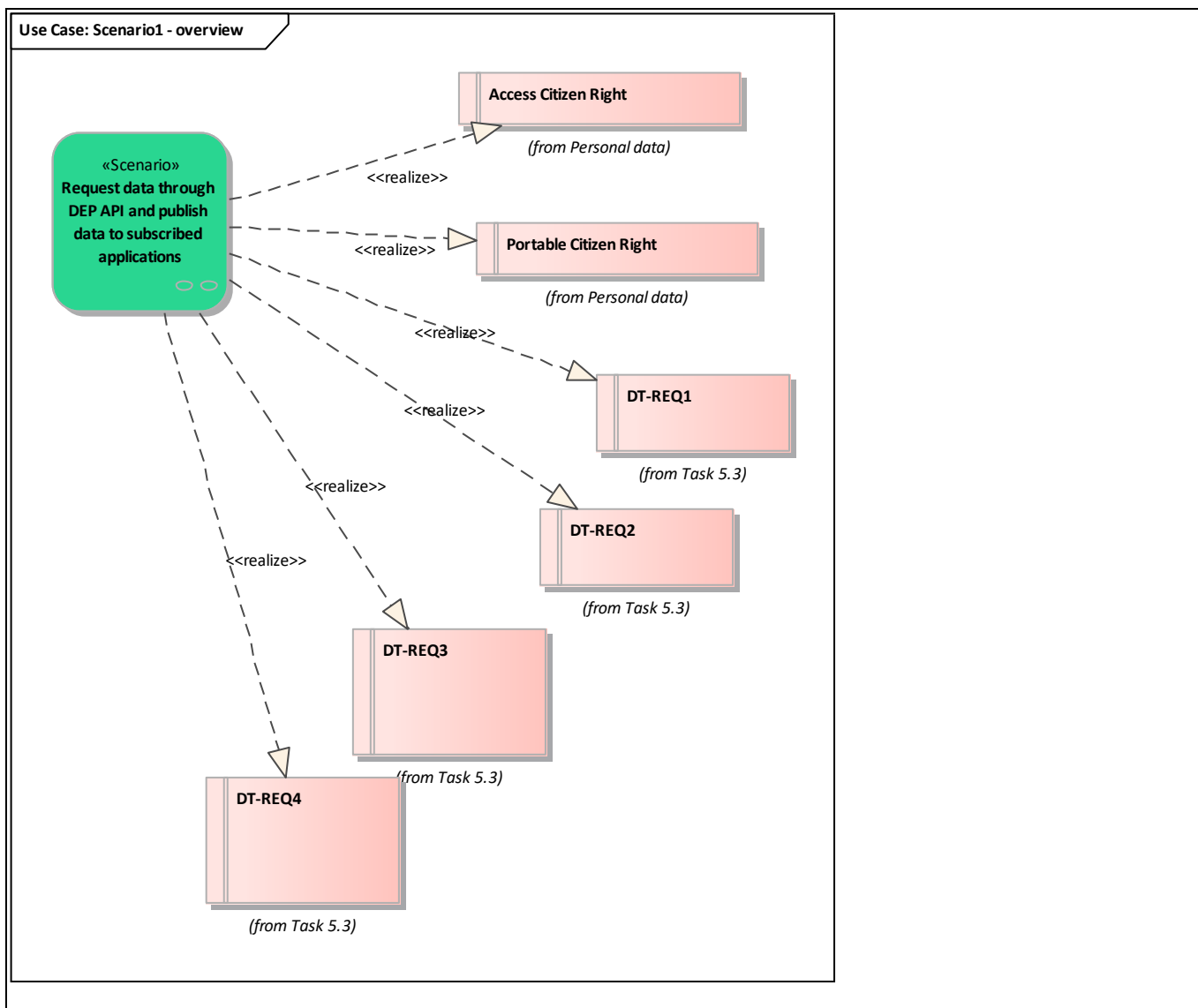
- Request data through DEP API and publish data to subscribed applications

Data can be sent to an application if the application has requested for the data through DEP API or if it has subscribed to publications of this data.



<i>Requirement list (refer to "Requirement" section for more information)</i>	
<i>Requirement R-ID</i>	<i>Requirement name</i>
<u>Cat1.Reg1</u>	Access Citizen Right
<u>Cat1.Reg2</u>	Portable Citizen Right
<u>Cat2.Reg3</u>	DT-REQ1
<u>Cat2.Reg4</u>	DT-REQ3
<u>Cat2.Reg5</u>	DT-REQ4
<u>Cat2.Reg6</u>	DT-REQ2





## Scenario step by step analysis

Scenario								
Scenario name	Request data through DEP API and publish data to subscribed applications							
Step No	Event	Name of process/activity	Description of process/activity	Service	Information producer (actor)	Information receiver (actor)	Information exchanged (IDs)	Requirement, R-IDs
1.1		Request data	An application requests for data from a Data Source.		Application			
1.2		Check authorization from data owner to request specific data	According to "Manage access permissions" SUC, an application can receive authorization from a Data Owner to		Application	Customer Portal, Foreign Customer Portal	Info1-Any Data	

			request data from a Data Source.					
1.3		Authorization check			<u>Customer Portal</u>	<u>Data Exchange Platform</u>	Info1-Any Data	
1.4		Authorization check			<u>Foreign Customer Portal</u>	<u>Data Exchange Platform</u>	Info1-Any Data	
1.5		Forward request for data	The Data Exchange Platform forwards to the Data Source the request for data.		<u>Data Exchange Platform</u>	<u>Data Source</u>	Info1-Any Data	
1.6		Check the request for data	The Data Source checks whether there is valid authorization for the requesting application.		<u>Data Source</u>			
1.7		Process the request for data	The Data Source makes data available to the requesting application, in a "publish-stream" mode.		<u>Data Source</u>			
1.8		Publish data to authorized applications	The Data Source publishes data to all applications with valid authorization.		<u>Data Source</u>	<u>Data Exchange Platform</u>	Info1-Any Data	
1.9		Forward data	The Data Exchange Platform forwards the published data to authorized applications.		<u>Data Exchange Platform</u>	<u>Application</u>	Info1-Any Data	

- 1.2. Check authorization from data owner to request specific data

**Business section: Request data through DEP API and publish data to subscribed applications/Check authorization from data owner to request specific data**

According to "Manage access permissions" SUC, an application can receive authorization from a Data Owner to request data from a Data Source.

Information sent:

<b><i>Business object</i></b>	<b><i>Instance name</i></b>	<b><i>Instance description</i></b>
<u>Any Data</u>	Any Data	

- 1.3. Authorization check

**Business section: Request data through DEP API and publish data to subscribed applications/Authorization check**

Information sent:

<b><i>Business object</i></b>	<b><i>Instance name</i></b>	<b><i>Instance description</i></b>
<u>Any Data</u>	Any Data	

- 1.4. Authorization check

**Business section: Request data through DEP API and publish data to subscribed applications/Authorization check**

Information sent:

Business object	Instance name	Instance description
Any Data	Any Data	

- 1.5. Forward request for data

**Business section: Request data through DEP API and publish data to subscribed applications/Forward request for data**

The Data Exchange Platform forwards to the Data Source the request for data.

Information sent:

Business object	Instance name	Instance description
Any Data	Any Data	

- 1.8. Publish data to authorized applications

**Business section: Request data through DEP API and publish data to subscribed applications/Publish data to authorized applications**

The Data Source publishes data to all applications with valid authorization.

Information sent:

Business object	Instance name	Instance description
Any Data	Any Data	

- 1.9. Forward data

**Business section: Request data through DEP API and publish data to subscribed applications/Forward data**

The Data Exchange Platform forwards the published data to authorized applications.

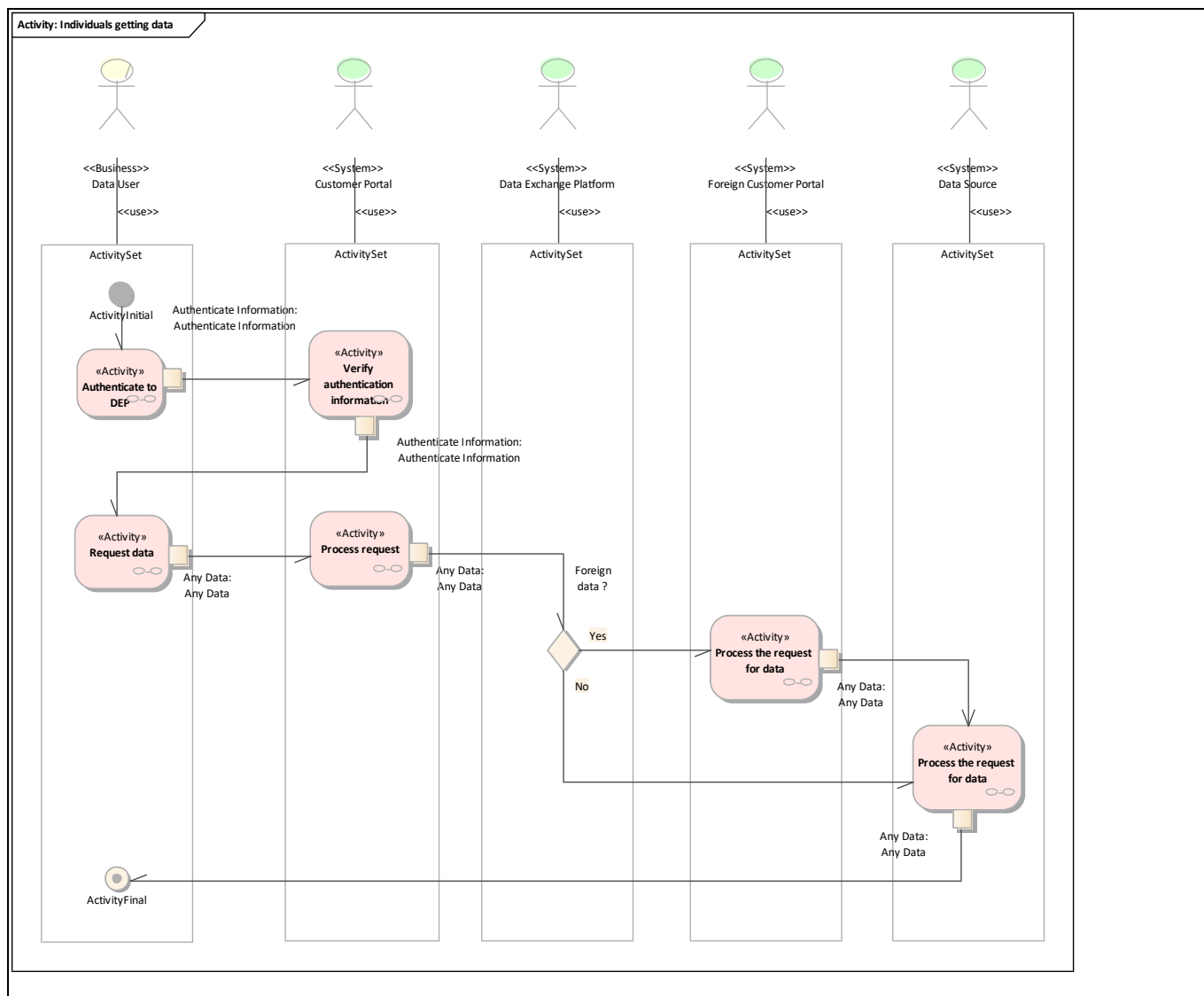
Information sent:

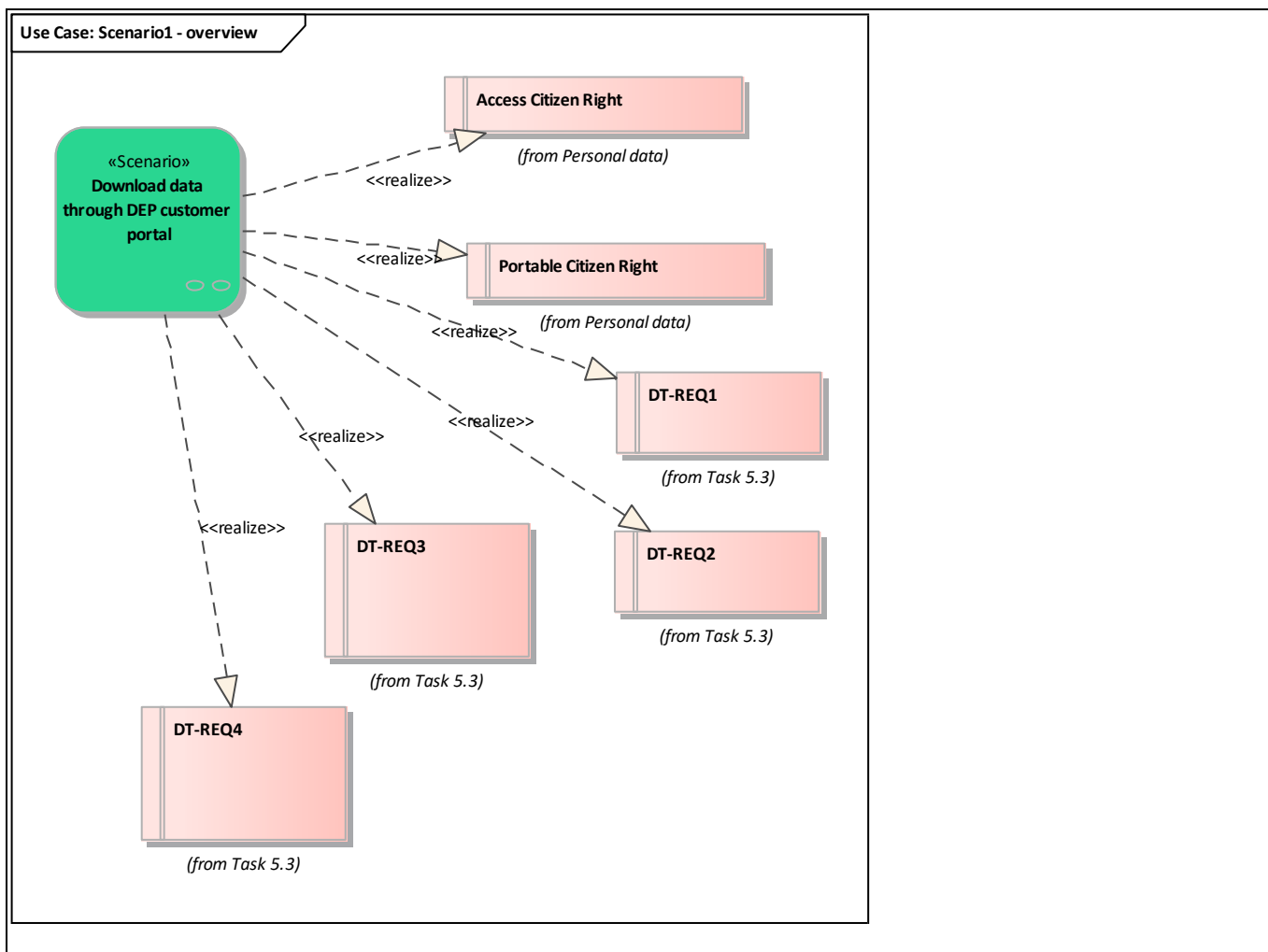
Business object	Instance name	Instance description
Any Data	Any Data	

- Download data through DEP customer portal

An authenticated user can check and download the data through DEP from any Data Hub, depending on the type of data (to be defined).

Requirement list (refer to "Requirement" section for more information)	
Requirement R-ID	Requirement name
Cat1.Reg2	Portable Citizen Right
Cat1.Reg1	Access Citizen Right
Cat2.Reg3	DT-REQ1
Cat2.Reg4	DT-REQ3
Cat2.Reg5	DT-REQ4
Cat2.Reg6	DT-REQ2





### Scenario step by step analysis

Scenario								
Scenario name		Download data through DEP customer portal						
Step No	Event	Name of process/activity	Description of process/activity	Service	Information producer (actor)	Information receiver (actor)	Information exchanged (IDs)	Requirement, R-IDs
2.1		Process the request for data			Foreign Customer Portal	Data Source	Info1-Any Data	
2.2		Authenticate to DEP	Data users authenticates to Data Exchange Platform via a web-based customer portal or through 3rd party application.		Data User	Customer Portal	Info2-Authenticate Information	
2.3		Verify authentication information	The Data Exchange Platform verifies the authentication information and the representation rights.		Customer Portal	Data User	Info2-Authenticate Information	

2.4		Request data	Data users request for data via a DEP web-based portal or through 3rd party applications.		<u>Data User</u>	<u>Customer Portal</u>	Info1-Any Data	
2.5		Process request	If the Data User and the Data Source are not in the same country, the Data Exchange Platform forwards the request to the Foreign Data Exchange Platform.		<u>Customer Portal</u>	<u>Data Source, Foreign Customer Portal</u>	Info1-Any Data	
2.6		Process the request for data	The Data Source can create different kinds of file (e.g. Excel, PDF, XML).		<u>Data Source</u>	<u>Data User</u>	Info1-Any Data	

- 2.1. Process the request for data

**Business section: Download data through DEP customer portal/Process the request for data**

Information sent:

<b><i>Business object</i></b>	<b><i>Instance name</i></b>	<b><i>Instance description</i></b>
Any Data	Any Data	

- 2.2. Authenticate to DEP

**Business section: Download data through DEP customer portal/Authenticate to DEP**

Data users authenticates to Data Exchange Platform via a web-based customer portal or through 3rd party application.

Information sent:

<b><i>Business object</i></b>	<b><i>Instance name</i></b>	<b><i>Instance description</i></b>
Authenticate Information	Authenticate Information	

- 2.3. Verify authentication information

**Business section: Download data through DEP customer portal/Verify authentication information**

The Data Exchange Platform verifies the authentication information and the representation rights.

Information sent:

<b><i>Business object</i></b>	<b><i>Instance name</i></b>	<b><i>Instance description</i></b>
Authenticate Information	Authenticate Information	

- 2.4. Request data

**Business section: Download data through DEP customer portal/Request data**

Data users request for data via a DEP web-based portal or through 3rd party applications.

Information sent:

<b><i>Business object</i></b>	<b><i>Instance name</i></b>	<b><i>Instance description</i></b>
-------------------------------	-----------------------------	------------------------------------



Any Data	Any Data	
----------	----------	--

- 2.5. Process request

**Business section: Download data through DEP customer portal/Process request**

If the Data User and the Data Source are not in the same country, the Data Exchange Platform forwards the request to the Foreign Data Exchange Platform.

Information sent:

Business object	Instance name	Instance description
Any Data	Any Data	

- 2.6. Process the request for data

**Business section: Download data through DEP customer portal/Process the request for data**

The Data Source can create different kinds of file (e.g. Excel, PDF, XML).

Information sent:

Business object	Instance name	Instance description
Any Data	Any Data	

## 5. Information exchanged

Information exchanged			
Information exchanged, ID	Name of information	Description of information exchanged	Requirement, R-IDs
Info1	Any Data		
Info2	Authenticate Information		

## 6. Requirements (optional)

Requirements (optional)		
Categories ID	Category name for requirements	Category description
Cat1	Personal data	
Requirement R-ID	Requirement name	Requirement description
Req1	Access Citizen Right	Right to secure direct access of own personal data and to any processing, storage or sharing details
Req2	Portable Citizen Right	A copy of the data held may be requested by the individual in a portable format
Requirements (optional)		
Categories ID	Category name for requirements	Category description
Cat2	Task 5.3	Requirements integrated from Task 5.3.
Requirement R-ID	Requirement name	Requirement description
Req3	DT-REQ1	Transfer of data must be secured, by means of encryption or communication protocol
Req4	DT-REQ3	Data owner's access to data through DEP (and foreign DEP)
Req5	DT-REQ4	Application's access to data through DEP (and foreign DEP)

Req6	DT-REQ2	Data portability (applies to personal data - Article 20 of the GDPR)
------	---------	--

## 7. Common terms and definitions

## 8. Custom information (optional)

### 9.18 VERIFY AND SETTLE ACTIVATED FLEXIBILITIES

# Verify and settle activated flexibilities

Based on IEC 62559-2 edition 1  
Generated from UML Use Case Repository with Modsarus® (EDF R&D Tool)

## 1. Description of the use case

### 1. Name of use case

Use case identification		
ID	Area(s)/Domain(s)/Zone(s)	Name of use case
	Balance management, Market for flexibilities, Operational planning and forecasting	Verify and settle activated flexibilities

### 2. Version management

Version management				
Version No.	Date	Name of author(s)	Changes	Approval status
1	2018-04-05	Marco Pietrucci (Terna)		
2	2018-06-25	Ricardo Jover (EDF), Eric Suignard (EDF)		
3	2018-07-19	Ricardo Jover (EDF), Eric Suignard (EDF)	<ul style="list-style-type: none"> <li>- Network operators involved, instead of BRPs.</li> <li>- Use of baseline, instead of winning bids.</li> <li>- Imbalance calculation changed into flexibility verification.</li> <li>- Calculation of delivered flexibilities and verification of delivered flexibilities in two steps.</li> <li>- Imbalance fees changed into penalties.</li> <li>- Invoice out of scope.</li> </ul>	
4	2018-07-30	Eric Suignard (EDF)		
5	2018-08-02	Eric Suignard (EDF)		
6	2018-09-21	Eric Suignard (EDF), Ricardo Jover (EDF)	Remarks from Innogy and EirGrid.	
7	2018-10-04	Eric Suignard (EDF)	Version post WP5&9 physical meeting in Tallinn	
8	2018-10-17	Eric Suignard (EDF)	Version reviewed by WP5&9 partners	
9	2019-05-07	Eric Suignard (EDF)	WP6-7-8 demos alignment and miscellaneous changes	

10	2019-07-09	Eric Suignard (EDF)	Elering review	
11	2020-06-16	Eric Suignard (EDF)	innogy's and Elering's review	

### 3. Scope and objectives of use case

Scope and objectives of use case	
<b>Scope</b>	Verification of the flexibilities actually delivered by Flexibility Service Providers.
<b>Objective(s)</b>	Calculate actually delivered flexibility as response to activation request. Verify that flexibility delivered matches with flexibility requested. Calculate the penalty if flexibility delivered is less than flexibility requested.
<b>Related business case(s)</b>	

### 4. Narrative of Use Case

Narrative of use case	
<b>Short description</b>	
Actual flexibility delivered is calculated as the difference between baseline and metered consumption/generation of that Flexibility Service Provider. The verification takes place by comparing the actually delivered flexibility and flexibility requested by the System Operator. Settlement means that a Flexibility Service Provider is asked for a penalty if actually delivered flexibility is less than requested flexibility. Imbalance settlement process follows but is out of the scope of this use case.	
<b>Complete description</b>	
<p style="text-align: center;"><u>Summary of use case</u></p> <ul style="list-style-type: none"> <li> <b>Flexibility verification and settlement</b>  <u>Description:</u> <ul style="list-style-type: none"> <li>Provide metering data <u>Description:</u> Real generation/consumption data measured by certified meters data and/or sub-meter data collected by Data Hubs.</li> <li>Provide baselines <u>Description:</u> Baselines stored at Flexibility Platform and collected previously (see "Calculate flexibility baseline" SUC) by Market Operators, FSPs or System Operators.</li> <li>Provide requested activation volumes <u>Description:</u> Volumes of requested flexibilities by System Operators (in "Manage flexibility activation" SUC).</li> <li>Forward metering data <u>Description:</u></li> <li>Calculate the actually delivered flexibilities <u>Description:</u> The Flexibility Platform calculates the difference between the metered consumed/produced energy (delivered energy) and the baseline.</li> <li>Verify the delivered flexibilities <u>Description:</u> The Flexibility Platform calculates the differences between the actually delivered flexibilities and the requested activation volumes.</li> <li>Calculate penalties <u>Description:</u> Penalties of the requested but not delivered flexibilities.</li> </ul> </li> </ul>	

## 5. Key performance indicators (KPI)

## 6. Use case conditions

<i>Use case conditions</i>	
<i>Assumptions</i>	
1	Market participant baselines (i.e. from any FSP: aggregator, individual consumer, individual generator) have been previously defined.
2	Activation volumes requested by System Operators have been previously registered in a Flexibility Platform.
3	Metering data have been previously loaded in Data Hubs.
4	Penalties are defined in the contracts between System Operators and Flexibility Service Providers. However, there may be market designs where that kind of bilateral contracts are not required. In these cases, penalties may be correlated to imbalance price
5	Meter data, baselines and information on requested flexibilities are available based on data access permission or legal obligation.: Meter data can be consumption or production data. They can be provided by certified meters or sub-meters.
<i>Prerequisites</i>	
1	For the verification and the calculation of penalties, the values of actual inputs / withdrawals must be obtained through accurate, reliable and certified instruments (metering data). Meter data, baselines and activation requests are needed.
2	Meter data (incl. sub-meter data) and baselines are available for the process.

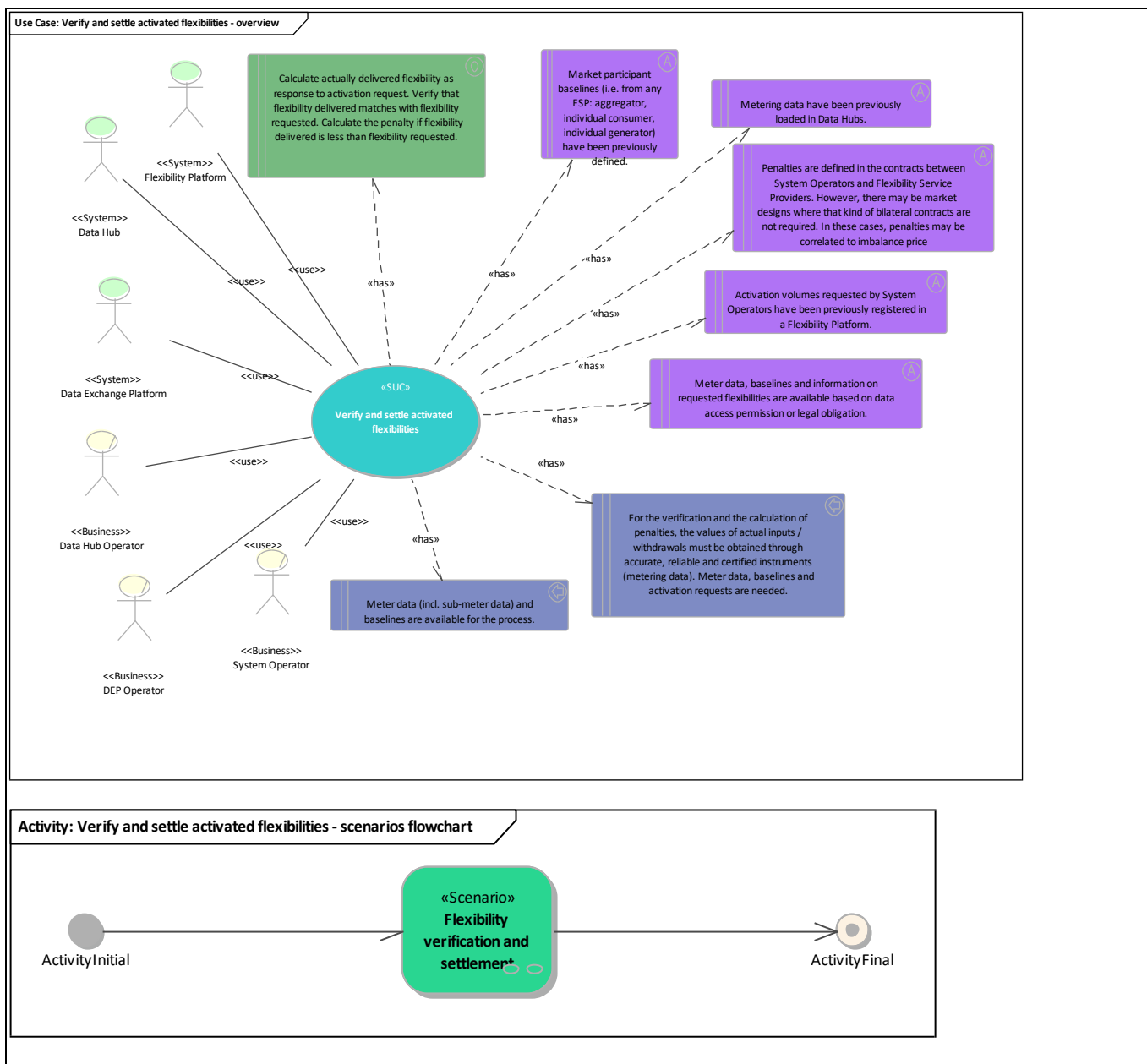
## 7. Further information to the use case for classification/mapping

<i>Classification information</i>
<i>Relation to other use cases</i>
<i>Level of depth</i>
<i>Prioritisation</i>
<i>Generic, regional or national relation</i>
<i>Nature of the use case</i>
SUC
<i>Further keywords for classification</i>

## 8. General remarks

## 2. Diagrams of use case

<i>Diagram(s) of use case</i>
-------------------------------



### 3. Technical details

#### 1. Actors

Actors			
Grouping (e.g. domains, zones)		Group description	
Actor name	Actor type	Actor description	Further information specific to this use case
Data Exchange Platform	System	Data exchange platform (DEP) is a communication platform the basic functionality of which is to secure data transfer (routing) from data providers (e.g. data hubs, flexibility service providers, TSOs, DSOs) to the data users (e.g. TSOs, DSOs, consumers, suppliers, energy service	

		providers). DEP stores data related to its services (e.g. cryptographic hash of the data requested). The DEP does not store core energy data (e.g. meter data, grid data, market data) while these data can be stored by data hubs. Several DEPs may exist in different countries and inside one country.	
Data Hub	System	Data Hub is an information system which main functionality is to store and make available measurements (e.g. meter data, operational data) and associated master data. Data Hubs are not necessarily centralized in a country or in a region.	
System Operator	Business	<p>System Operator means a natural or legal person responsible for operating, ensuring the maintenance of and, if necessary, developing the system in a given area and, where applicable, its interconnections with other systems, and for ensuring the long-term ability of the system to meet reasonable demands for the distribution or transmission of electricity (cf. ENTSOE-EFET-ebIX harmonized role model 2019). Can be:</p> <ul style="list-style-type: none"> <li>• A Transmission System Operator (cf. definition in T3.3 deliverable), for frequency control, congestion management and voltage control on transmission network,</li> <li>• A Distribution System Operator (cf. definition in T3.3 deliverable), for congestion management and voltage control on distribution network.</li> </ul> <p>NB: In some countries (e.g. Germany and Poland), the high voltage network is part of the distribution grid and in other countries (e.g. France and Italy) the high voltage network is part of the transmission grid.</p> <p>A System Operator can be:</p> <ul style="list-style-type: none"> <li>• A Primary System Operator,</li> <li>• A Secondary System Operator.</li> </ul>	
Flexibility Platform	System	<p>Flexibility Platform (FP) for System Operators and Flexibility Service Providers that enables the trading of different flexibility products and services. A FP is operated by a Market Operator.</p> <p>Available to System Operators and Flexibility Services Providers. It is used to support the prequalification, the bidding, the activation and the verification processes, ensuring coordination between activities undertaken by several operators using the same flexible resources. Several national and regional FPs may exist.</p>	
DEP Operator	Business	Data exchange platform operator owns and operates a communication system which basic functionality is data transfer.	
Data Hub Operator	Business	<p>Data hub operator owns and operates an information system which main functionality is to store and make available electricity (also gas, heat) metering data and associated master data. Can be :</p> <ul style="list-style-type: none"> <li>• Grid Data Hub Operator in the sphere of a System Operator</li> <li>• Market Data Hub Operator in the sphere of a Market Operator</li> <li>• Meter Data Hub Operator in the sphere of a Metered Data Operator</li> <li>• Sub-meter Data Hub Operator in the sphere of an Energy Service Provider</li> </ul>	

## 2. References

### 4. Step by step analysis of use case

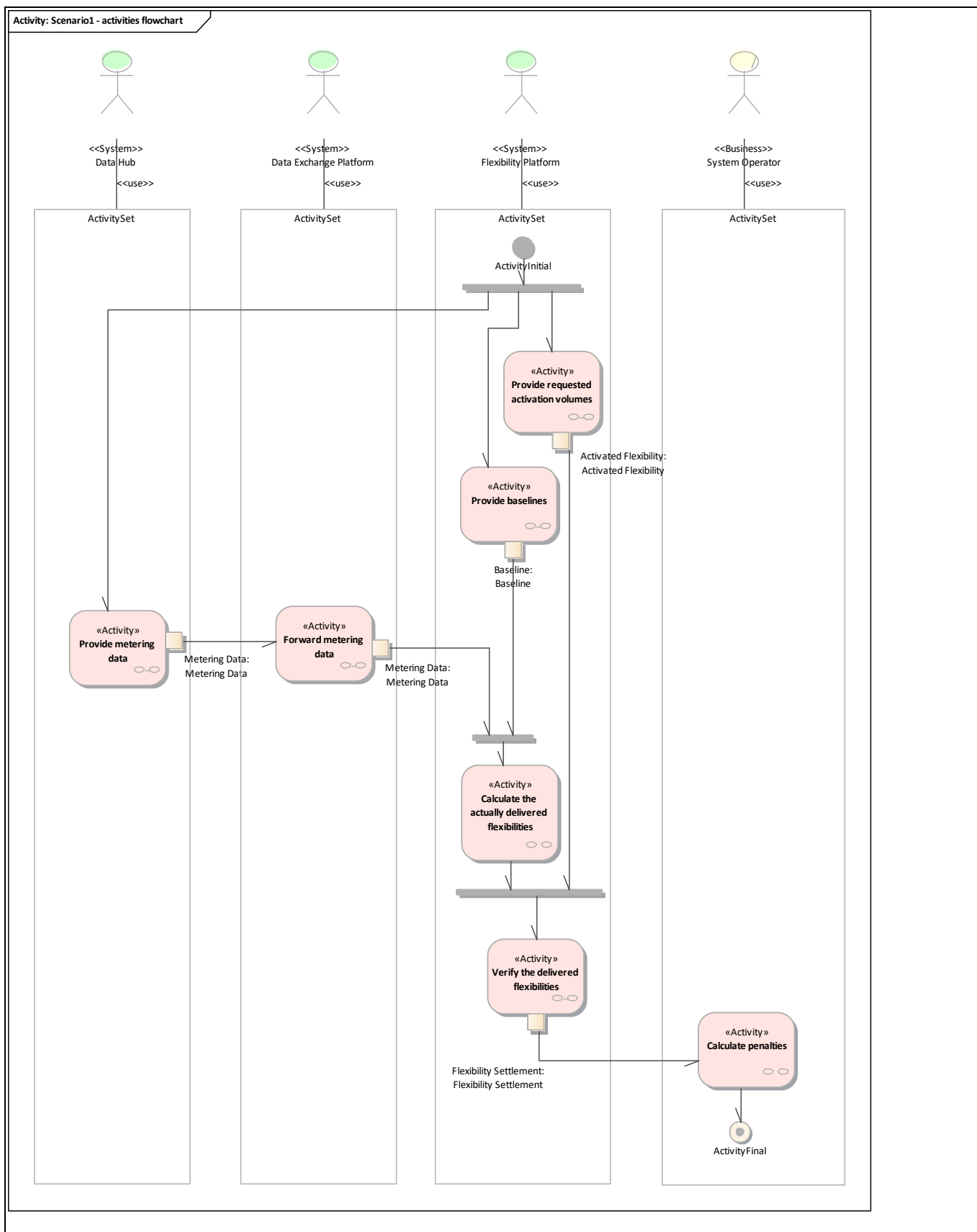
#### 1. Overview of scenarios

Scenario conditions						
No.	Scenario name	Scenario description	Primary actor	Triggering event	Pre-condition	Post-condition
1	Flexibility verification and settlement					

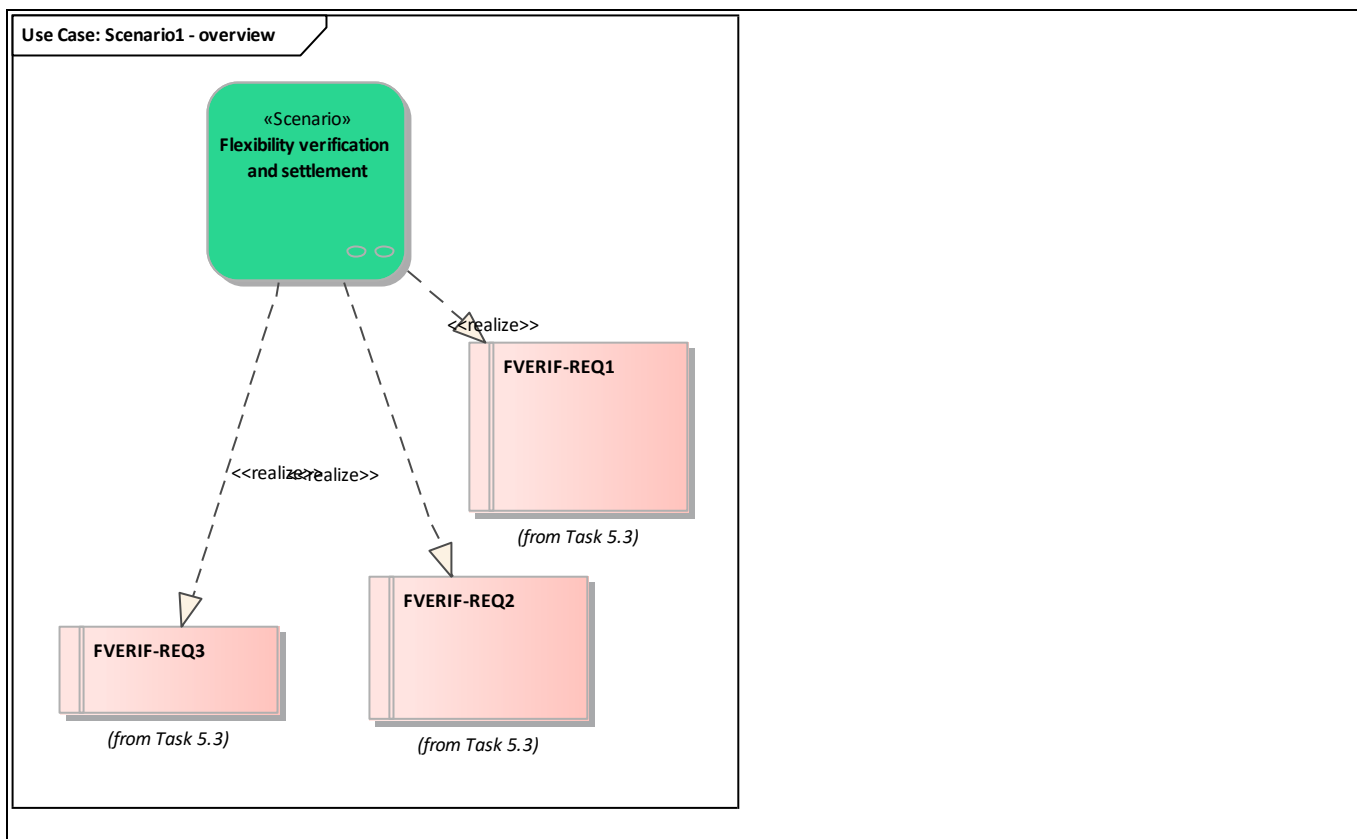
#### 2. Steps - Scenarios

##### 1. Flexibility verification and settlement

Requirement list (refer to "Requirement" section for more information)	
Requirement R-ID	Requirement name
Cat1.Reg1	FVERIF-REQ1
Cat1.Reg2	FVERIF-REQ2
Cat1.Reg3	FVERIF-REQ3







## Scenario step by step analysis

Scenario								
Scenario name	Flexibility verification and settlement							
Step No	Event	Name of process/activity	Description of process/activity	Service	Information producer (actor)	Information receiver (actor)	Information exchanged (IDs)	Requirement, R-IDs
1.1		Provide metering data	Real generation/consumption data measured by certified meters data and/or sub-meter data collected by Data Hubs.		Data Hub	Data Exchange Platform	Info1-Metering Data	
1.2		Provide baselines	Baselines stored at Flexibility Platform and collected previously (see "Calculate flexibility baseline" SUC) by Market Operators, FSPs or System Operators.		Flexibility Platform	Flexibility Platform	Info2-Baseline	
1.3		Provide requested activation volumes	Volumes of requested flexibilities by System Operators (in "Manage flexibility activation" SUC).		Flexibility Platform	Flexibility Platform, Flexibility Platform	Info3-Activated Flexibility	

1.4		Forward metering data			<u>Data Exchange Platform</u>	<u>Flexibility Platform</u>	Info1-Metering Data	
1.5		Calculate the actually delivered flexibilities	The Flexibility Platform calculates the difference between the metered consumed/produced energy (delivered energy) and the baseline.		<u>Flexibility Platform</u>			
1.6		Verify the delivered flexibilities	The Flexibility Platform calculates the differences between the actually delivered flexibilities and the requested activation volumes.		<u>Flexibility Platform</u>	<u>System Operator</u>	Info4-Flexibility Settlement	
1.7		Calculate penalties	Penalties of the requested but not delivered flexibilities.		<u>System Operator</u>			

- 1.1. Provide metering data

**Business section: Flexibility verification and settlement/Provide metering data**

Real generation/consumption data measured by certified meters data and/or sub-meter data collected by Data Hubs.

Information sent:

<b><i>Business object</i></b>	<b><i>Instance name</i></b>	<b><i>Instance description</i></b>
<u>Metering Data</u>	Metering Data	

- 1.2. Provide baselines

**Business section: Flexibility verification and settlement/Provide baselines**

Baselines stored at Flexibility Platform and collected previously (see "Calculate flexibility baseline" SUC) by Market Operators, FSPs or System Operators.

Information sent:

<b><i>Business object</i></b>	<b><i>Instance name</i></b>	<b><i>Instance description</i></b>
<u>Baseline</u>	Baseline	

- 1.3. Provide requested activation volumes

**Business section: Flexibility verification and settlement/Provide requested activation volumes**

Volumes of requested flexibilities by System Operators (in "Manage flexibility activation" SUC).

Information sent:

<b><i>Business object</i></b>	<b><i>Instance name</i></b>	<b><i>Instance description</i></b>
<u>Activated Flexibility</u>	Activated Flexibility	

- 1.4. Forward metering data

### **Business section: Flexibility verification and settlement/Forward metering data**

Information sent:

<b><i>Business object</i></b>	<b><i>Instance name</i></b>	<b><i>Instance description</i></b>
Metering Data	Metering Data	

- 1.6. Verify the delivered flexibilities

### **Business section: Flexibility verification and settlement/Verify the delivered flexibilities**

The Flexibility Platform calculates the differences between the actually delivered flexibilities and the requested activation volumes.

Information sent:

<b><i>Business object</i></b>	<b><i>Instance name</i></b>	<b><i>Instance description</i></b>
Flexibility Settlement	Flexibility Settlement	

## **5. Information exchanged**

<b><i>Information exchanged</i></b>			
<b><i>Information exchanged, ID</i></b>	<b><i>Name of information</i></b>	<b><i>Description of information exchanged</i></b>	<b><i>Requirement, R-IDs</i></b>
Info1	Metering Data		
Info2	Baseline		
Info3	Activated Flexibility		
Info4	Flexibility Settlement		

## **6. Requirements (optional)**

<b><i>Requirements (optional)</i></b>		
<b><i>Categories ID</i></b>	<b><i>Category name for requirements</i></b>	<b><i>Category description</i></b>
Cat1	Task 5.3	Requirements integrated from Task 5.3.
<b><i>Requirement R-ID</i></b>	<b><i>Requirement name</i></b>	<b><i>Requirement description</i></b>
Req1	FVERIF-REQ1	Calculation of actually delivered flexibility as a response to an activation request
Req2	FVERIF-REQ2	Verification that flexibility delivered matches with flexibility requested
Req3	FVERIF-REQ3	Calculation of the penalty if flexibility delivered is less than flexibility requested

## **7. Common terms and definitions**

## **8. Custom information (optional)**