



Business requirements for Flexibility register administration

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A. Preface

This Business Requirement Specification (BRS) describes the processes needed to administer a Flexibility register for Resources for use in flexibility services. The BRS is made in an ebIX® project with members from ebIX® and representants of TSOs and DSOs. The reason for ebIX® to start modelling flexibility services processes was induced by the quickly growing interest in flexibility energy services and the increasing number of flexibility implementations, all be it most of them still experimentally. We tried to use as much experience as possible in the project to set up this BRS. In setting up this BRS we based the work on the good work already done by other groups ([6], [7], [8] and [9]), the experience from the project members and the result from the ebIX® Distributed Flexibility project phase I; “ebIX® Overview of energy flexibility services” ([5]).

Most processes modelled in this BRS are focused around the administration of a Flexibility register. The two core processes are:

Maintain Resource in flexibility register: The Flexibility Service Provider registers, maintains and ends the Resource in the flexibility register.

Request and notify flexibility register characteristics: Entitled Roles can request information from the flexibility register or be notified by the Flexibility Register Administrator when registration, update or end of a Resource or the related Flexibility Service Provider has occurred.

I want to express my thanks to the project members.

May 2022,

Gerrit Fokkema (Convenor).

B. About this document

This document is a Business Requirements Specification (BRS) for exchange of information related to administration of a flexibility register within the European energy market. The Flexibility register will contain the Resources used for flexibility services in the flexibility market and their characteristics, such as status for grid- and/or product pre-qualification and if the Resource is part of a pool of Resources. Such a Flexibility register will ease the access for the Flexibility Service Providers¹ and help System Operators and other market roles to allow flexibility actors in existing and new products.

The flexibility register is introduced in this version (version 1.1.) of the BRS with a Flexibility Register Administrator as the responsible role. The Flexibility Register Administrator keeps track of parties (roles), and flexibility services related data for Accounting Points and Resources involved in flexibility processes.

As a general introduction ebIX® has published a separate document “Introduction to ebIX® Business Requirements and Business Information Models” [1]. The introduction also includes the generic model elements that are not specific for a particular business process.

In line with UN/CEFACT Modelling Methodology version 2 (UMM-2) ebIX® defines the business requirements as the first step in modelling energy market processes. This document specifies an UMM Business Requirements View, which consist of the three sub views: Business Domain View, Business Partner View and Business Entity View.

The Business Information Model is in turn the basis for the creation of XML schema's and is the basis for the specification of web services. The Business Information Model and the syntax specific structures are specified by the “ebIX® Technical Committee” (ETC).

Since the ebIX® model is open for national customisation, some attributes are added as optional for usage for regional/national customisation. If used, these attributes must be specified nationally.

A complete overview of all elaborated UseCases, including relations between them, is shown in A.14.

B.1. Comments to the ebIX® model

If you have comments or suggestions to the requirements, please contact the ebIX® secretary (secretary@ebix.org).

¹ Sometimes called (Resource) Aggregator.

B.2. References

B.2.1. Standards

- [1] UML Profile for UN/CEFACT's Modelling Methodology (UMM), Base Module, 2.0. ([UN/CEFACT Modelling Methodology \(UMM\)](#))
- [2] The Harmonized Role Model (for the Electricity Market) by ebIX®, ENTSO-E, and EFET (https://www.ebix.org/artikel/role_model)

B.2.2. ebIX® Documents

- [1] Introduction to ebIX® Business Requirements and Business Information Models (<https://www.ebix.org/artikel/documents>)
- [2] Recommended Identification Schemes for the European Energy Market (<https://www.ebix.org/artikel/documents>)
- [3] ebIX® code lists (<https://www.ebix.org/artikel/documents>)
- [4] ebIX® Business Requirements Specifications (BRSs) are referenced several places in this document, such as ebIX® BRS for Customer Move and the ebIX® BRS for administration of consent. These BRSs are published at (<https://www.ebix.org/artikel/documents>)
- [5] ebIX® Overview of energy flexibility services (<https://www.ebix.org/artikel/distributed-flexibility-project>)

B.2.3. Energy flexibility services work by other groups

- [6] USEF (<https://www.usef.energy/>)
- [7] Horizon 2020 projects (EU-SysFlex, INTERFACE and OneNet) (<https://ec.europa.eu/programmes/horizon2020/en/home>)
- [8] Equigy project (<https://equigy.com/>)
- [9] "[A toolbox for TSOs and DSOs to make use of new system and grid services](#)" by CEDEC, E.DSO for Smart Grids, Eurelectric, GEODE and ENTSO-E.

B.3. Participants in the project

These Business Requirements, as part of the ebIX® Model for the European Energy Market (see [1]), are prepared by the ebIX Flexibility project, consisting of representatives from ebIX (and their countries), ENTSO-E, DSO's and TSO's.

B.4. Main changes since last version

Old	New	Clarification	Date
Version 1.2			
v1r1B	v1r2A	<ul style="list-style-type: none"> Hidden attributes from the root class in Appendix A. Corrected document names to be in line in the data view and in Appendix A. Removed the stereotype «Business entity» from all class diagram descriptions. Renamed the class "Resource" to "Resource information" in all documents. Renamed the class "Accounting Point" to "Accounting Point information". Move Pool ID to the root class with a cardinality of [0..1] in the Request flexibility register information class. Addition of links from the activity diagrams in the Business Domain View to the business documents (Business Entities) in the Business Entity View. Added Grid Connection ID in all documents. 	20230203
Version 1.1			
v1r0A	v1r1A	Addition of clarifying text and correction of spelling errors.	20220614
v1r1A	v1r1B	Removal of the attributes Accounting Point address and Accounting Point geographical coordinates since these are part of the Accounting Point register and not the flexibility register. Correction of spelling errors.	20221011
v1r1B	v1r1C	Addition of clarifying text and correction of spelling errors.	20221103
Version 1.0			
	v1r0A	Draft for ebIX® Forum approval.	20220510

1 Introduction

1.1 Definitions

Flexibility is defined as the capability to modify generation injection and/or consumption patterns in the energy system (like electricity or gas) - on an individual Resource, Accounting Point or aggregated level - on external request.

Flexibility Services are defined as balancing services, non-frequency ancillary services, congestion management services etc. where Flexibility is used to meet the needs of energy market participants or System Operators on different existing or new marketplaces.

Flexibility Service Provider is a party that offers flexibility services to the energy market based on acquired (aggregated) capabilities.

A **flexibility product** is a certain capacity or volume of energy that a Flexibility Service Provider makes available for a flexibility service.

Grid constraints are technical requirements such as thermal limit of the network element and/or voltage limits and are part of operational security limits of the energy grid in question that need to be guarded to meet security requirements, as for instance defined in in Article 18 of the System Operation Guideline².

A **pool** is a collection of one or more Resources that is used by a Flexibility Service Provider to offer one or more flexibility products to the market.

A **Resource** delivers the capability to modify generation injection and/or consumption patterns in the energy system (like electricity or gas). It is a market representation of an asset, or a group of assets related to the energy industry. A Resource represents for example grid assets, consumption assets or production assets, such as generating units, consumption units, energy storage units or virtual power plants.

A **resource group** indicates a group of Resources. A resource group may typically be used to group different technologies within a pool. There are no defined use cases for the resource group, but the resource group may be an attribute of the resource information class in the flexibility register.

The **resolution** (attribute used in several documents in the Business Entity View, see chapter 4) is the time between two observations, leading to the number of observations in this timeseries (calculated from the observation period divided by the Resolution).

The observation period must contain a whole number of observations as derived from the resolution.

The resolution is expressed in compliance with ISO 8601 in the following format:

PnYnMnDTnHnMnS.

² Article 18 COMMISSION REGULATION (EU) 2017/1485 of 2 August 2017 establishing a guideline on electricity transmission system operation rules. These operational security limits are only related to the transmission system, but similar can apply to the distribution system.

For example **PT15M** for 15 minutes resolution.

1.2 Basic principles and assumptions

The following principles have been used when drafting this document:

- In this BRS it is assumed that roles that are involved in the process are implicitly consented to receive relevant data. Other parties who are interested in receiving these data may get them under the condition that they are explicitly consented by the Customer. These parties are called Consented Parties.
- A Flexibility Service Provider must comply to European and national rules regarding formal registration etc.
- In this BRS we introduce a flexibility register with a Flexibility Register Administrator, who keeps track of parties (roles), such as the Flexibility Service Provider's Balance Responsible Party, and flexibility services related data for Accounting Points and Resources involved in flexibility processes. The Flexibility register is closely related to the Metering Point administration and may, based on national rules, be incorporated in the Metering Point register. The Flexibility register can, based on national rules, be centralised or distributed.
- Resource registration could be separated from Flexibility Service Provider registration for that Resource, but in this BRS it is chosen to combine the Resource and Flexibility Service Provider registration³.
- When registering a Resource in the flexibility register, we assume there is a valid flexibility contract between the Flexibility Service Provider and the Resource Provider for the Resource. This is a legal requirement, however not checked in the processes nor further elaborated in this BRS.
- We assume that the flexibility register also keeps track of who the Flexibility Settlement Responsible is for Resources. Further, the flexibility register may keep track of relevant activation windows for Resources.
- A Resource is registered in the flexibility register before it is grid- and or product pre-qualified.
- The grid- and or product pre-qualification is executed by two "qualifier roles":
 - The **Flexibility Grid Qualifier** is a party responsible for pre-qualifying a Resource or a pool of Resources for specific requirements in an energy grid. The grid pre-qualification includes a verification if the grid can (technically) accept the delivery of flexibility services from the Resource or pool of Resources. The Flexibility Grid Qualifier may be a role within, or closely linked to, a System Operator (DSO or TSO).
 - The **Flexibility Product Qualifier** is a party responsible for pre-qualifying a Resource or a pool of Resources for a specific product for delivery of flexibility services to the energy market. The product pre-qualification includes an assessment whether the Resource or the pool of Resources meets the requirements of the product.

³ We assume that it is the Flexibility Service Provider, having a contract with the Resource Provider (owner), that is responsible for the registration and update of the Resource.

- There must be a product register defining characteristics of flexibility products offered in the market. However, the content of this register is out of scope for this BRS.
- The role System Operator used in this BRS covers the system operator part of both the DSOs and the TSOs.
- We use Accounting Point as the object where energy (transfer) is measured for market purposes and where market players assume certain responsibilities in well-defined roles. An Accounting Point is a type of Metering Point. The administration of the characteristics for the Accounting Points, including the different responsible roles, is the Metering Point administration, performed by the Metering Point Administrator.
- Each Accounting Point is associated with a physical connection to the grid (sometimes referred to as connection point or similar). This Grid connection is identified with the “Grid connection ID” (*Definition: “The unique identification of the grid connection the Accounting Point is connected to”*). Each Accounting Point is connected to one Grid connection (ID), although there are rare cases where an Accounting Point can have more than one physical Grid connection to the grid. A Grid connection ID has one or more Accounting Points linked to it, as is the case for sub-Accounting Points (see below).

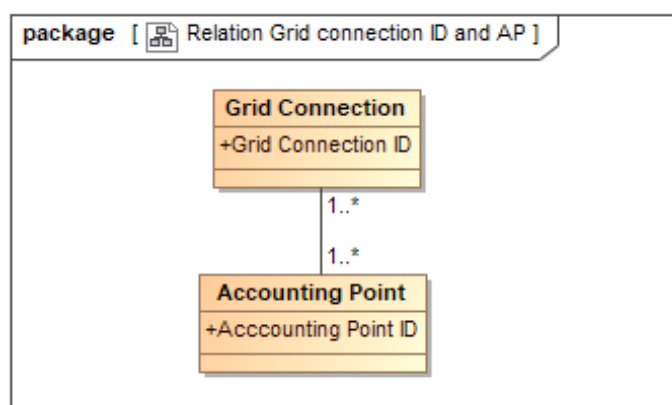


Figure 1 Relation between Grid connection ID and Accounting Point

- An Accounting Point consists of one or more Installation(s), which contains one or more Assets that consume or produce energy. At the connection of an Installation to the grid, the energy transfer usually is measured with one or more Meter(s).

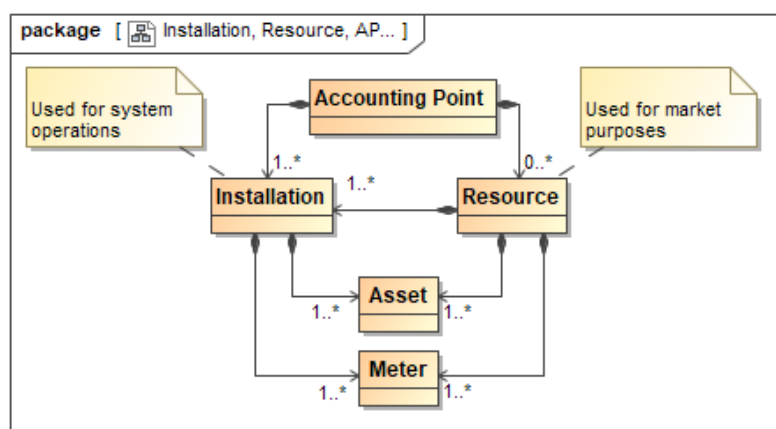


Figure 2 What is an Accounting Point?

Further, an Accounting Point can have zero or more Resources. A Resource is built up of one or more Assets of one or more Installations at the Accounting Point, but not all Assets from an

Installation nor all Installations at an Accounting Point need to be part of a Resource. The Resource may be used for offering a certain energy and/or capacity (service) to the market. A Resource can be measured separately or using the meter(s) of the installation(s) of the Accounting Point. The Resource is through the Accounting Point also linked to the same Grid connection and has the same Grid connection ID as the Accounting Point it is part of.

Since this BRS concerns (flexibility) market processes, we use the Resource. The Installation is not used in the rest of the BRS.

- From each Accounting Point it may be split off one or more sub-Accounting Point(s) (linked to the same Grid connection ID), which is measured. A sub-Accounting Point can have zero or more Resources. Sometimes a Resource can for market reasons be split off into a sub-Accounting Point.
- The sub-Accounting Points (SAPs) must be treated as normal Accounting Points (APs) in the market processes. For the flexibility processes, measurements can come from Accounting Point-, sub-Accounting Point- or Resource level. Where we write in this document Accounting Point it applies as well for a sub-Accounting Point; we do not (need to) distinguish between main and sub-Accounting Points.
- There can only be one Flexibility Service Provider (FSP) for one Resource for a delivery period, but a Flexibility Service Provider may have many Resources.
- In this BRS we assume a change of Flexibility Service Provider for a Resource implies that the old Flexibility Service Provider ends his registration in the flexibility register and the new Flexibility Service Provider registers for the Resource in the flexibility register.
- There is always one Resource Provider responsible for a Resource, who is or has a link to the Customer of the Accounting Point.
- We assume that the Resource Provider nor the Customer are informed directly by the Flexibility Register Administrator of changes to the flexibility register. Based on GDPR, the Resource Provider and/or the Customer will have access to information from the flexibility register, however how this is done is out of the scope of this BRS.
- It is assumed that the System Operators publish potential constraints for their grid as limitations for the provision of flexibility by Flexibility Services Providers.
- It is assumed that the contracts for the Resources are automatically cancelled when the Customer at the Accounting Point *moves out*⁴, so the registration of the Flexibility Service Provider in the Flexibility register is ended. If the Resource Provider stays at the Accounting Point with the new Customer, the Flexibility Services Provider will have to register again for the Accounting Point.
- When defining the UseCases in this Business Requirement Specifications (BRS), the electricity sector has been the focus area. However, it should be possible to also use the UseCases as a basis for other energy sources, such as gas or heat/cold.
- “The happy flow principle” is used in the UseCase descriptions, i.e., the focus is the expected outcome of a process and exceptions on this outcome (rejections, etc.) are described in the “exception row”.

⁴ In some cases a Customer can change without having a move out, such as for merging of companies.

- Since the ebIX® model is open for national customisation, some attributes are added as optional for usage for regional/national customisation. If used, these attributes must be specified nationally.
- In this BRS we use an extended definition of the harmonised role Market Operator, i.e. the Market Operator is not only dealing with electricity, but also market related flexibility services, hence the following definition is proposed:
 - A market operator is a party that provides a service ~~whereby~~ for matching the offers to sell ~~electricity~~ energy and/or market related flexibility services ~~are matched~~ with bids to buy ~~electricity~~ energy and/or market related flexibility services.
- An Entitled Role is only entitled to receive information from “entities” he is consented for, either explicitly or by legislation.
- Which of the Roles are entitled to what attributes in the documents exchanged in this BRS, such as because of the GDPR⁵, must be defined at national level.

⁵ EU General Data Protection Regulation

2 Business Domain View: Flexibility register administration (Business Process UseCase)

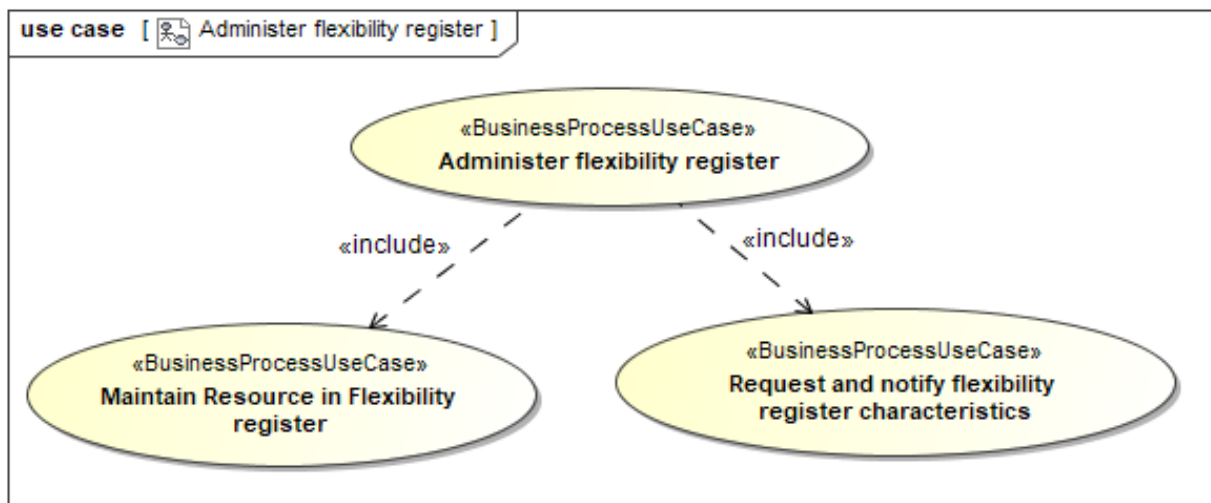


Figure 1 Business Process UseCase: Flexibility register administration

2.1 Description

UseCase description: Administer Flexibility register	
definition	<p><i>This is an overview uses case.</i></p> <p>In this process a flexibility register is administered and maintained, which among others includes:</p> <ul style="list-style-type: none"> • The Flexibility Service Provider registers, updates and ends a Resource in the flexibility register. Based on national and European rules, the registration and update of the flexibility register may include grid pre-qualification information, product pre-qualification information, activation windows and other roles linked to the Resource. • End of Resource registration if the Customer linked to the Resource moves out of the Accounting Point. • An Entitled Role for Flexibility Register Information can request information from the flexibility register or be notified by the Flexibility Register Administrator when registration, update or end of a Resource or the related Flexibility Service Provider has occurred.

beginsWhen	<ul style="list-style-type: none"> the Flexibility Service Provider needs to register for, update or end a Resource registration in a flexibility register or an Entitled Role for Flexibility Register Information needs information from the flexibility register, or the Customer has moved out.
preCondition	<p>If required by national rules, the Flexibility Service Provider must be licensed (admitted) for the market.</p> <p>The Flexibility Register Administrator knows the Flexibility Service Provider.</p>
endsWhen	<p>This is a “life cycle” UseCase, which ends when the Customer moves out of his Accounting Point, or the Flexibility Service Provider ends the Resource in the flexibility register.</p>
postCondition	<p>The Flexibility Service Providers registration for, update or end of a Resource at the Accounting Point in the flexibility register is finalised (ended) and the Entitled Roles have been notified.</p>
exceptions	<p>None.</p>
actions	<p>Not applicable at this level.</p>

2.2 Maintain Resource in flexibility register (Business Process UseCase)

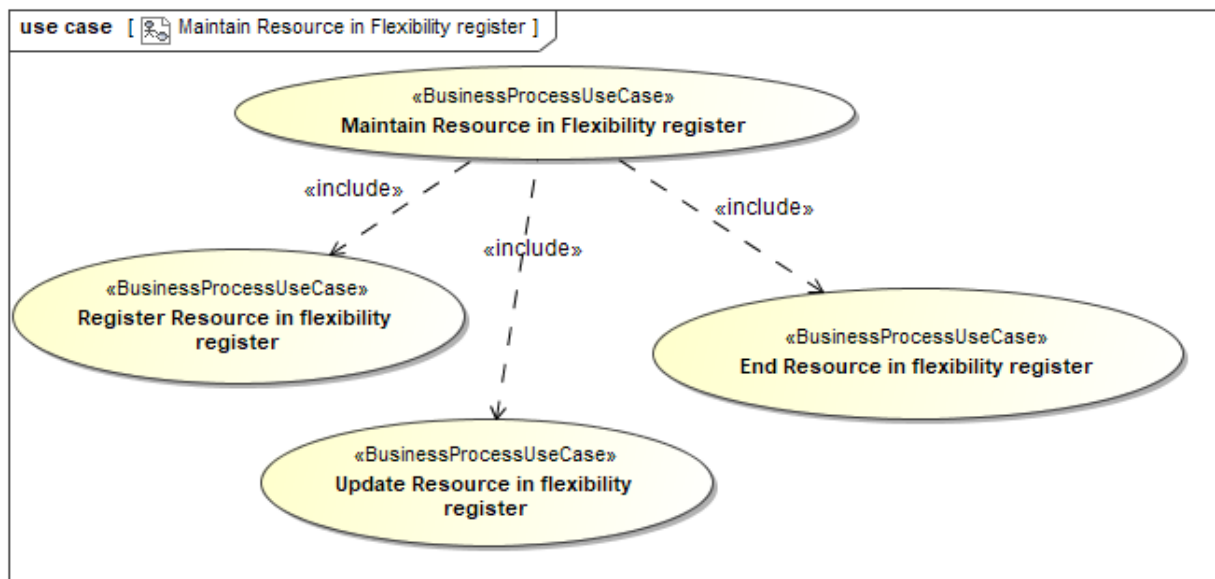


Figure 2 Business Process UseCase: Maintain Resource in Flexibility register

2.2.1 Description

UseCase description: Maintain Resource in flexibility register	
definition	<p>In this process, the Flexibility Service Provider registers, maintains and ends the Resource in the flexibility register.</p> <p>Further, the Grid Qualifier or Product Qualifier updates the flexibility register with grid- and product qualification information of the Resource.</p> <p>In addition the Resource registration will be ended when the Customer moves out of his Accounting Point.</p>
beginsWhen	<p>When the Flexibility Service Provider needs to register for, update or end a Resource registration in a flexibility register or the Customer moved out of the Accounting Point.</p> <p>Or when the Grid Qualifier or Product Qualifier needs to update the flexibility register with grid- and product qualification information of the Resource.</p>
preCondition	<p>The Flexibility Service Provider is registered as a licensed Flexibility Service Provider, hence known by the Resource Administrator.</p> <p>The characteristics of the Resource and related metering configuration are verified and prepared for flexibility services by the Flexibility Service Provider.</p>

endsWhen	When the Resource is registered, updated or ended in the flexibility register and the Entitled Roles have been notified of the registration for, update or end of a Resource at the Accounting Point in the flexibility register.
postCondition	The registration for, update or end of a Resource at the Accounting Point in the flexibility register is finalised and the Entitled Roles have been notified.
exceptions	When the request for registration, update or end of the Resource at the Accounting Point in the flexibility register was rejected, the process stops.
actions	Not applicable at this level.

2.2.2 Register Resource in flexibility register (Business Process UseCase)

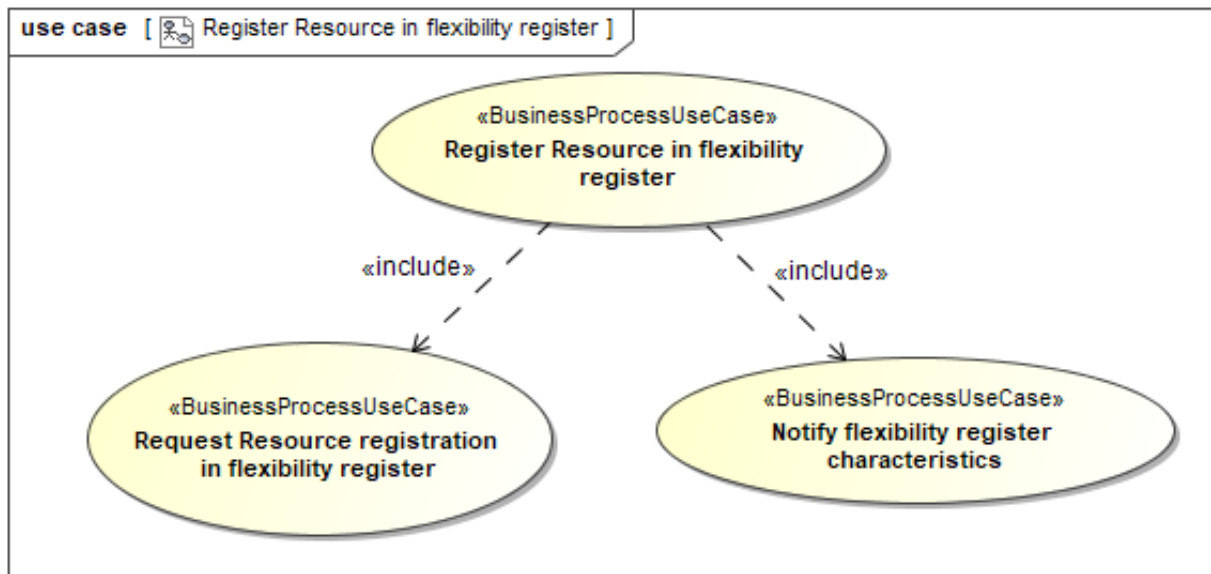


Figure 3 Business Process UseCase: Register Resource in Flexibility register

2.2.2.1 Description

UseCase description: Register Resource in flexibility register	
definition	In this process the Flexibility Service Provider requests registration of a Resource in a flexibility register and the Flexibility Register Administrator notifies Entitled Roles of the registration.
beginsWhen	When the Flexibility Service Provider decides to request registration of a Resource at an Accounting Point in the flexibility register, to achieve the intended start of providing flexibility services.
preCondition	The Flexibility Service Provider has got consent from the Customer linked to the Resource.
endsWhen	The request for registration of a Resource in the flexibility register is confirmed and Entitled Roles have been notified.
postCondition	The Resource at the Accounting Point is registered in the flexibility register and the Resource can be used for offering flexibility services in the market.
exceptions	When the request was rejected, the process stops.
actions	See 2.2.2.2

2.2.2.2 Business Process

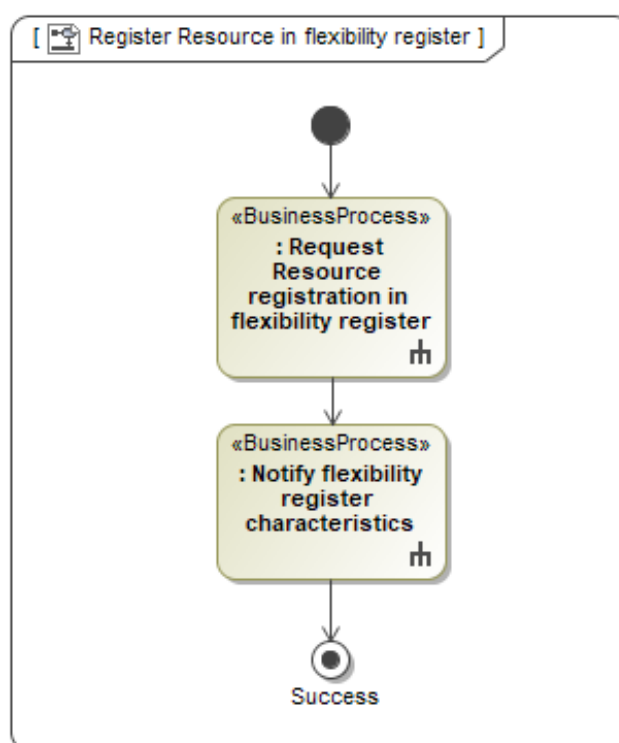


Figure 4 Business Process: Register Resource in Flexibility register

2.2.2.3 Request Resource registration in flexibility register (Business Process UseCase)

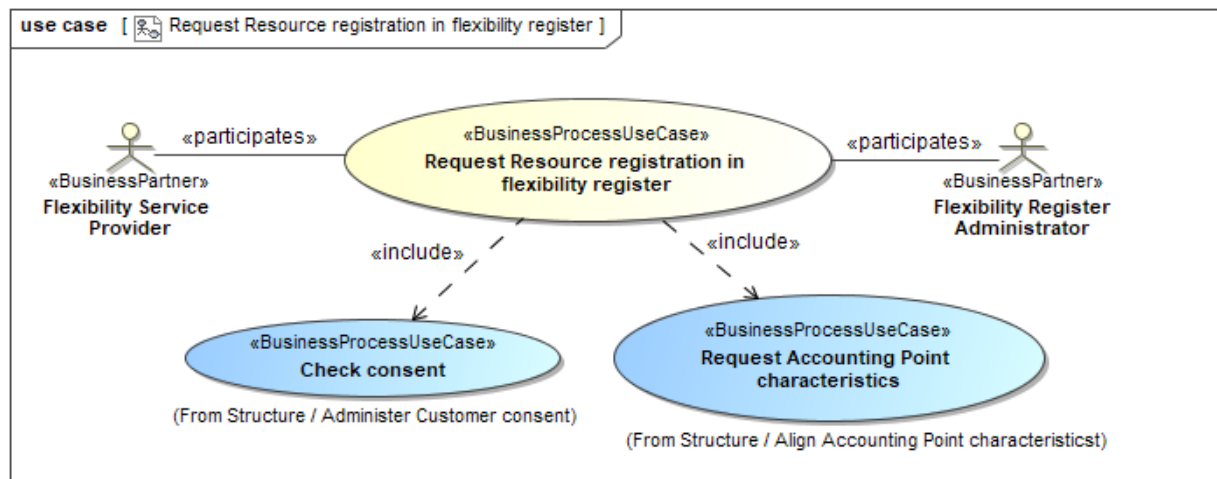


Figure 5 Business Process UseCase: Request Resource registration in flexibility register

2.2.2.3.1 Description

UseCase description: Request Resource registration in flexibility register	
definition	<p>In this process Flexibility Service Provider requests registration of a Resource in the flexibility register.</p> <p>As part of the registration process, the Flexibility Register Administrator requests Accounting Point Characteristics from the Metering Point Administrator and checks the consent at the Consent Administrator.</p>
beginsWhen	When the Flexibility Service Provider decides to request registration of a Resource in the flexibility register, to achieve the intended start of providing flexibility services.
preCondition	<p>The Flexibility Service Provider is known by the Resource Administrator.</p> <p>The Flexibility Service Provider has got consent from the Customer for registration of the Resource in the flexibility register.</p>
endsWhen	The request for registration in the flexibility register of a Resource is confirmed to the Flexibility Service Provider.
postCondition	The Resource at the Accounting Point is registered in the flexibility register and the Resource can be used for offering flexibility services in the market by the Flexibility Service Provider.
exceptions	When the request was rejected, the process stops.
actions	See 2.2.2.3.2

2.2.2.3.2 Business Process

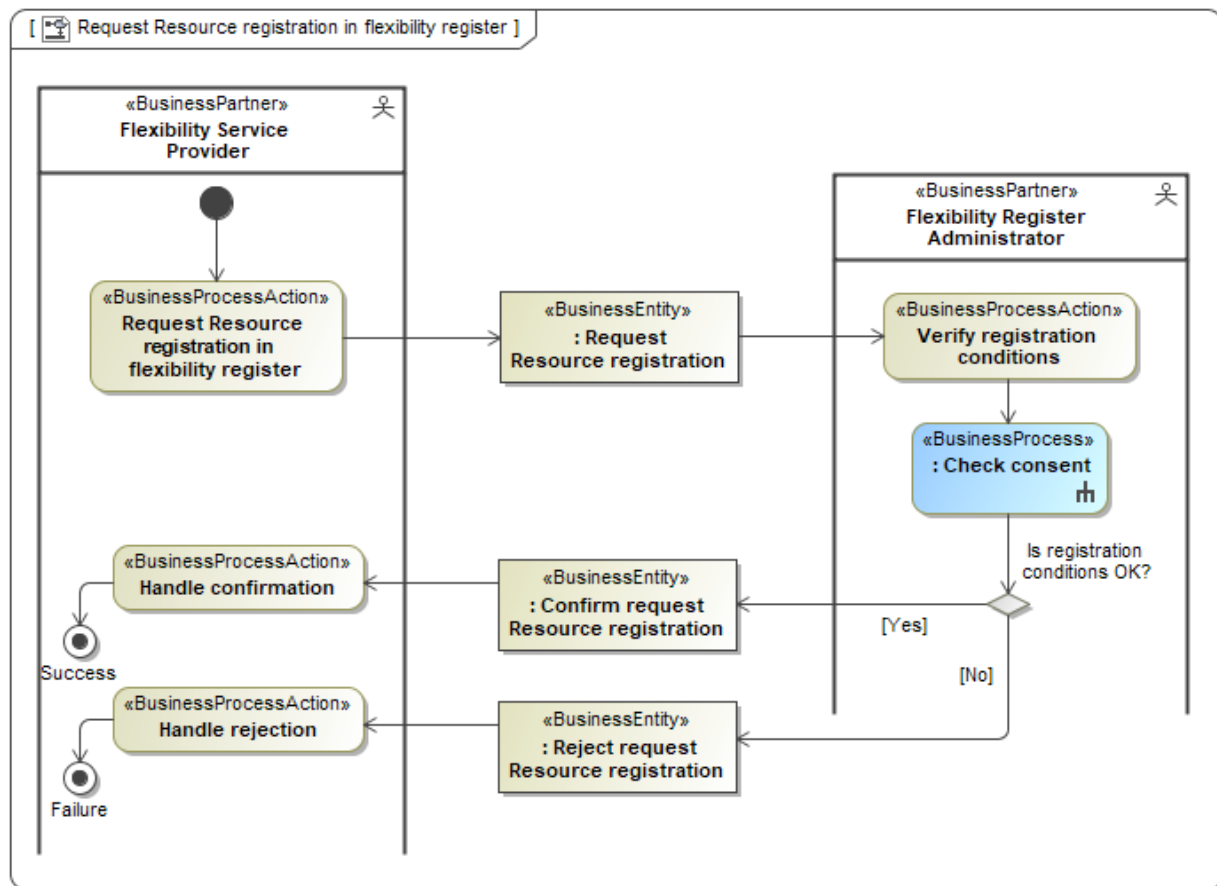


Figure 6 Business Process: Request Resource registration in flexibility register

The data content of the three «Business entity» (Square boxes between the swim lanes) are found at:

- 4.1 Request Resource registration (Class Diagram).
- 4.2 Confirm request Resource registration (Class Diagram).
- 4.3 Reject request Resource registration (Class Diagram).

2.2.2.3.3 Check Consent

Before registering a new Resource in the flexibility register, the Flexibility Register Administrator must check the Flexibility Service Provider's consent from the Customer. The "Check Consent" process is documented in the ebIX® BRS for administration of consent, see [4].

2.2.2.4 Notify flexibility register characteristics

After confirmation of the registration to the requesting Flexibility Service Provider, the registration will be notified to Entitled Roles by the Flexibility Register administrator. The process of notifying flexibility register characteristics is described in paragraph "2.3.3 Notify flexibility register characteristics (Business Process UseCase)".

2.2.3 Update Resource in flexibility register (Business Process UseCase)

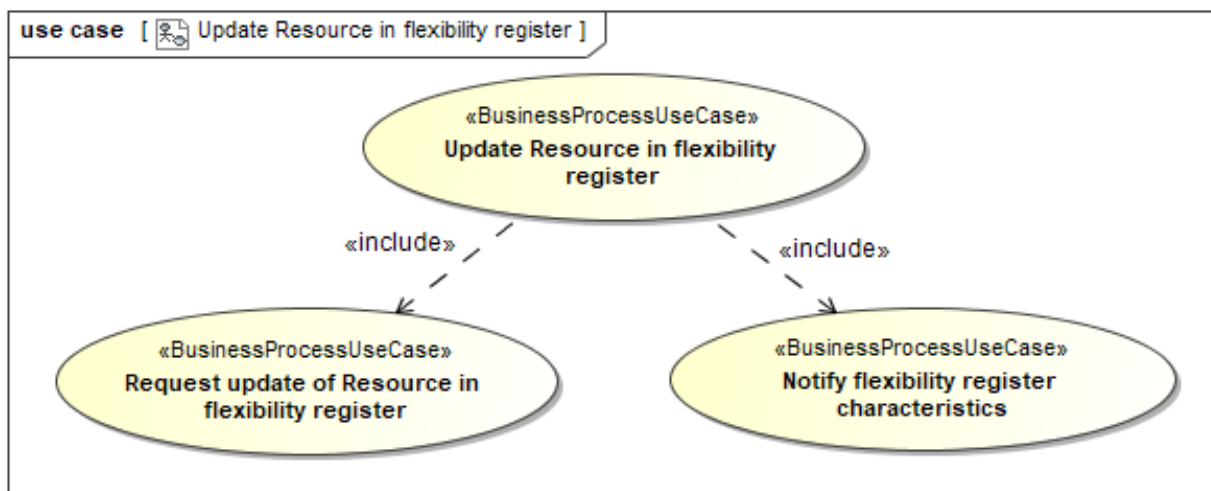


Figure 7 Business Process UseCase: Update Resource in flexibility register

2.2.3.1 Description

UseCase description: Update Resource in flexibility register ⁶	
definition	In this process the Flexibility Service Provider, Grid Qualifier or Product Qualifier, requests update of a registration of a Resource in a flexibility register and the Flexibility Register Administrator notifies Entitled Roles of the update.
beginsWhen	The Flexibility Service Provider, Grid Qualifier or Product Qualifier has a need to update the characteristics of a Resource in the flexibility register.
preCondition	The Flexibility Service Provider has already registered the Resource in the flexibility register and there is a need to update characteristics of the Resource.
endsWhen	The Entitled Roles have received updated characteristics for the Resource.
postCondition	The characteristics of the Resource have been updated in the flexibility register and the Entitled Roles have been notified.
exceptions	None.
actions	See 2.2.3.2

⁶ The UseCase “Notify flexibility register characteristics” is described in chapter “2.3.3, Notify flexibility register characteristics (Business Process UseCase)”

2.2.3.2 Business Process

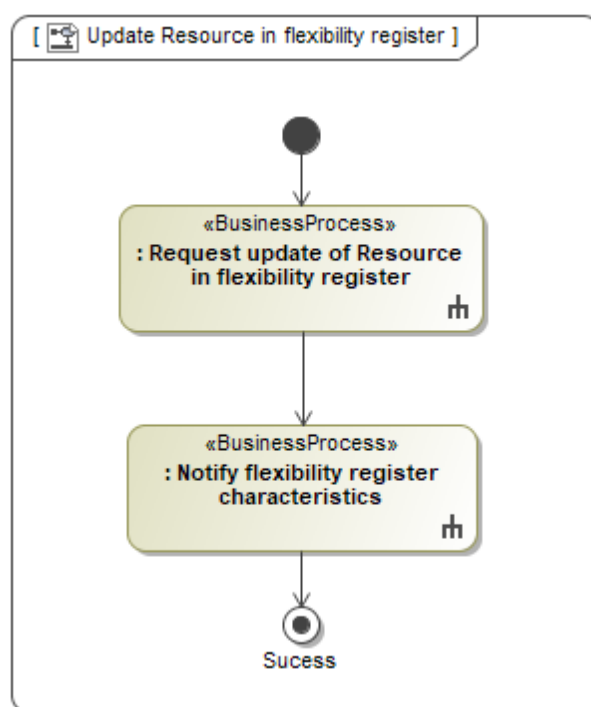


Figure 8 Business Process: Update Resource in flexibility register

2.2.3.3 Request update of Resource in flexibility register (Business Process UseCase)

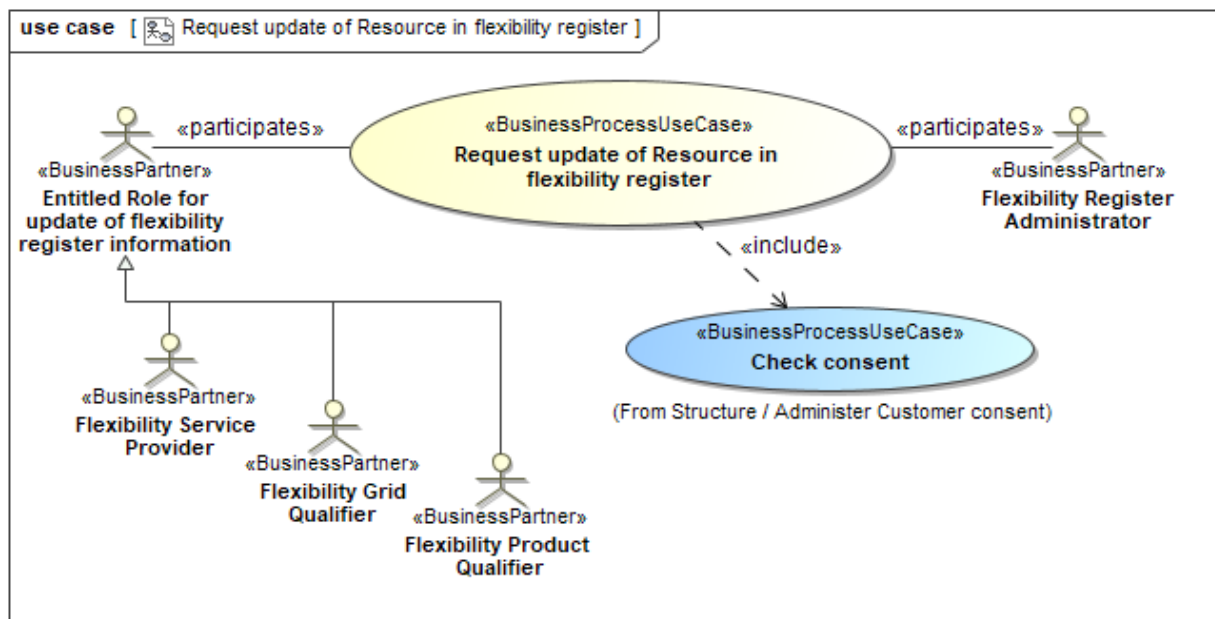


Figure 9 Business Process UseCase: Request update of Resource in flexibility register

2.2.3.3.1 Description

UseCase description: Request update of Resource in flexibility register	
definition	In this process an Entitled Role for update of flexibility register information, e.g. Flexibility Service Provider, Flexibility Grid Qualifier and Flexibility Product Qualifier, requests update of a Resource in the flexibility register.
beginsWhen	When the Entitled Role for update of flexibility register information needs to update the Resource in the flexibility register.
preCondition	The Resource is registered in the flexibility register. The Entitled Role for update of flexibility register information has got a consent from the Customer linked to the Resource.
endsWhen	The Request update Resource in flexibility register has been confirmed by the Flexibility Register Administrator
postCondition	The characteristics of the Resource have been updated in the flexibility register.
exceptions	When the request for update of characteristics of a Resource was rejected, the process stops.
actions	See 2.2.3.3.2

2.2.3.3.2 Business Process

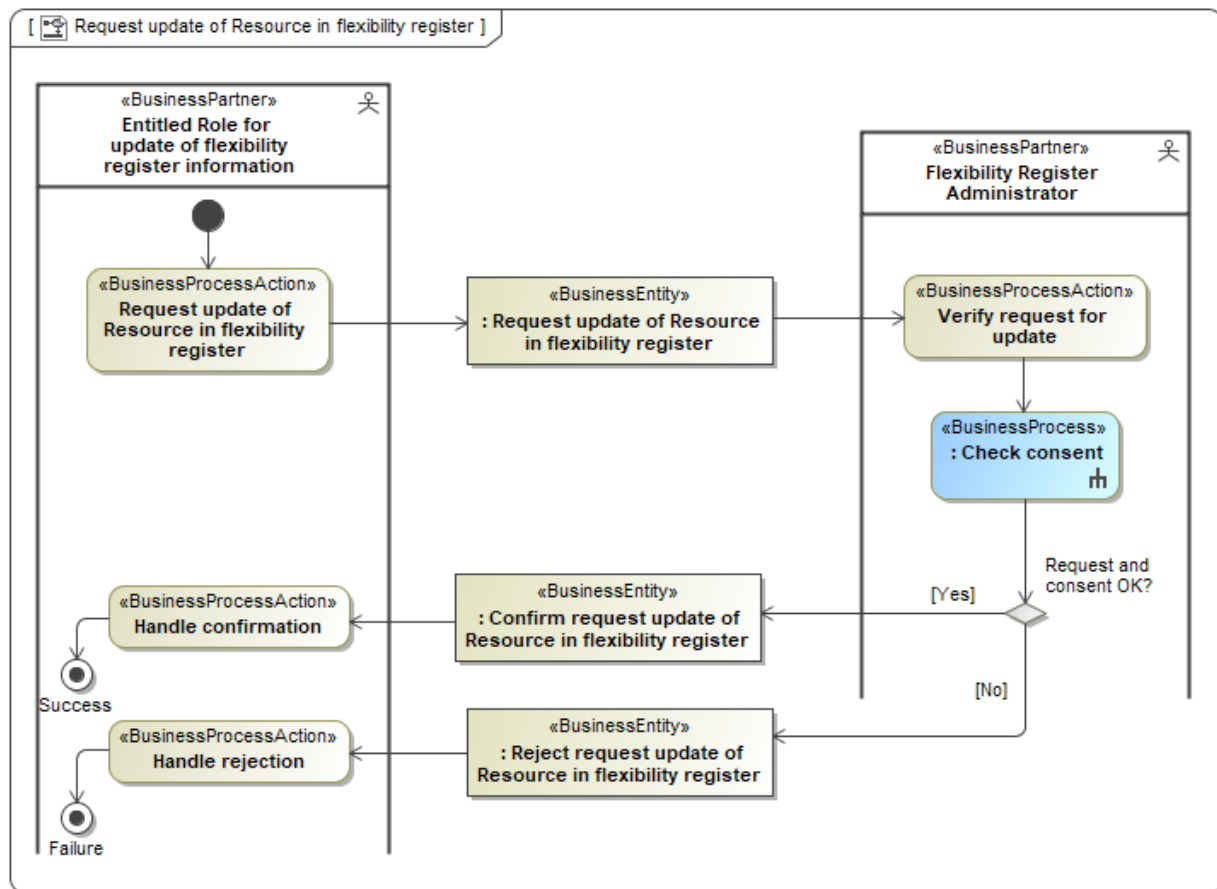


Figure 10 Business Process: Request update Resource in flexibility register

The data content of the three «Business entity» (Square boxes between the swim lanes) are found at:

- 4.5 Request update of Resource in flexibility register (Class Diagram).
- 4.6 Confirm request update of Resource in flexibility register (Class Diagram).
- 4.7 Reject request update of Resource in flexibility register (Class Diagram).

2.2.3.3.3 Check Consent

Before updating a Resource in the flexibility register, the Flexibility Register Administrator must check the Flexibility Service Provider's consent from the Customer. The "Check Consent" process is documented in the ebIX® BRS for administration of consent, see [4].

2.2.3.4 Notify flexibility register characteristics

After the update of characteristics is confirmed to the requesting Entitled Role for update of the flexibility register information, the Flexibility Register Administrator will notify the Entitled Roles of the update. The process of notifying flexibility register characteristics is described in paragraph "2.3.3 Notify flexibility register characteristics (Business Process UseCase)".

2.2.4 End Resource in flexibility register (Business Process UseCase)

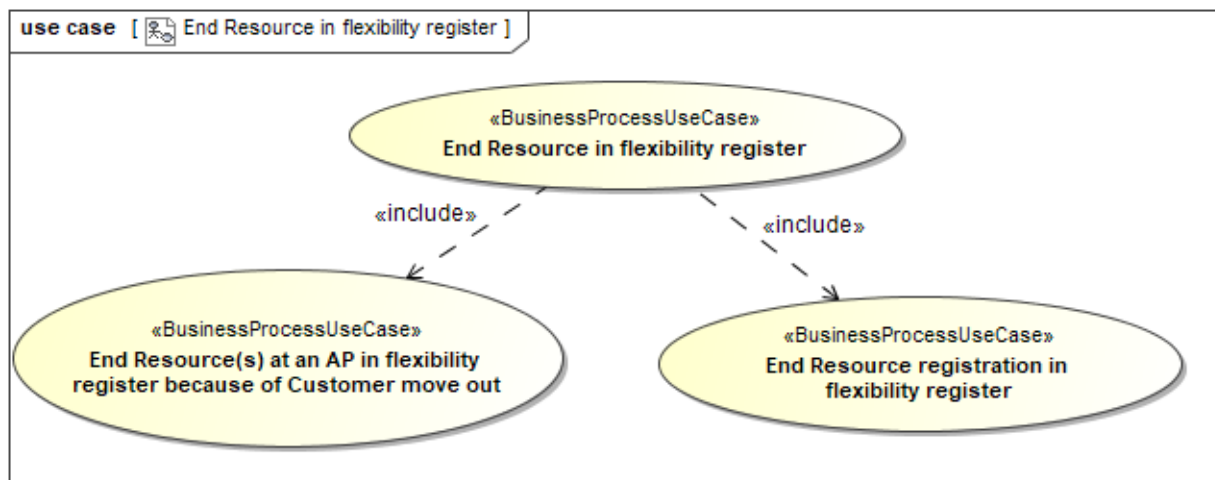


Figure 11 Business Process UseCase: End Resource in flexibility register

2.2.4.1 Description

UseCase description: End Resource in flexibility register	
definition	<p>In this process one or more Resources are ended in in the flexibility register by a given date, either on request by the Flexibility Service Provider (maybe triggered by the Resource Provider’s request to end the contract) or by the “Customer move out” of the Accounting Point.</p> <p>The process includes notification of end of Flexibility Service Provider for the Resource at the Accounting Point to Entitled Roles.</p>
beginsWhen	When the Flexibility Service Provider sends a request to end the Flexibility Service Provider registration for the Resource in the flexibility register or when the Flexibility Register Administrator receives a customer move out notification from the Metering Point Administrator for the Accounting Point.
preCondition	The contract between the Flexibility Service Provider and the Resource Provider is ending or the Customer moves out of the Accounting Point.
endsWhen	Entitled Roles have been notified about the end.
postCondition	The Resource is no longer available for energy flexibility services in the flexibility market and all Entitled Roles have been notified.

exceptions	<p>When the request end of Flexibility Service registration was rejected, the process stops.</p> <p>The end of Flexibility Service Provider for a Resource in the flexibility register may be triggered by the withdrawal of the consent to the Flexibility Service Provider.</p>
actions	See 2.2.4.2

2.2.4.2 Business Process

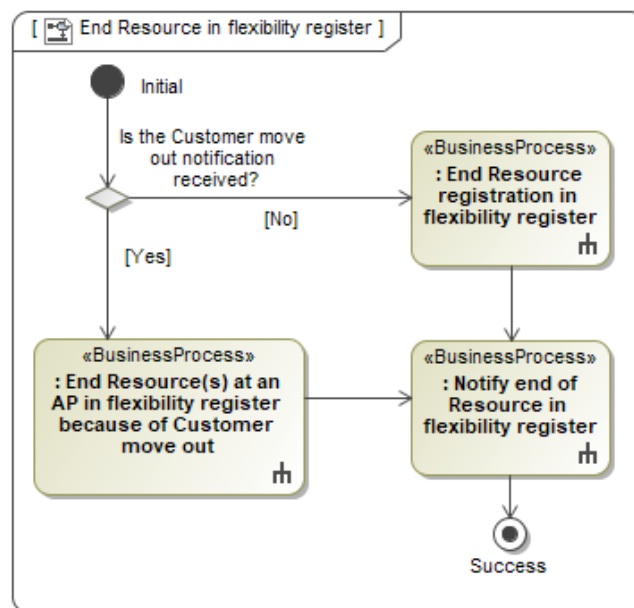


Figure 12 Business Process: End Resource in Flexibility register

2.2.4.3 End Resource(s) in flexibility register because of Customer move out (Business Process UseCase)

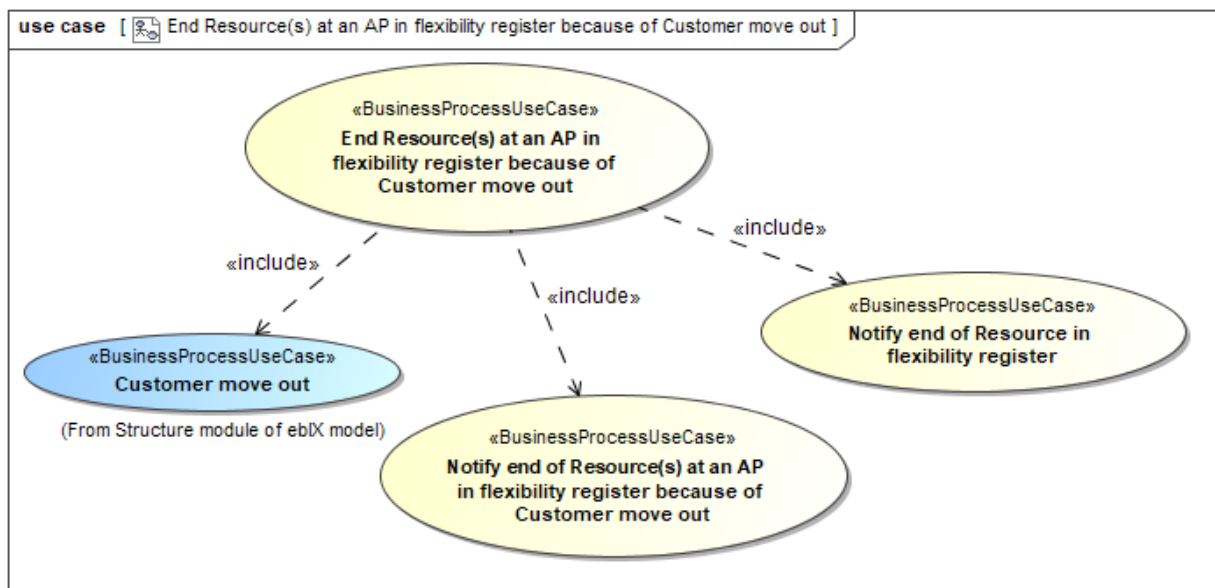


Figure 13 Business Process UseCase: End Resource(s) (AP) in flexibility register because of Customer move out

2.2.4.3.1 Description

UseCase description: End Resource(s) in flexibility register because of Customer move out	
definition	<p>In this process one or more Resources are ended in the flexibility register, by a given date, because the “Customer move out” of the Accounting Point.</p> <p>The process includes a notification of end of Resource(s) in the flexibility register because of Customer move out to the Flexibility Service Provider for the Accounting Point and a “normal” notification of end of Resource(s) in the flexibility register to other Entitled Roles.</p>
beginsWhen	When the Customer linked to the Accounting Point is moving out of the Accounting Point.
preCondition	<p>The Customer has moved out or indicated that he will move out of the Accounting Point.</p> <p>The Metering Point Administrator knows to which Flexibility Register Administrator to notify Customer move out.</p>
endsWhen	The Flexibility Service Provider and other Entitled roles have been notified about the Customer moving out of the Accounting Point, i.e. the end of the Resource(s) and related link to the Flexibility Service Provider in the flexibility register.

postCondition	The Resource(s) at the Accounting Point and the link to the Flexibility Service Provider is no longer registered in the flexibility register.
exceptions	If the Resource Provider stays at the Accounting Point after the “Customer move out” (continues with the new Customer), the Flexibility Services Provider will have to register again for the Resources(s) at the Accounting Point.
actions	See 2.2.4.3.2

2.2.4.3.2 Business Process

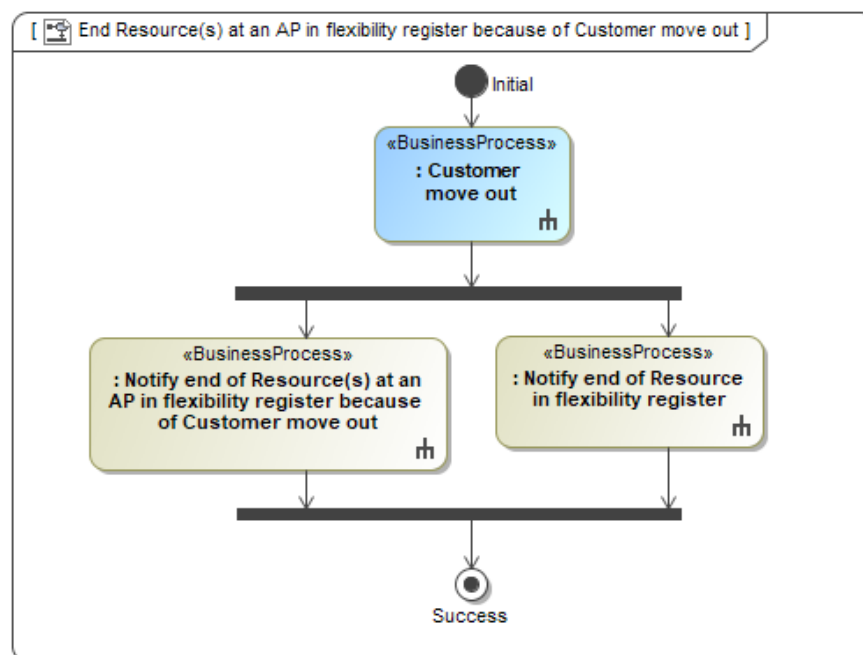


Figure 14 Business Process: End Resource(s) in flexibility register because of Customer move out

2.2.4.3.3 Customer Move Out notification

When the Customer moves out from the Accounting Point the contract with the Flexibility Service Provider to provide flexibility services from the Accounting Point is considered not to be valid anymore. Therefore, a notification from the Move Out Process will be generated by the Metering Point Administrator and sent to the Flexibility Register Administrator, who will end the Flexibility Service Provider registration for the Resource at the Accounting Point and notify the Flexibility Service Provider and other Entitled Roles of it.

The “Customer Move Out” process is documented in the ebIX® BRS for Customer Move, see [4].

2.2.4.3.4 Notify end of Resource(s) in flexibility register because of Customer move out (Business Process UseCase)

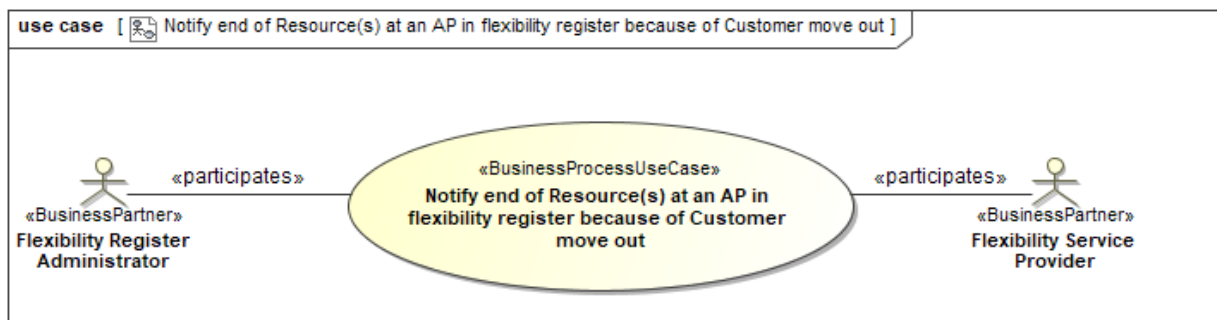


Figure 15 Business Process UseCase: Notify end of Resources(s) in flexibility register because of Customer move out

2.2.4.3.4.1 Description

UseCase description: Notify end of Resource(s) in flexibility register because of Customer move out	
definition	In this process the Flexibility Register Administrator notifies the Flexibility Service Provider that his registration in the flexibility register for the Resource(s) at the Accounting Point ends because of the Customer (linked to the Resource Provider) moved out.
beginsWhen	When the Flexibility Register Administrator received a notification of the Customer (linked to the Resource Provider) moved out of the Accounting Point.
preCondition	The Customer (linked to the Resource Provider) has or will move out of the Accounting Point.
endsWhen	The Flexibility Service Provider has been notified about the Customer moving out of the Accounting Point and the Flexibility Service Provider and his Balance Responsible Party are no longer linked to the Resource in the flexibility register from the move-out date.
postCondition	The Flexibility Service Provider is no longer registered as Flexibility Service Provider for the Resource(s) at the Accounting Point.
exceptions	None.
actions	See 2.2.4.3.4.2

2.2.4.3.4.2 Business Process

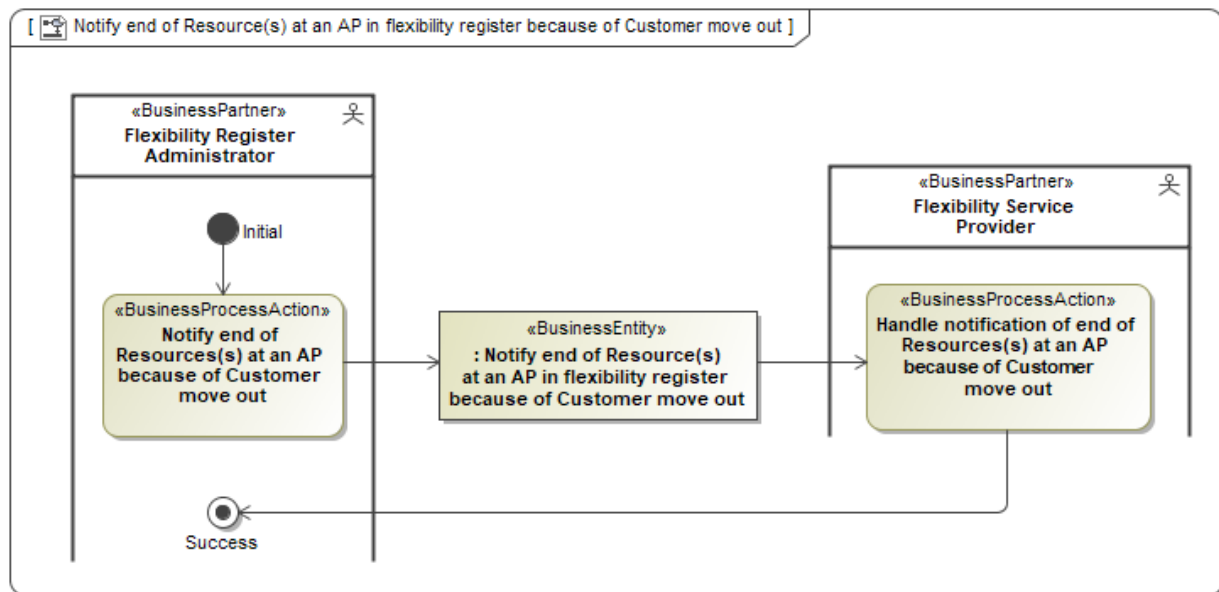


Figure 16 Business Process: Notify end of Resource(s) in flexibility register because of Customer move out

The data content of the «Business entity» (Square box between the swim lanes) is found at “4.11 Notify end of Resource(s) at an Accounting Point in flexibility register because of Customer move out (Class Diagram)”.

2.2.4.3.5 Notify end of Resource in flexibility register

After notification of the end of registration of the Resource to the Flexibility Service Provider, the Flexibility Register Administrator will notify the end to the Entitled Roles. The process of notifying end of Resource in flexibility register is described in paragraph “2.2.4.5 Notify end of Resource in flexibility register (Business Process UseCase)”.

2.2.4.4 End Resource registration in flexibility register (Business Process UseCase)

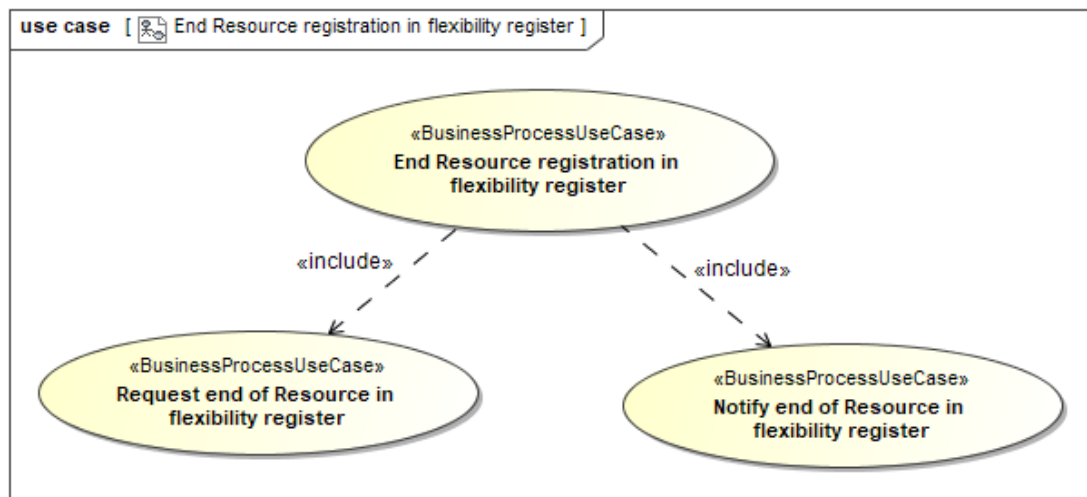


Figure 17 Business Process UseCase: End Resource registration in flexibility register

2.2.4.4.1 Description

UseCase description: End Resource registration in flexibility register	
definition	<p>In this process the Flexibility Service Provider requests end (decommission) of a Resource in a flexibility register.</p> <p>During the business process, the end of Resource registration in the flexibility register is confirmed, the flexibility register is updated and Entitled Roles for flexibility register information are notified.</p>
beginsWhen	When the Flexibility Service Provider requests end of Resource in the flexibility register by the Flexibility Register Administrator.
preCondition	<p>The Flexibility Service Provider is linked to the Resource in the flexibility register.</p> <p>An end date of the Resource registration in the flexibility register has been agreed between the Flexibility Service Provider and the Resource Provider.</p>
endsWhen	When the end of Resource registration in the flexibility register is notified to the Entitled Roles by the Flexibility Register Administrator.
postCondition	The Resource is no longer registered in the flexibility register from the requested end date.
exceptions	When the Request end of Resource in the flexibility register is rejected, the process stops.
actions	See 2.2.4.4.2

2.2.4.4.2 Business Process

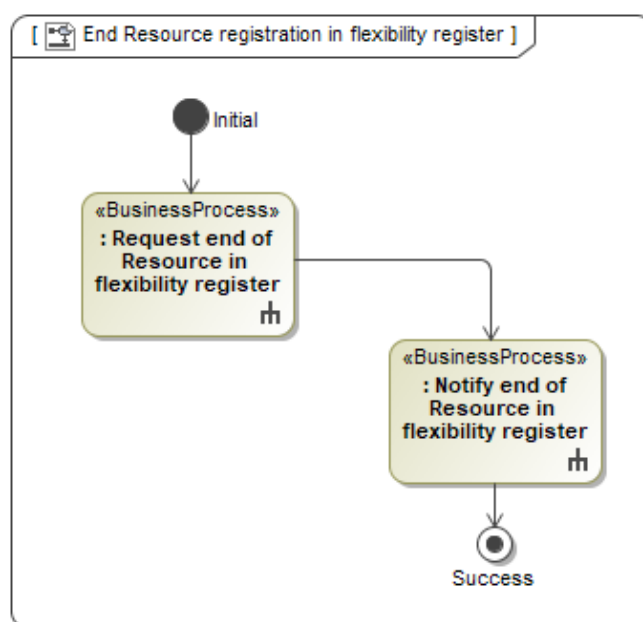


Figure 18 Business process: End Resource registration in flexibility register

2.2.4.4.3 Request end of Resource in flexibility register (Business Process UseCase)

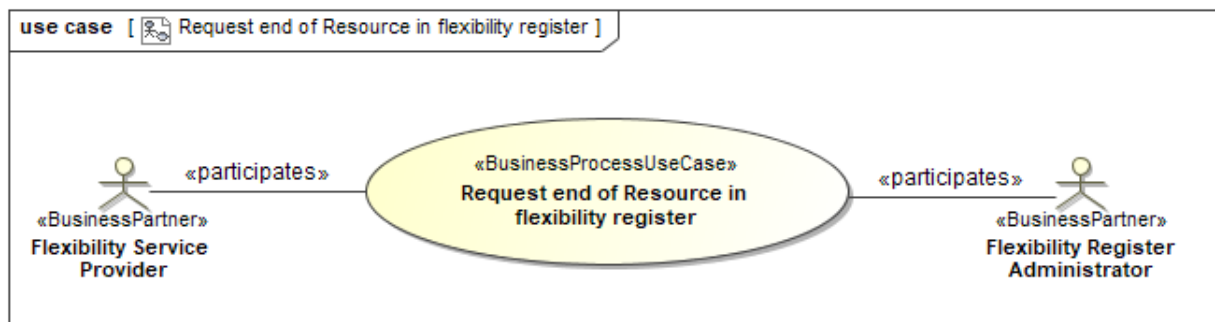


Figure 19 Business Process UseCase: Request end of Resource in flexibility register

2.2.4.4.3.1 Description

UseCase description: Request end of Resource in flexibility register	
definition	In this process the Flexibility Service Provider requests end (decommission) of a Resource in a flexibility register, which is confirmed by the Flexibility Register Administrator.
beginsWhen	When the Flexibility Service Provider decides to request end of Resource in the flexibility register.
preCondition	The Flexibility Service Provider is linked to the Resource in the flexibility register. An end date of the Resource registration in the flexibility register has been decided.
endsWhen	When the end of Resource registration in the flexibility register is confirmed to the Flexibility Service Provider.
postCondition	The Resource is no longer registered in the flexibility register from the requested end date.
exceptions	When the Request end of Resource in the flexibility register is rejected, the process stops.
actions	See 2.2.4.4.3.2

2.2.4.4.3.2 Business Process

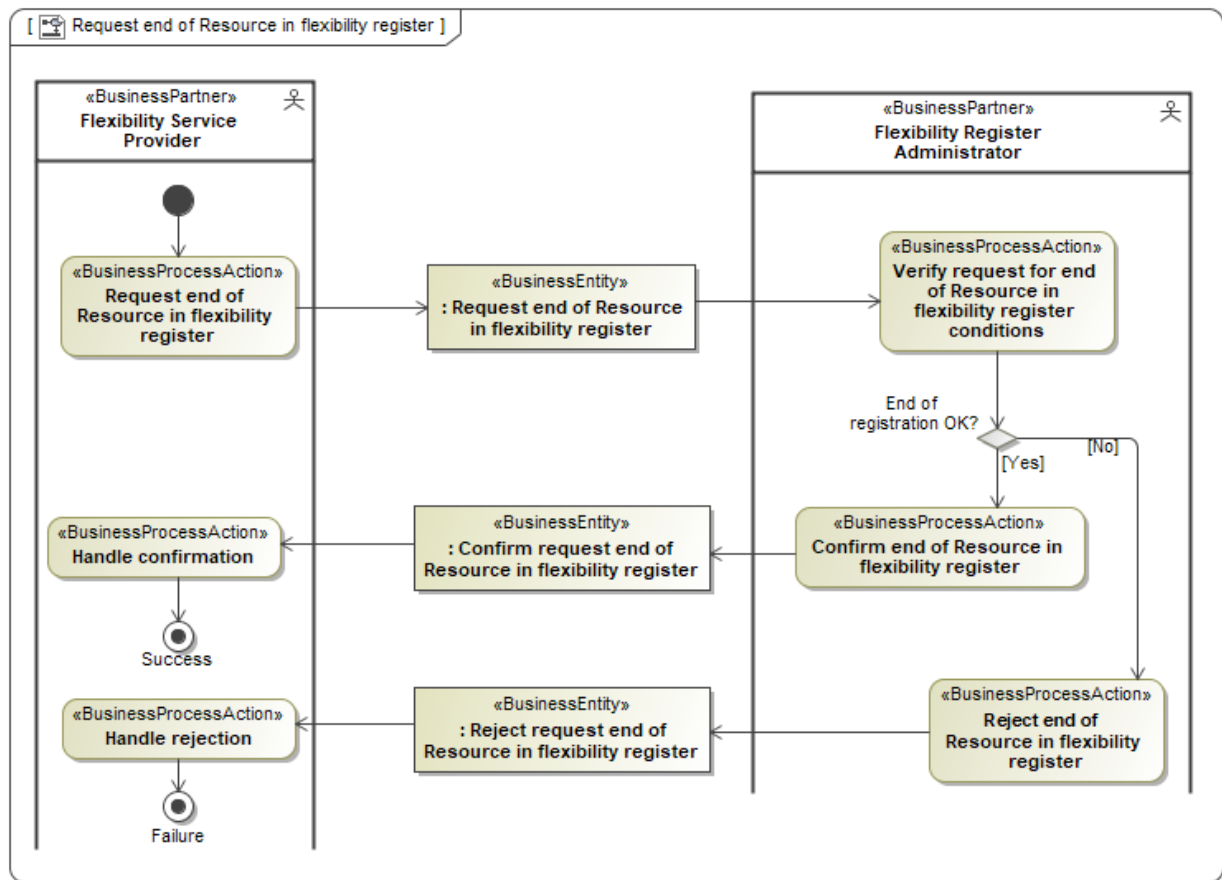


Figure 20 Business process: Request end of Resource in flexibility register

The data content of the three «Business entity» (Square boxes between the swim lanes) are found at:

- 4.8 Request end of Resource in flexibility register (Class Diagram).
- 4.9 Confirm request end of Resource in flexibility register (Class Diagram).
- 4.10 Reject request end of Resource in flexibility register (Class Diagram).

2.2.4.5 Notify end of Resource in flexibility register (Business Process UseCase)

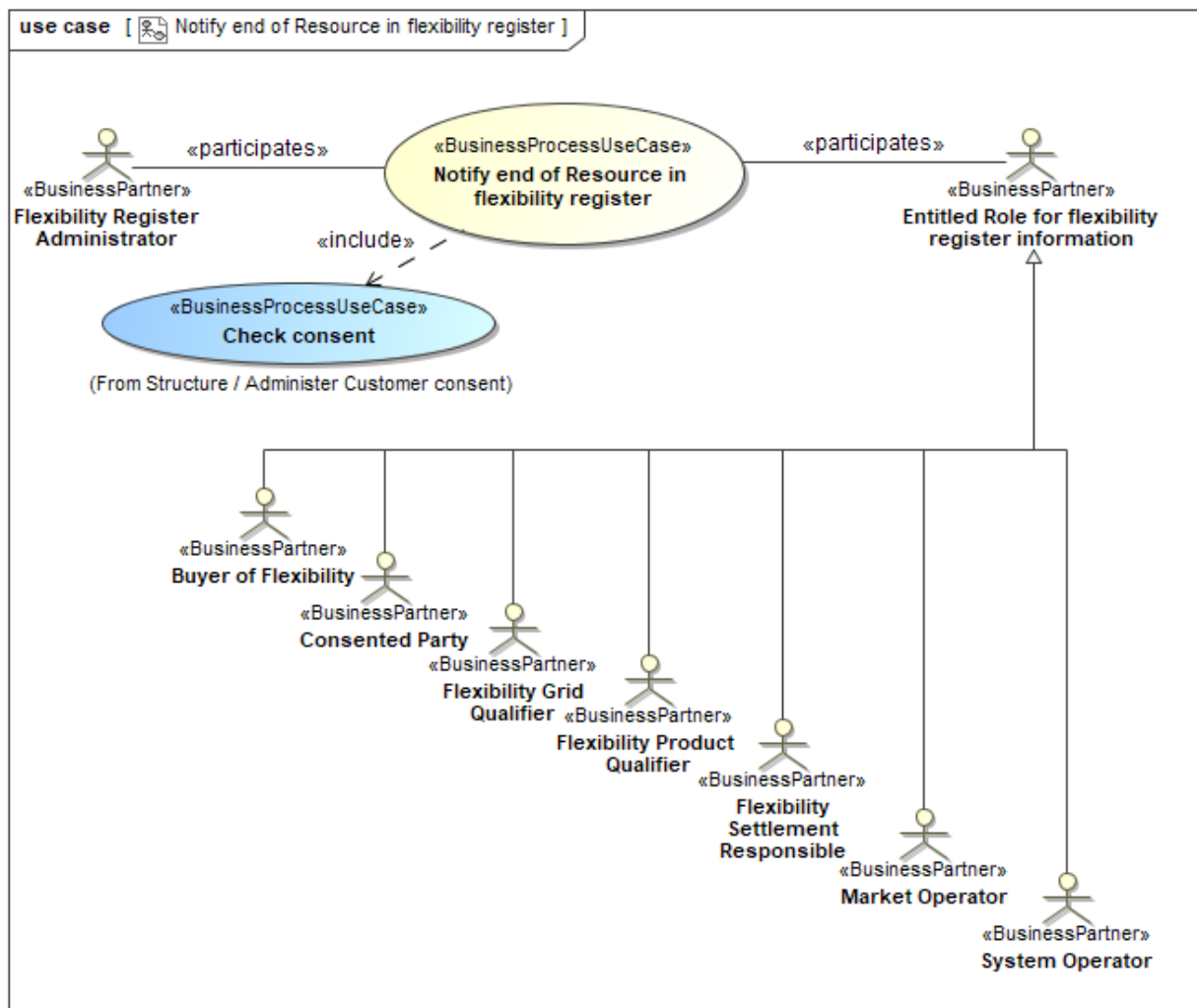


Figure 21 Business Process UseCase: Notify end of Resource in flexibility register

2.2.4.5.1 Description

UseCase description: Notify end of Resource in flexibility register	
definition	In this process, the Entitled Roles for flexibility register information, such as Buyer of Flexibility, Consented Party, Flexibility Grid Qualifier, Flexibility Product Qualifier, Flexibility Settlement Responsible, Flexibility Service Provider, Market Operator, Resource Provider and/or System Operator, are notified by the Flexibility Register Administrator of the end of Resource registration in flexibility register.
beginsWhen	When the request for end of Resource registration in the flexibility register, either on request from the Flexibility Service Provider has been confirmed or because the Flexibility Register Administrator received a notification of the Customer move out of the Accounting Point.

preCondition	The end of Resource registration in the flexibility register has been confirmed or a notification of the Customer move out of the Accounting Point has been received by the Flexibility Register Administrator.
endsWhen	When the Entitled Roles have received the notification.
postCondition	The end of registration of the Resource in the flexibility register has been notified to the Entitled Roles.
exceptions	None.
actions	See 2.2.4.5.2

2.2.4.5.2 Business Process

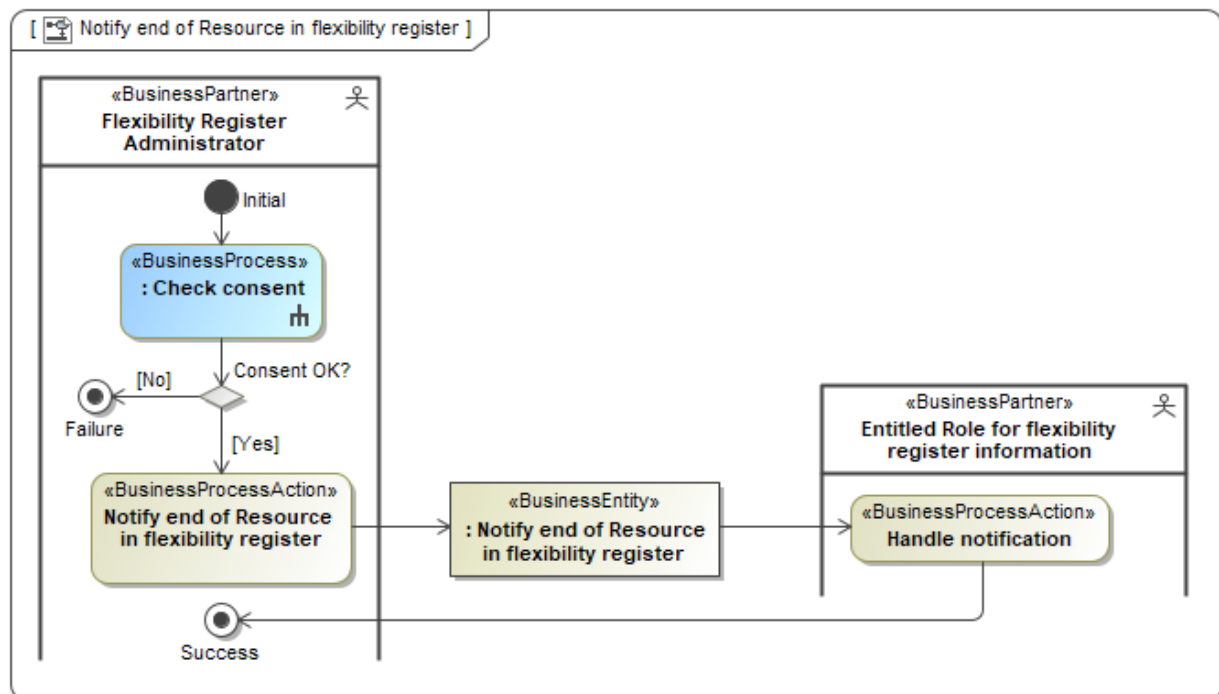


Figure 22 Business process: Notify end of Resource in flexibility register

The data content of the «Business entity» (Square box between the swim lanes) is found at “4.12 Notify end of Resource in flexibility register (Class Diagram)”.

2.2.4.5.3 Check Consent

Before notifying the Entitled Roles about the end of a Resource in the flexibility register, the Flexibility Register Administrator must check the Customer’s consent for it. The “Check Consent” process is documented in the ebIX® BRS for administration of consent, see [4].

2.3 Request and notify flexibility register characteristics (Business Process UseCase)

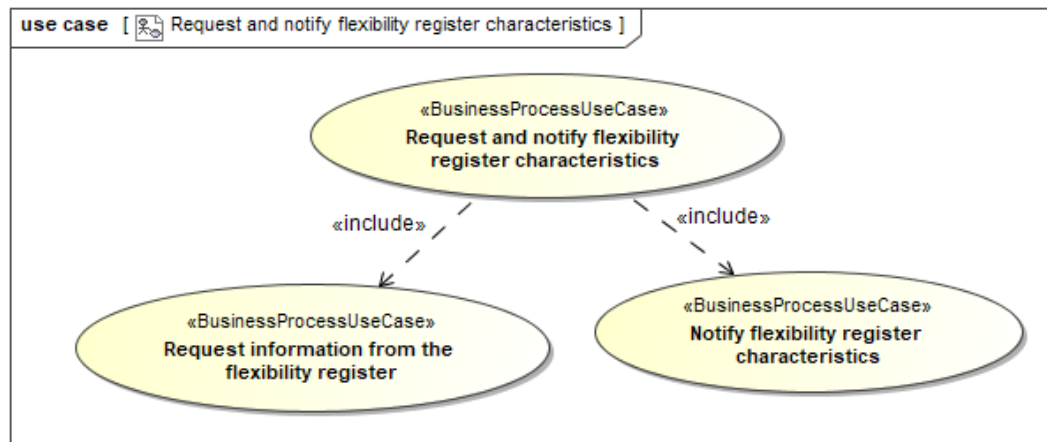


Figure 23 Business Process UseCase: Request and notify flexibility register characteristics

2.3.1 Description

UseCase description: Request and notify flexibility register characteristics	
definition	<p><i>This is an overview uses case.</i></p> <p>In this process an Entitled Role for Flexibility Register Information can request information from the flexibility register or be notified by the Flexibility Register Administrator when registration, update or end of a Resource or the related Flexibility Service Provider has occurred.</p>
beginsWhen	When an Entitled Role for Flexibility Register Information needs information from the flexibility register or when a registration, an update or an end of a Resource, or the related Flexibility Service Provider, has occurred.
preCondition	The Entitled Role for flexibility register information has got a consent from the Customer linked to the Resource.
endsWhen	When the Entitled Role for flexibility register information has received flexibility register characteristics.
postCondition	The Entitled Role for flexibility register information has updated information.
exceptions	None.
actions	Not applicable at this level.

2.3.2 Request information from the flexibility register (Business Process UseCase)

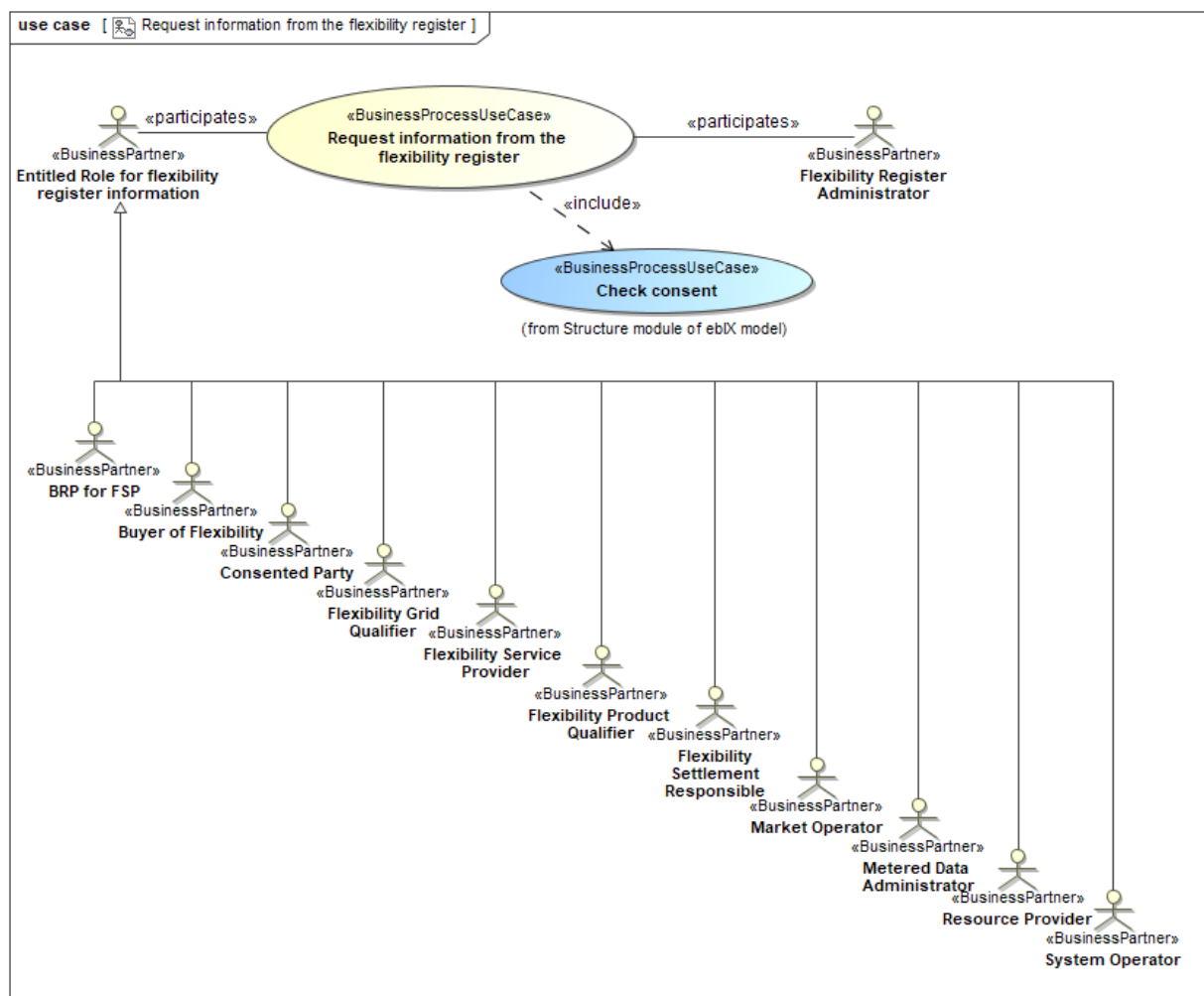


Figure 24 Business Process UseCase: Request information from the flexibility register

2.3.2.1 Description

UseCase description: Request information from the flexibility register ⁷	
definition	In this process an Entitled Role for flexibility register information, e.g. Buyer of Flexibility, Balance Responsible Party (BRP) for Flexibility Service Provider (FSP), Consented Party, Flexibility Grid Qualifier, Flexibility Product Qualifier, Flexibility Settlement Responsible, Flexibility Service Provider, Market Operator, Metered Data Administrator, Resource Provider and/or System Operator, requests information regarding a Resource from the flexibility register.
beginsWhen	The Entitled Role for flexibility register information has a need for information regarding a Resource from the flexibility register.
preCondition	The Entitled Role for flexibility register information has a relation to the Resource at the Accounting Point or the Entitled Role for flexibility register information is consented to receive information from the flexibility register.
endsWhen	The Entitled Role for flexibility register information has received the requested information regarding a Resource from the flexibility register.
postCondition	The Entitled Role for flexibility register information for the Resource at the Accounting Point can use the received information for whatever it is intended for.
exceptions	When the request for information regarding a Resource from the flexibility register was rejected, the process stops.
actions	See 2.3.2.2

⁷ The set of information that is sent to a specific role must be tuned to fit this role, based on GDPR and national rules.

2.3.2.2 Business Process

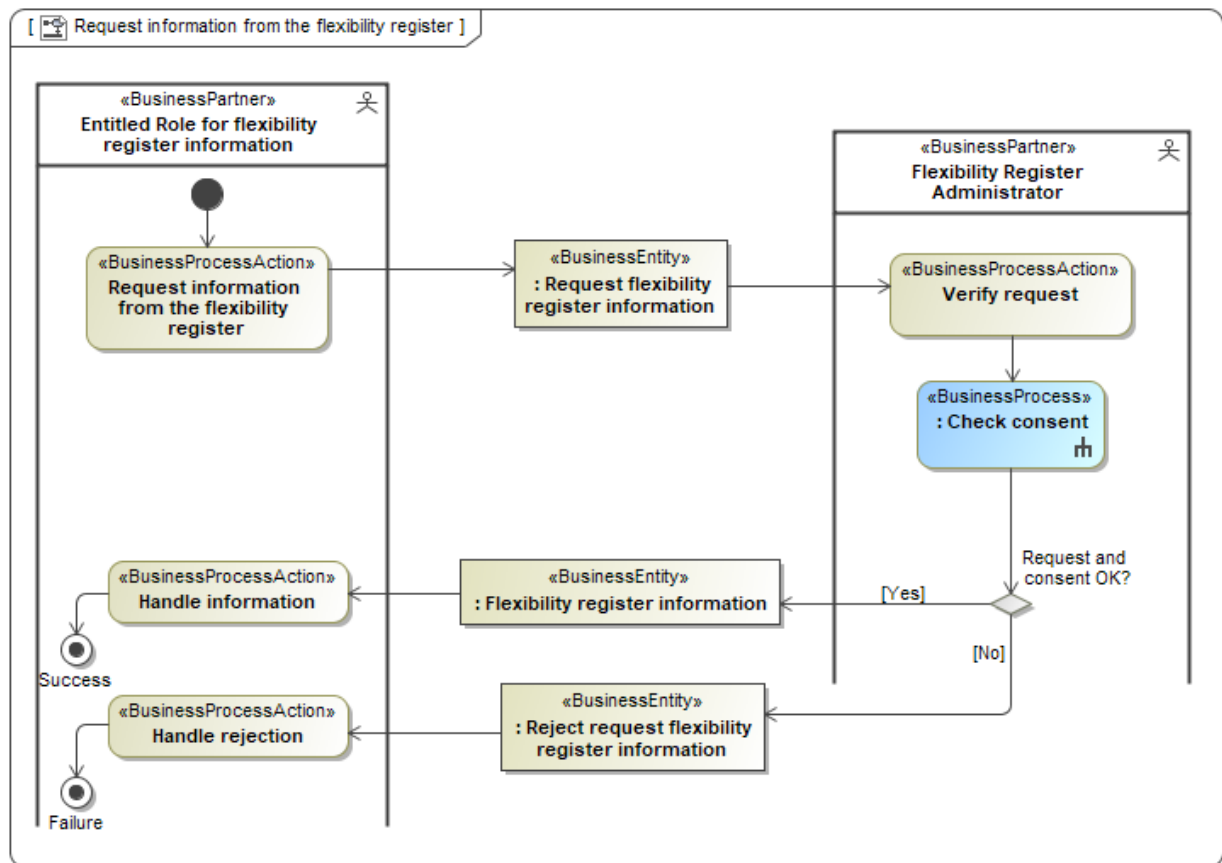


Figure 25 Business Process: Request information from the flexibility register

The data content of the three «Business entity» (Square boxes between the swim lanes) are found at:

- 4.13 Request flexibility register information (Class Diagram).
- 4.4 Flexibility register information (Class Diagram).
- 4.14 Reject request flexibility register information (Class Diagram).

2.3.2.3 Check Consent

Before the Flexibility Register Administrator response to a request for information from the flexibility register, the Flexibility Register Administrator must check the requestors (Entitled Role) consent from the Customer. The “Check Consent” process is documented in the ebIX® BRS for administration of consent, see [4].

2.3.3 Notify flexibility register characteristics (Business Process UseCase)

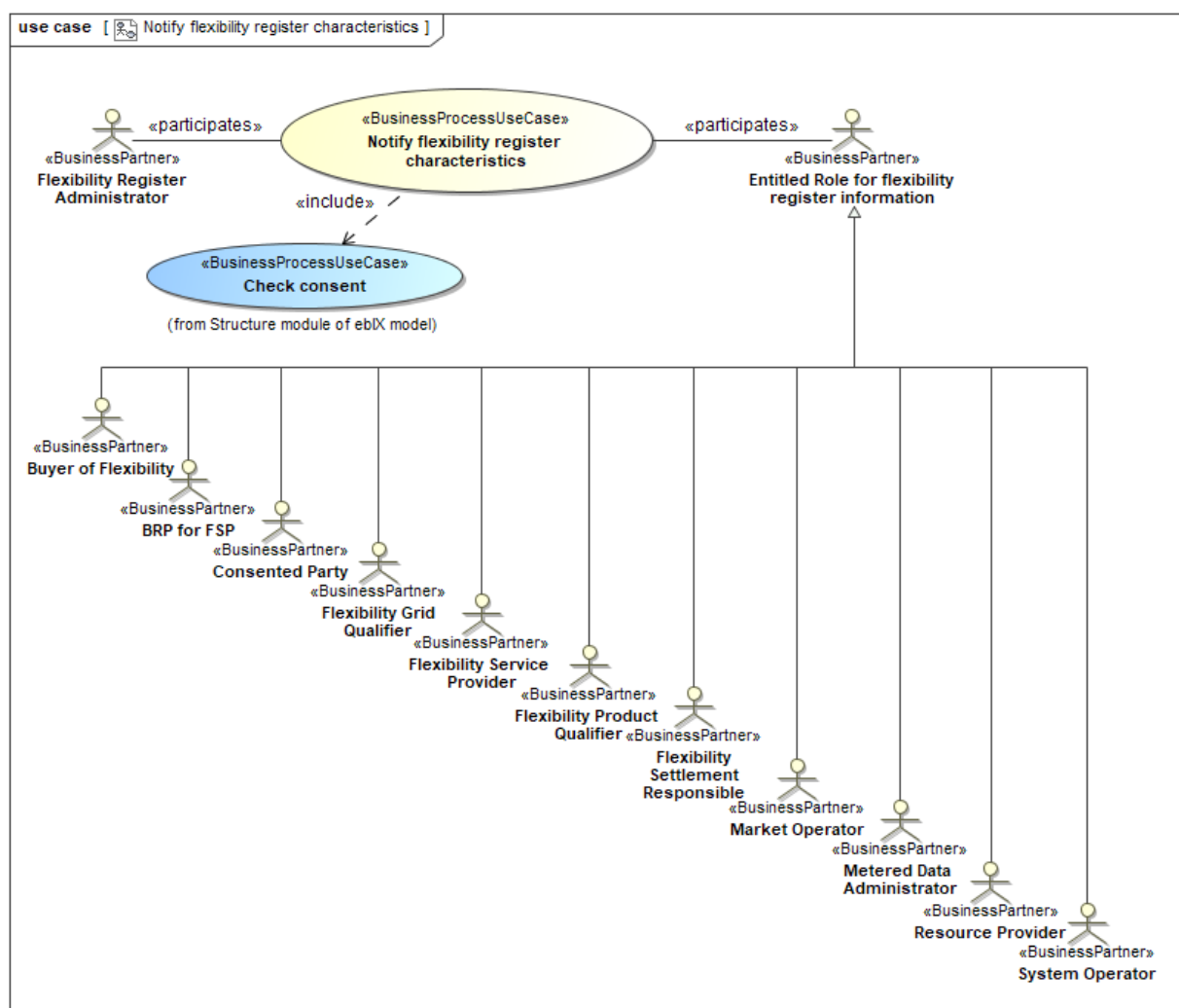


Figure 26 Business Process UseCase: Notify flexibility register characteristics

2.3.3.1 Description

UseCase description: Notify flexibility register characteristics ⁸	
definition	In this process the Flexibility Register Administrator notifies one or more Entitled Roles for flexibility register information, e.g., Buyer of Flexibility, Balance Responsible Party (BRP) for Flexibility Service Provider (FSP), Consented Party, Flexibility Grid Qualifier, Flexibility Product Qualifier, Flexibility Settlement Responsible, Flexibility Service Provider, Market Operator, Metered Data Administrator, Resource Provider and/or System Operator, about new or updated Resource(s) in the flexibility register.

⁸ The set of information that is sent to a specific role must be tuned to fit this role, based on GDPR and national rules.

beginsWhen	When the Flexibility Register Administrator has new or updated flexibility register information regarding a Resource for distribution to Entitled Role(s).
preCondition	The Entitled Role for flexibility register information has a relation to the Resource at the Accounting Point. The Entitled Role for flexibility register information is consented to receive information from the flexibility register.
endsWhen	The Entitled Role for flexibility register information has received the information regarding a new or updated Resource or Resources from the flexibility register.
postCondition	The Entitled Role for flexibility register information for the Resource at the Accounting Point can use the received information for whatever it is intended for.
exceptions	None.
actions	See 2.3.3.2

2.3.3.2 Business Process

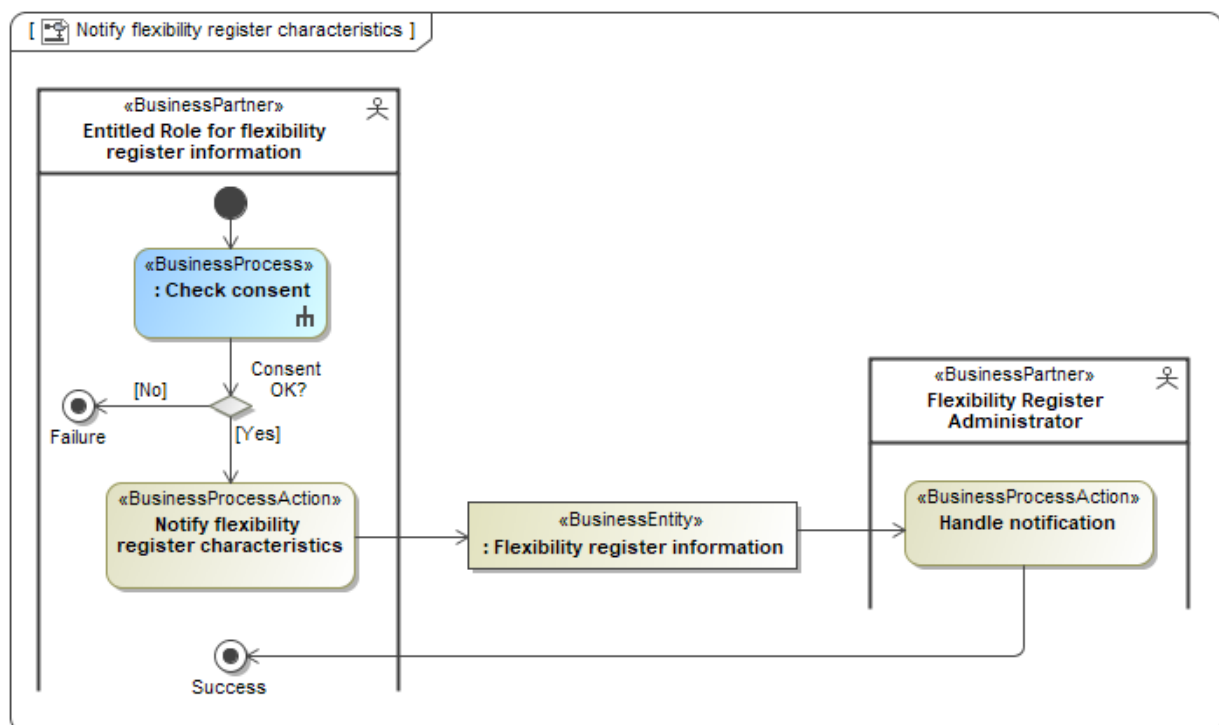


Figure 27 Business Process: Notify flexibility register characteristics

2.3.3.3 Check Consent

Before the Flexibility Register Administrator can notify flexibility register characteristics for a Resource to Entitled Roles, the Flexibility Register Administrator must check the Entitled Roles consent from the Customer. The “Check Consent” process is documented in the ebIX® BRS for administration of consent, see [4].

3 Business Partner View: Flexibility register administration

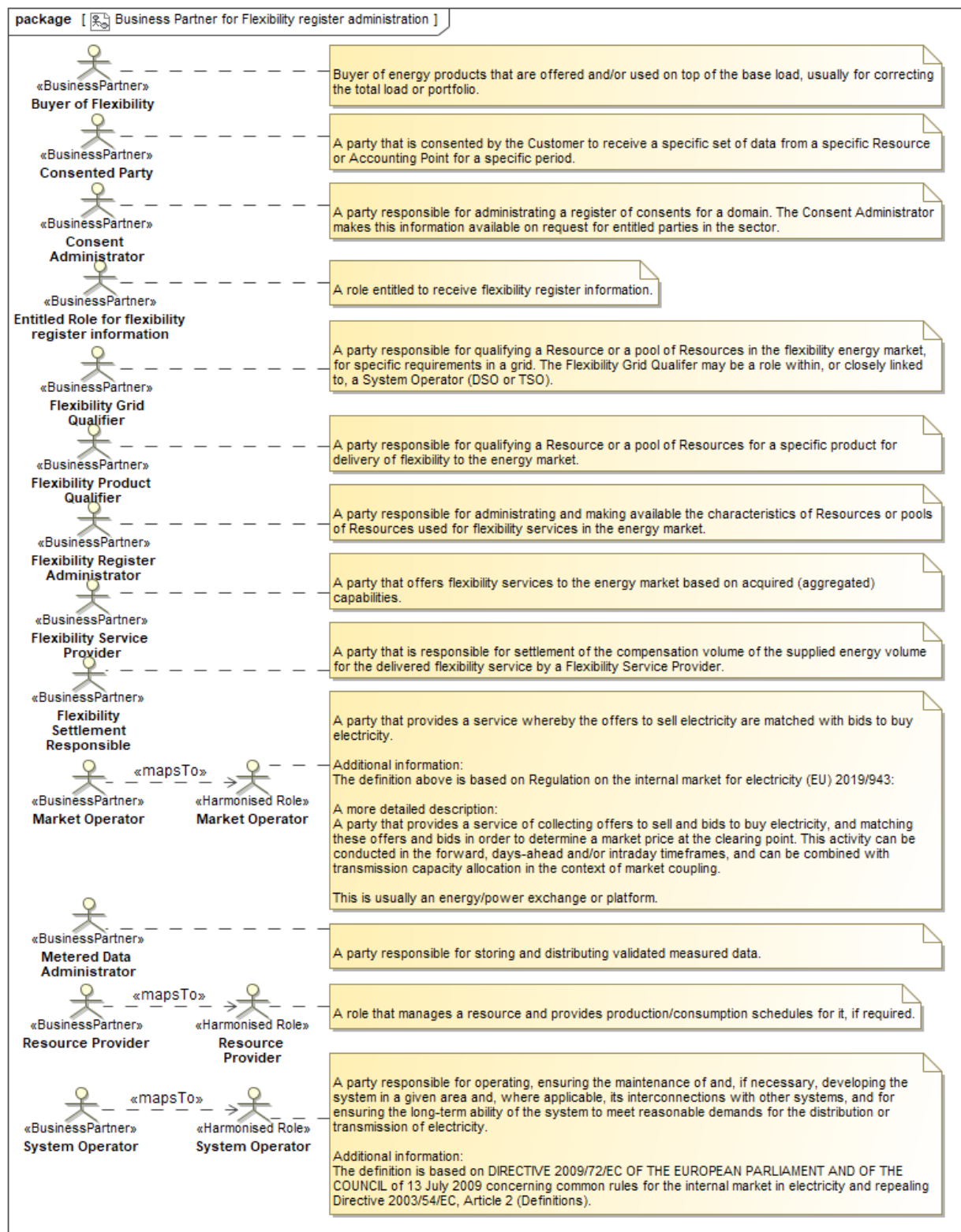


Figure 28 Business Partner View: Flexibility register administration⁹

⁹Note: The Flexibility Service Provider may be mapped to yet undefined roles.

4 Business Entity View

A general introduction to the Business Entity View can be found in the Introduction to ebIX® Business Requirements and Business Information Models [1].

4.1 Request Resource registration (Class Diagram)

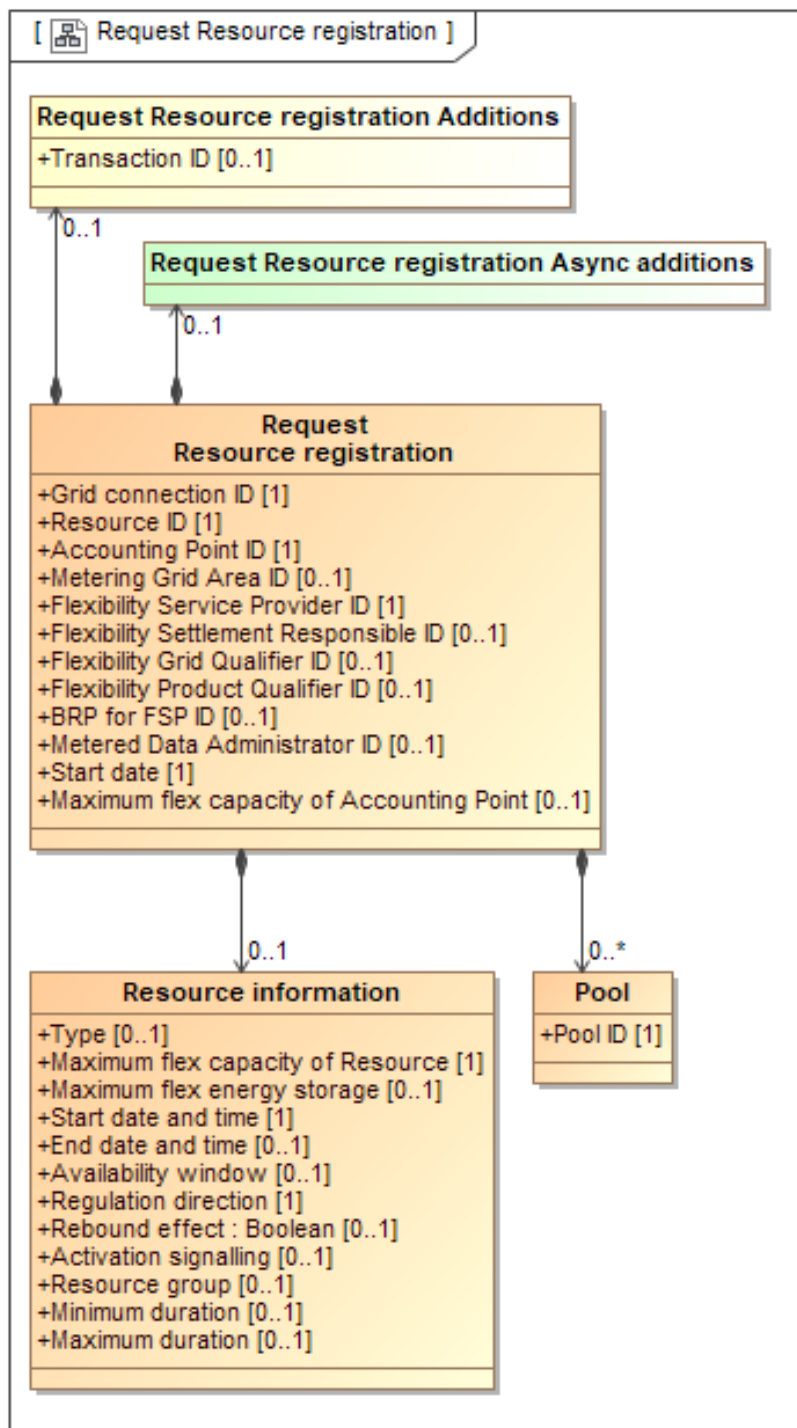


Figure 29 Class diagram: Request Resource registration

4.1.1 Element definitions: Request Resource registration

Class/attribute	Sector ¹⁰	Description
Request Resource registration		The information set to be sent by the Flexibility Service Provider to the Flexibility Register Administrator when requesting Resource registration in the flexibility register.
Grid connection ID		The unique identification of the grid connection the Resource and/or the Accounting Point is/are connected to.
Resource ID		The unique identification of the Resource to be registered.
Accounting Point ID		The unique identification of the Accounting Point the Resource is linked to.
Metering Grid Area ID		The unique identification of the Metering Grid Area the Accounting Point of the Resource is linked to.
Flexibility Service Provider ID		The unique identification of the requesting Flexibility Service Provider.
Flexibility Settlement Responsible ID		The unique identification of the Flexibility Settlement Responsible that is responsible for settlement of flexibility trades for this Resource.
Flexibility Grid Qualifier ID		The unique identification of the party responsible for pre-qualifying the Resource for specific requirements in the grid.
Flexibility Product Qualifier ID		The unique identification of the party responsible for pre-qualifying the Resource for a specific product for delivery of flexibility.
BRP for FSP ID		The unique identification of the Flexibility Service Provider's Balance Responsible Party for this Resource at this Accounting Point.
Metered Data Administrator		The unique identification of the Metered Data Administrator for this Resource at this Accounting Point.
Start date		The requested date for the Flexibility Service Provider to start delivery of flexibility service(s) for this Resource.
Maximum flex capacity of Accounting Point		The maximum capacity that can be used for flexibility purposes for this Accounting Point.
Pool		A repeatable class containing the Pool(s) the Resource is part of.
Pool ID		The unique identification of the pool of Resources the Resource is part of.
Resource information		Grid qualification information related to the relevant Resource.

¹⁰ It is assumed that Metering Points are uniquely dedicated to either electricity or to gas.

Class/attribute	Sector ¹⁰	Description
Type		The type of energy production/consumption of the Resource, such as solar, wind, hydro, thermal or battery.
Maximum flex capacity of Resource		The maximum capacity that can be used for the intended flexibility purposes from this Resource.
Maximum flex energy storage		The maximum of energy storage capacity (in kWh or MWh) of the Resource available for the intended flexibility product.
Start Date		The date from which this Resource is or will be ready for delivery of flexibility services.
End Date		The date from when this Resource will no longer deliver flexibility services.
Availability window		An indication of the time window(s) when this Resource is available for activation.
Regulation direction		The regulation direction possible for this Resource at the Accounting Point: up, down or both.
Rebound effect		Indicates if an activation of the Resource impacts future consumption and/or production from the Resource.
Activation signalling		Indicates if the Resource can respond on direct activation signals (from the Buyer of Flexibility), such as "continuous", "stepwise" or "only on/off".
Resource group		Indicates the group of Resources within the pool this Resource belongs to. The Resource group is typically used to group different technologies within a pool.
Minimum duration		The minimum time for which the Resource can be activated.
Maximum duration		The maximum time for which the Resource can be activated.
Request Resource registration Additions		Additional information needed for technical reasons or to be agreed on a national level.
Transaction ID		The unique identification of this set of information given by the sender of the document.
Request FSP registration for Resource Async Additions		Additional information needed when using asynchronous communication.

4.2 Confirm request Resource registration (Class Diagram)

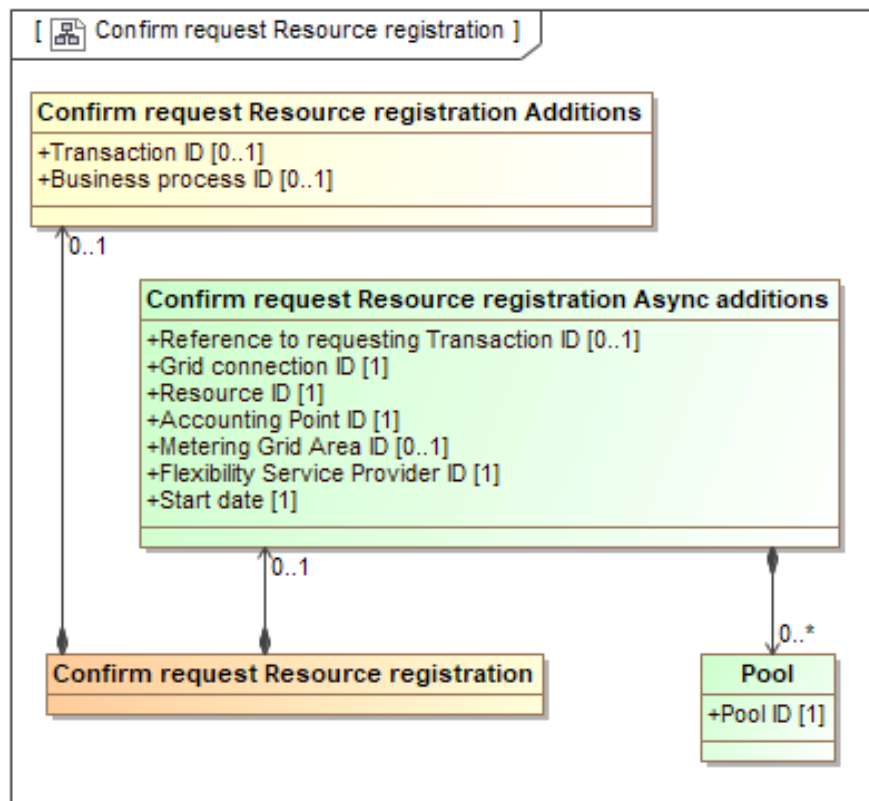


Figure 30 Class diagram: Confirm request Resource registration

4.2.1 Element definitions: Confirm request Resource registration

Class/attribute	Sector ¹¹	Description
Confirm request Resource registration		The information set to be sent by the Flexibility Register Administrator to the requesting Flexibility Service Provider, to confirm his Request for registration of a Resource in the flexibility register.
Confirm request Resource registration Additions		Additional information needed for technical reasons or to be agreed on a national level.
Transaction ID		The unique identification of this set of information as assigned by the Flexibility Register Administrator.
Business process ID		The unique identification of the instance of the process that this transaction is a part of.
Confirm request Resource registration Async Additions		Additional information needed when using asynchronous communication.
Reference to requesting Transaction ID		The Transaction ID from the request leading to this confirmation.

¹¹ It is assumed that Metering Points are uniquely dedicated to either electricity or to gas.

Class/attribute	Sector ¹¹	Description
Grid connection ID		The unique identification of the grid connection the Resource and/or the Accounting Point is/are connected to.
Resource ID		The unique identification of the Resource for which the registration in the flexibility register is confirmed.
Accounting Point ID		The unique identification of the Accounting Point the Resource is linked to in the flexibility register.
Metering Grid Area ID		The unique identification of the Metering Grid Area the Accounting Point of the Resource is linked to. If not present in the request, the Flexibility Register Administrator will look up the Metering Grid Area in the Accounting Point administration and return it to the Flexibility Service Provider.
Flexibility Service Provider ID		The unique identification of the Flexibility Service Provider that requested the registration of the Resource and will be responsible for the flexibility services from the Resource.
Start date		The requested date for the Flexibility Service Provider to start delivery of flexibility service(s) from this Resource.
Pool		A repeatable class containing the Pool(s) the Resource is part of.
Pool ID		The unique identification of the pool of Resources this Resource is linked to in the register.

4.3 Reject request Resource registration (Class Diagram)

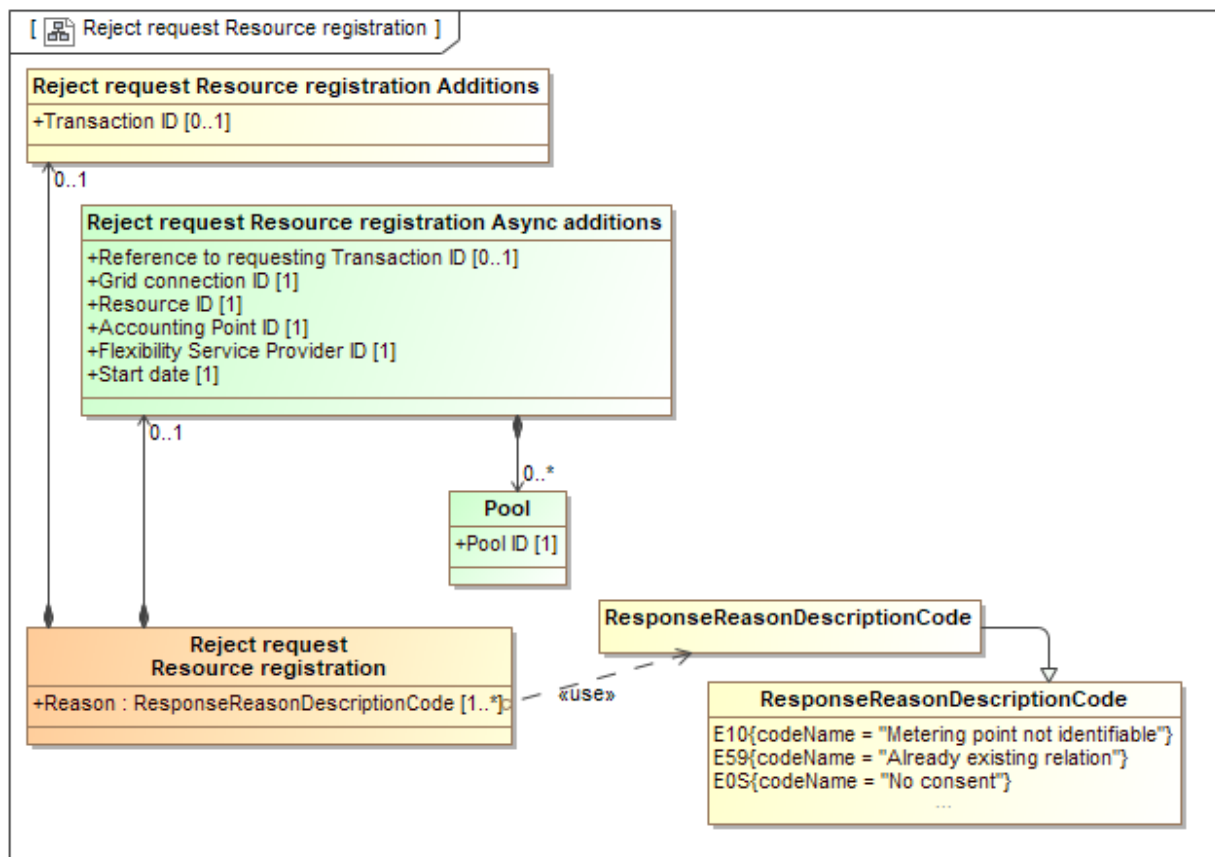


Figure 31 Class diagram: Reject request Resource registration

4.3.1 Element definitions: Reject request Resource registration

Class/attribute	Sector ¹²	Description
Reject request Resource registration		The information set to be sent by the Flexibility Register Administrator to the requesting Flexibility Service Provider, to reject his request for registration of a Resource in the flexibility register.
Reason		A code specifying (one of) the reason(s) for the rejection of the request for registration of a Resource in the flexibility register.
Reject request Resource registration Additions		Additional information needed for technical reasons or to be agreed on a national level.
Transaction ID		The unique identification of this set of information given by the Flexibility Register Administrator.

¹² It is assumed that Metering Points are uniquely dedicated to either electricity or to gas.

Class/attribute	Sector ¹²	Description
Reject request Resource registration Async Additions		Additional information needed when using asynchronous communication.
Reference to requesting Transaction ID		The Transaction ID from the request given by the requesting Flexibility Service Provider.
Grid connection ID		The unique identification of the grid connection the Resource and/or the Accounting Point is/are connected to.
Resource ID		The unique identification of the Resource that was requested to be registered.
Accounting Point ID		The unique identification of the Accounting Point the Resource is linked to in the request.
Flexibility Service Provider ID		The unique identification of the requesting Flexibility Service Provider.
Start date		The requested date for the Flexibility Service Provider to start delivery of flexibility service(s) for this Resource.
Pool		A repeatable class containing the Pool(s) the Resource is part of.
Pool ID		The unique identification of the pool of Resources the Resource in the request was linked to.

4.4 Flexibility register information (Class Diagram)

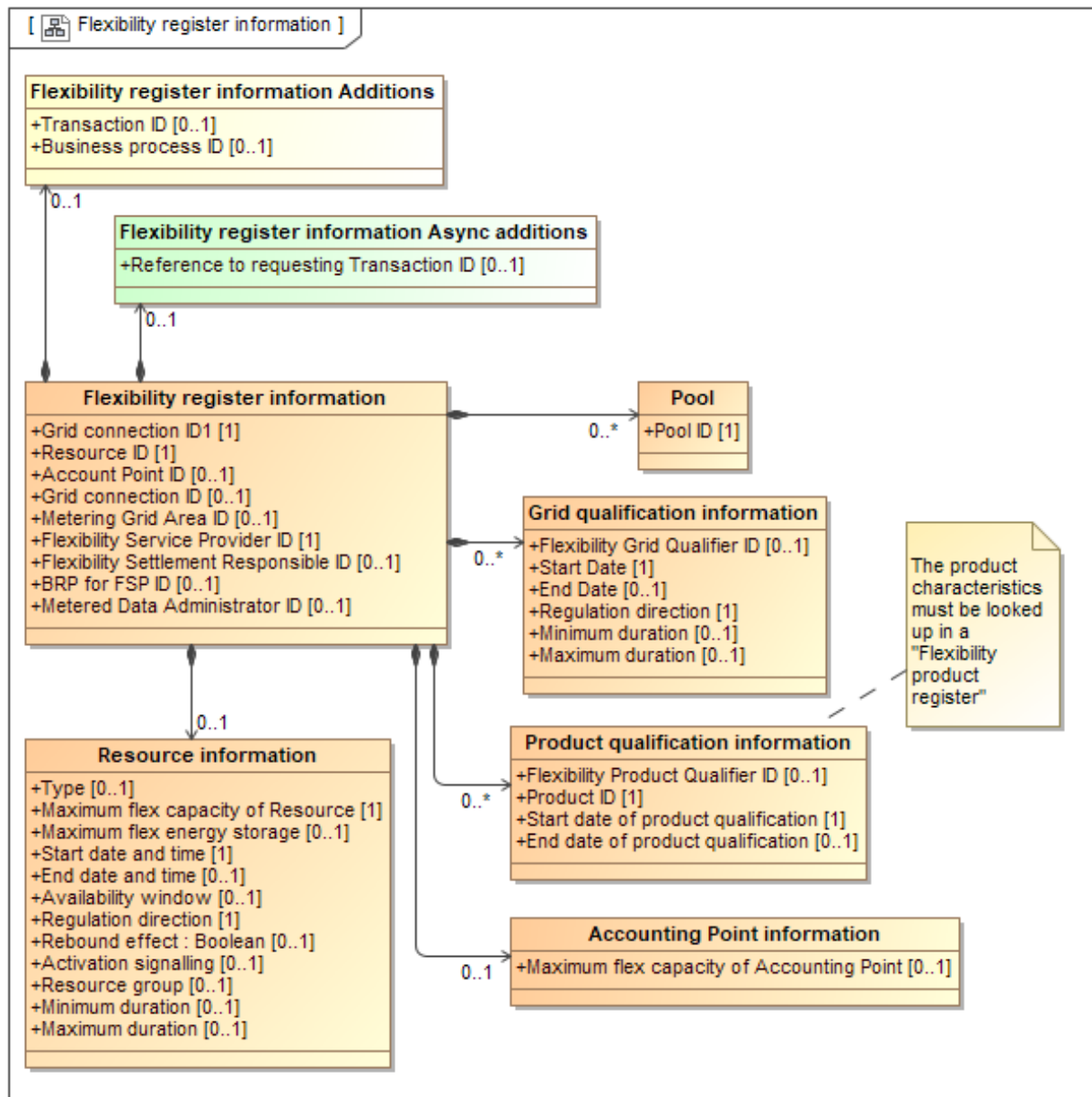


Figure 32 Class diagram: Flexibility register information

4.4.1 Element definitions: Flexibility register information

Class/attribute ¹³	Sector ¹⁴	Description
Flexibility register information		The information set to be sent by a Flexibility Register Administrator to the Entitled Roles for flexibility register information, e.g., Buyer of Flexibility, Balance Responsible Party (BRP) for Flexibility Service Provider (FSP), Consented Party, Flexibility Grid Qualifier, Flexibility Product Qualifier, Flexibility Settlement Responsible, Flexibility Service Provider, Market Operator, Metered Data Administrator, Resource Provider and/or System Operator, containing the characteristics of a Resource in the flexibility register.
Grid connection ID		The unique identification of the grid connection the Resource and/or the Accounting Point is/are connected to.
Resource ID		The unique identification of the Resource.
Accounting Point ID		The unique identification of the Accounting Point the Resource is linked to.
Grid connection ID		The unique identification of the grid connection the Resource and/or the Accounting Point is/are connected to.
Metering Grid Area ID		The unique identification of the Metering Grid Area ID the Accounting Point of the Resource is linked to.
Flexibility Service Provider ID		The unique identification of the Flexibility Service Provider that is responsible for flexibility services from the Resource.
Flexibility Settlement Responsible ID		The unique identification of the Flexibility Settlement Responsible party, who is responsible for settlement of the compensation volume of the supplied energy volume for the delivered flexibility service from the Resource by the Flexibility Service Provider.
BRP for FSP ID		The unique identification of the Flexibility Service Provider's Balance Responsible Party for this Resource
Metered Data Administrator		The unique identification of the Metered Data Administrator for validated measured data for this Resource.
Pool		A repeatable class containing the Pool(s) the Resource is part of.
Pool ID		The unique identification of the pool the Resource is linked to.
Grid qualification information		The grid qualification information of a Resource in the flexibility register.
Flexibility Grid Qualifier ID		The unique identification of the party that pre-qualified the Resource or the pool of Resources for specific requirements in a grid.

¹³ More attributes may be added when learning more from the flexibility markets.

¹⁴ It is assumed that Metering Points are uniquely dedicated to either electricity or to gas.

Class/attribute ¹³	Sector ¹⁴	Description
Start Date		The date from when the Resource is grid qualified.
End Date		The date from when the Resource no longer will be grid qualified.
Regulation direction		The regulation direction this Resource is qualified for: up, down or both.
Minimum duration		The qualified minimum time for which this Resource or pool of Resources can be activated.
Maximum duration		The qualified maximum time for which this Resource or pool of Resources can be activated.
Product qualification information		The product qualification information of a Resource in the flexibility register.
Flexibility Product Qualifier ID		The unique identification of the party that pre-qualified the Resource or the pool of Resources for a specific product for delivery of flexibility.
Product ID		The unique identification of the product the pool / the Resource is qualified for.
Start Date		The date from when the Resource was qualified for delivery of this product.
End Date		The date from when the Resource no longer will be qualified for delivery of this product.
Accounting Point information		Resource characteristics related to the Accounting Point.
Maximum flex capacity of Accounting Point		The maximum capacity that can be used for flexibility purposes at this Accounting Point.
Resource information		Characteristics related to the Resource.
Type		The type of energy production/consumption of the Resource, such as solar, wind, hydro, thermal or battery.
Maximum flex capacity of Resource		The maximum capacity that can be used for the intended flexibility purposes from this Resource.
Maximum flex energy storage		The maximum of energy storage capacity (in kWh or MWh) of the Resource available for the intended flexibility product.
Start Date		The date from which this Resource is ready for delivery of flexibility services.
End Date		The date from when this Resource will no longer deliver flexibility services.
Availability window		An indication of the time window(s) when this Resource is available for activation.
Regulation direction		The regulation direction possible for this Resource at the Accounting Point: up, down or both.

Class/attribute ¹³	Sector ¹⁴	Description
Rebound effect		Indicates if an activation of the Resource impacts future consumption and/or production from the Resource.
Activation signalling		Indicates if the Resource can respond on direct activation signals (from the Buyer of Flexibility), such as "continuous", "stepwise" or "only on/off".
Resource group		Indicates the group of Resources this Resource belongs to. The Resource group is typically used to group different technologies within a pool.
Minimum duration		The minimum time for which this Resource or pool of Resources can be activated.
Maximum duration		The maximum time for which this Resource or pool of Resources can be activated.
Flexibility register information Additions		Additional information needed for technical reasons or to be agreed on a national level.
Transaction ID		The unique identification of this set of information given by the Flexibility Service Provider.
Business process ID		he unique identification of the instance of the process that this transaction is a part of.
Flexibility register information Async additions		Additional information needed when using asynchronous communication.
Reference to requesting Transaction ID		The Transaction ID from the request.

4.5 Request update of Resource in flexibility register (Class Diagram)

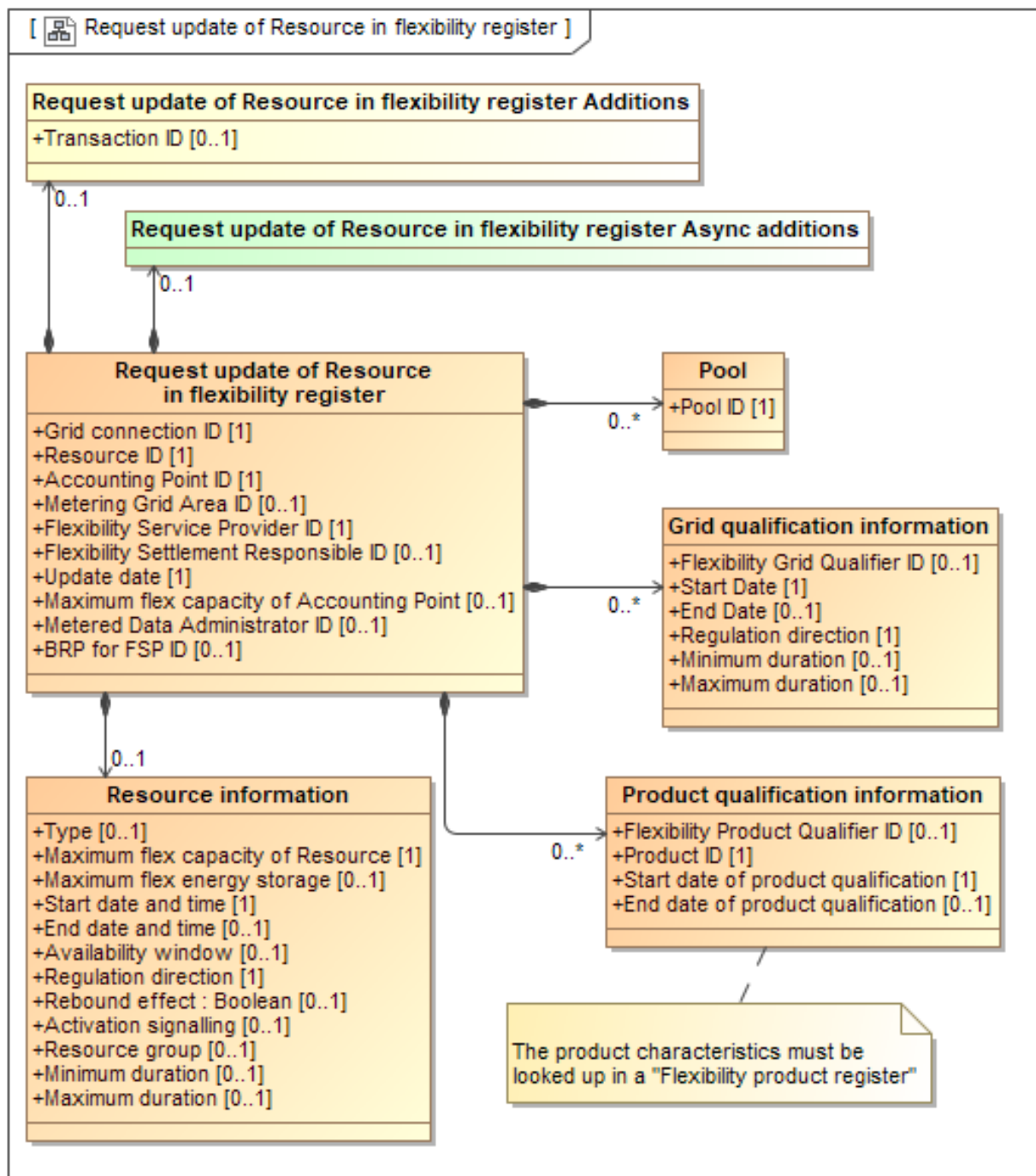


Figure 33 Class diagram: Request update of Resource in flexibility register

4.5.1 Element definitions: Request update of Resource in flexibility register

Class/attribute	Sector ¹⁵	Description
Request update of Resource in flexibility register		The information set to be sent by an Entitled Role for update of flexibility register information, e.g. Flexibility Service Provider, Flexibility Grid Qualifier and Flexibility Product Qualifier, to the Flexibility Register Administrator when requesting update of a Resource in the flexibility register.
Grid connection ID		The unique identification of the grid connection the Resource and/or the Accounting Point is/are connected to.
Resource ID		The unique identification of the Resource.
Accounting Point ID		The unique identification of the Accounting Point the Resource is linked to.
Metering Grid Area ID		The unique identification of the Metering Grid Area where the Accounting Point of the Resource is linked to.
Flexibility Service Provider ID		The unique identification of the Flexibility Service Provider, responsible for the flexibility services from the Resource.
Flexibility Settlement Responsible ID		The unique identification of the Flexibility Settlement Responsible that is responsible for the settlement of the flexibility services delivered by this Resource.
BRP for FSP ID		The unique identification of the Flexibility Service Provider's Balance Responsible Party for this Resource.
Metered Data Administrator		The unique identification of the Metered Data Administrator for the validated measured data for this Resource.
Start date		The date the Flexibility Service Provider starts delivery of flexibility service(s) for this Resource.
Maximum flex capacity of Accounting Point		The maximum capacity that can be used for flexibility purposes for this Accounting Point.
Pool		A repeatable class containing the Pool(s) the Resource is part of.
Pool ID		The unique identification of the pool of Resources this Resource is part of.
Grid qualification information		The grid qualification information of a Resource in the flexibility register.
Flexibility Grid Qualifier ID		The unique identification of the Grid Qualifier that qualifies the Resource.
Start Date		The date from when the Resource was grid qualified.

¹⁵ It is assumed that Metering Points are uniquely dedicated to either electricity or to gas.

Class/attribute	Sector ¹⁵	Description
End Date		The date from when the Resource no longer will be grid qualified.
Regulation direction		The regulation direction this Resource is qualified for: up, down or both.
Minimum duration		The minimum activation time for which this Resource or pool of Resources is qualified.
Maximum duration		The maximum activation time for which this Resource or pool of Resources is qualified.
Product qualification information		The product qualification information of the Resource in the flexibility register.
Flexibility Product Qualifier ID		The unique identification of the Flexibility Product Qualifier for this Resource.
Product ID		The unique identification of the product the Resource is qualified to deliver.
Start Date		The date from when the Resource was qualified for the product.
End Date		The date from when the Resource no longer will be qualified for the product.
Resource information		Characteristics of the Resource.
Type		The type of energy production/consumption of the Resource, such as solar, wind, hydro, thermal or battery.
Maximum flex capacity of Resource		The maximum capacity that can be used for the intended flexibility purposes from this Resource.
Maximum flex energy storage		The maximum of energy storage capacity (in kWh or MWh) of the Resource available for the intended flexibility product.
Start Date		The date from which this Resource is ready for delivery of flexibility services
End Date		The date from when this Resource will no longer deliver flexibility services.
Availability window		An indication of the time window(s) when this Resource is available for activation.
Regulation direction		The regulation direction possible for this Resource at the Accounting Point: up, down or both.
Rebound effect		Indicates if an activation of the Resource impacts future consumption and/or production from the Resource.
Activation signalling		Indicates if the Resource can respond on direct activation signals (from the Buyer of Flexibility), such as "continuous", "stepwise" or "only on/off".
Resource group		Indicates the group of Resources within a pool this Resource belongs to. The Resource group is typically used to group different technologies within a pool.

Class/attribute	Sector ¹⁵	Description
Minimum duration		The minimum time for which this Resource or pool of Resources can be activated.
Maximum duration		The maximum time for which this Resource or pool of Resources can be activated.
Request update of Resource in flexibility register Additions		Additional information needed for technical reasons or to be agreed on a national level.
Transaction ID		The unique identification of this set of information given by the sender of the document.
Request update of Resource in flexibility register Async Additions		Additional information needed when using asynchronous communication.

4.6 Confirm request update of Resource in flexibility register (Class Diagram)

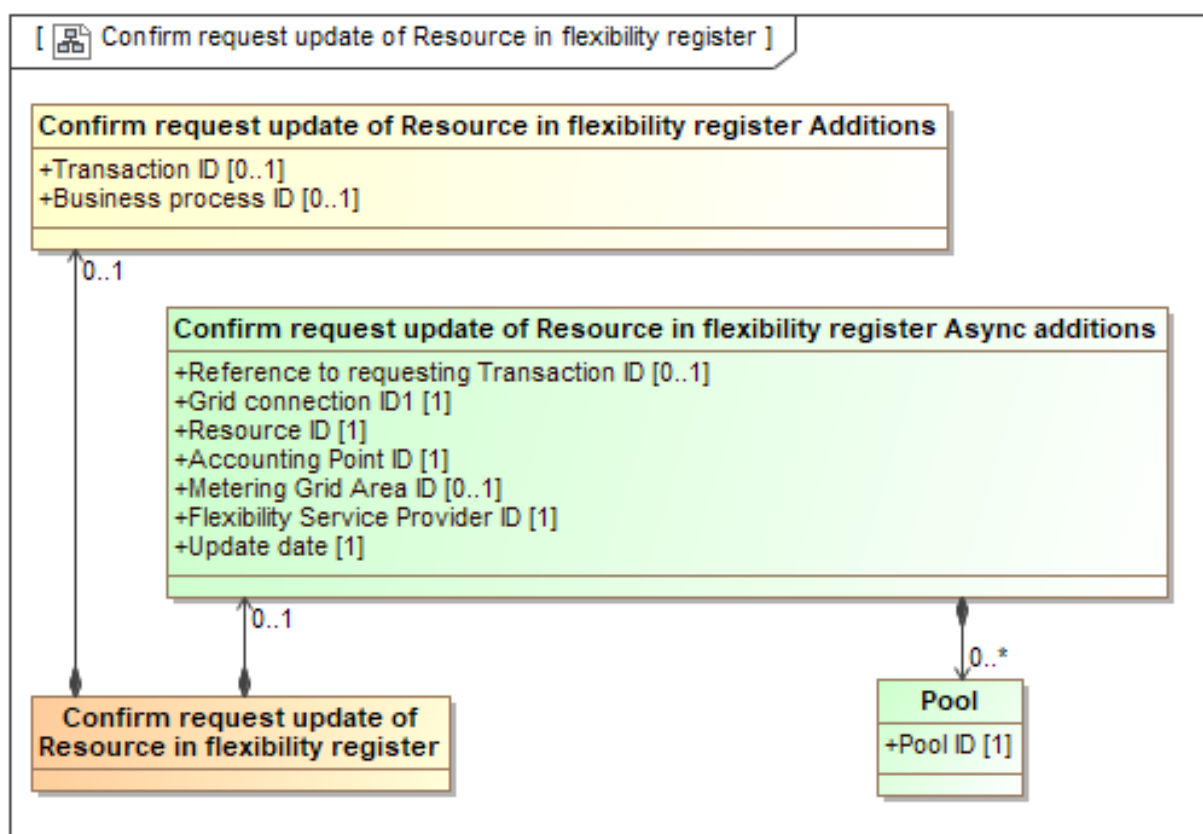


Figure 34 Class diagram: Confirm request update of Resource in flexibility register

4.6.1 Element definitions: Confirm request update of Resource in flexibility register

Class/attribute	Sector ¹⁶	Description
Confirm request update of Resource in flexibility register		The information set to be sent by the Flexibility Register Administrator to the requesting Entitled Role for update of flexibility register information, e.g. Flexibility Service Provider, Flexibility Grid Qualifier and Flexibility Product Qualifier, to confirm his Request for update of Resource registration in flexibility register.
Confirm request update of Resource in flexibility register Additions		Additional information needed for technical reasons or to be agreed on a national level.
Transaction ID		The unique identification of this set of information.
Business process ID		The unique identification of the instance of the process that this transaction is a part of.
Confirm request update of Resource in flexibility register Async Additions		Additional information needed when using asynchronous communication.

¹⁶ It is assumed that Metering Points are uniquely dedicated to either electricity or to gas.

Class/attribute	Sector ¹⁶	Description
Reference to requesting Transaction ID		The Transaction ID from the request that is confirmed.
Grid connection ID		The unique identification of the grid connection the Resource and/or the Accounting Point is/are connected to.
Resource ID		The unique identification of the Resource the update of the flexibility register is confirmed for.
Accounting Point ID		The unique identification of the Accounting Point the Resource is linked to in the flexibility register.
Metering Grid Area ID		The unique identification of the Metering Grid Area the Accounting Point of the Resource is linked to.
Flexibility Service Provider ID		The unique identification of the Flexibility Service Provider responsible for the Resource and this update.
Update date		The date for update of the Resource in the flexibility register becomes or became valid.
Pool		A repeatable class containing the Pool(s) the Resource is part of.
Pool ID		The unique identification of the pool of Resources the Resource is part of.

4.7 Reject request update of Resource in flexibility register (Class Diagram)

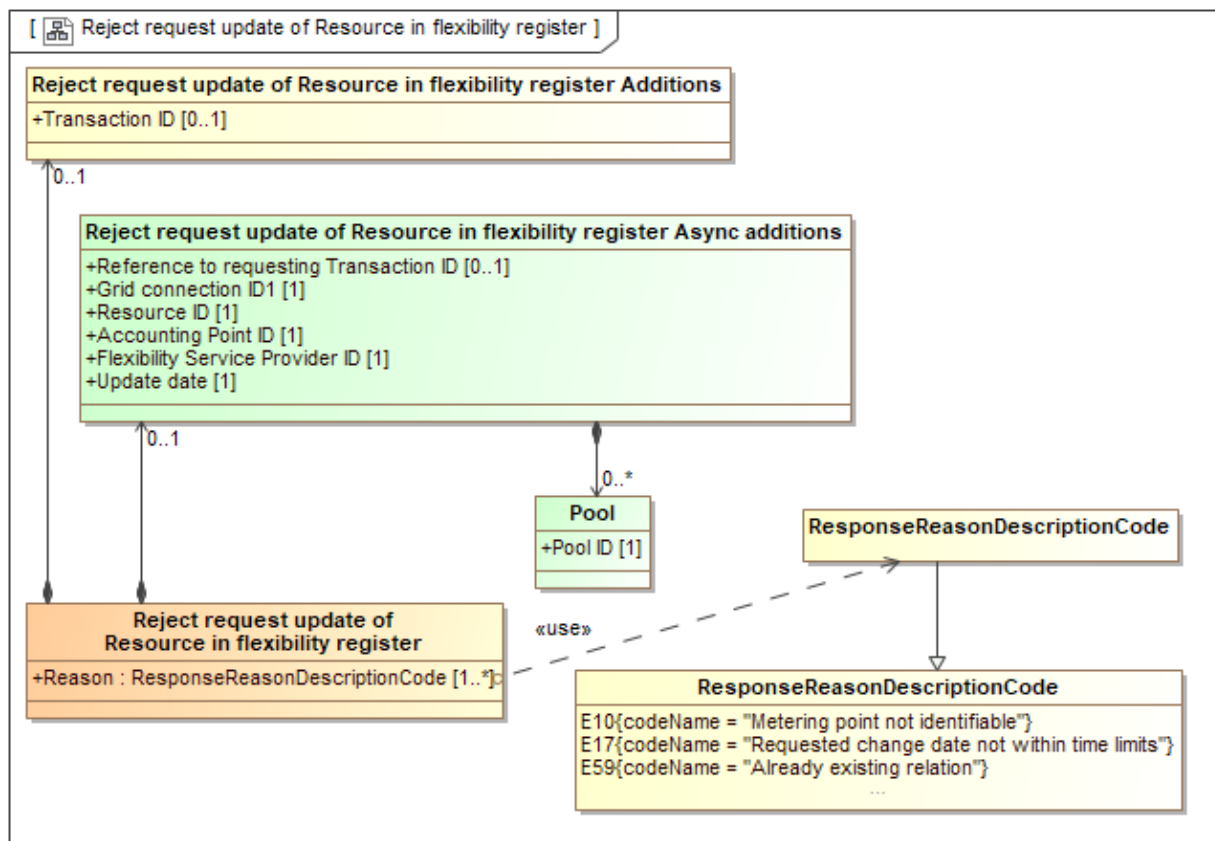


Figure 35 Class diagram: Reject request update of Resource in flexibility register

4.7.1 Element definitions: Reject request Resource registration

Class/attribute	Sector ¹⁷	Description
Reject request update of Resource in flexibility register		The information set to be sent by the Flexibility Register Administrator to the requesting Entitled Role for update of flexibility register information, e.g. Flexibility Service Provider, Flexibility Grid Qualifier and Flexibility Product Qualifier, to reject his request for update of a Resource in the flexibility register.
Reason		A code specifying (one of) the reason(s) for the rejection of the request for updating the Resource in the flexibility register
Reject request update of Resource in flexibility register Additions		Additional information needed for technical reasons or to be agreed on a national level.
Transaction ID		The unique identification of this set of information given by the Flexibility Register Administrator.

¹⁷ It is assumed that Metering Points are uniquely dedicated to either electricity or to gas.

Class/attribute	Sector ¹⁷	Description
Reject request update of Resource in flexibility register Async Additions		Additional information needed when using asynchronous communication.
Reference to requesting Transaction ID		The Transaction ID from the request that is rejected, given by the requestor.
Grid connection ID		The unique identification of the grid connection the Resource and/or the Accounting Point is/are connected to.
Resource ID		The unique identification of the Resource the update request is rejected for.
Accounting Point ID		The unique identification of the Accounting Point the Resource is linked to.
Flexibility Service Provider ID		The unique identification of the requesting Flexibility Service Provider.
Update date		The requested date for the update of the Resource in the flexibility register to become valid.
Pool		A repeatable class containing the Pool(s) the Resource is part of.
Pool ID		The unique identification of the pool of Resources the Resource is linked to.

4.8 Request end of Resource in flexibility register (Class Diagram)

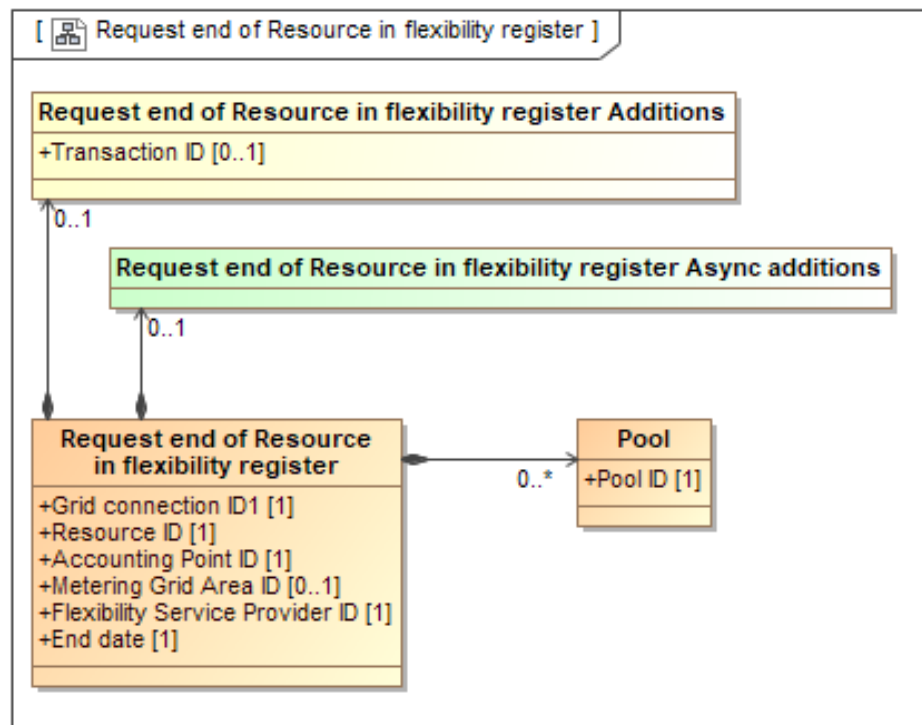


Figure 36 Class diagram: Request end of Resource in flexibility register

4.8.1 Element definitions: Request end of Resource in flexibility register

Class/attribute	Sector ¹⁸	Description
Request end of Resource in flexibility register		The information set to be sent by the Flexibility Service Provider to the Flexibility Register Administrator when requesting end of a Resource in the flexibility register.
Grid connection ID		The unique identification of the grid connection the Resource and/or the Accounting Point is/are connected to.
Resource ID		The unique identification of the Resource the end is requested for.
Accounting Point ID		The unique identification of the Accounting Point the Resource is linked to.
Metering Grid Area ID		The unique identification of the Metering Grid Area the Accounting Point of the Resource is linked to.
Flexibility Service Provider ID		The unique identification of the Flexibility Service Provider that is requesting the end of the Resource.
End date		The requested date for ending (decommission) the Resource in the flexibility register.

¹⁸ It is assumed that Metering Points are uniquely dedicated to either electricity or to gas.

Class/attribute	Sector ¹⁸	Description
Pool		A repeatable class containing the Pool(s) the Resource is part of.
Pool ID		The unique identification of the pool of Resources the Resource is linked to.
Request end of Resource in flexibility register Additions		Additional information needed for technical reasons or to be agreed on a national level.
Transaction ID		The unique identification of this set of information given by the sender of the document.
Request end of Resource in flexibility register Async Additions		Additional information needed when using asynchronous communication.

4.9 Confirm request end of Resource in flexibility register (Class Diagram)

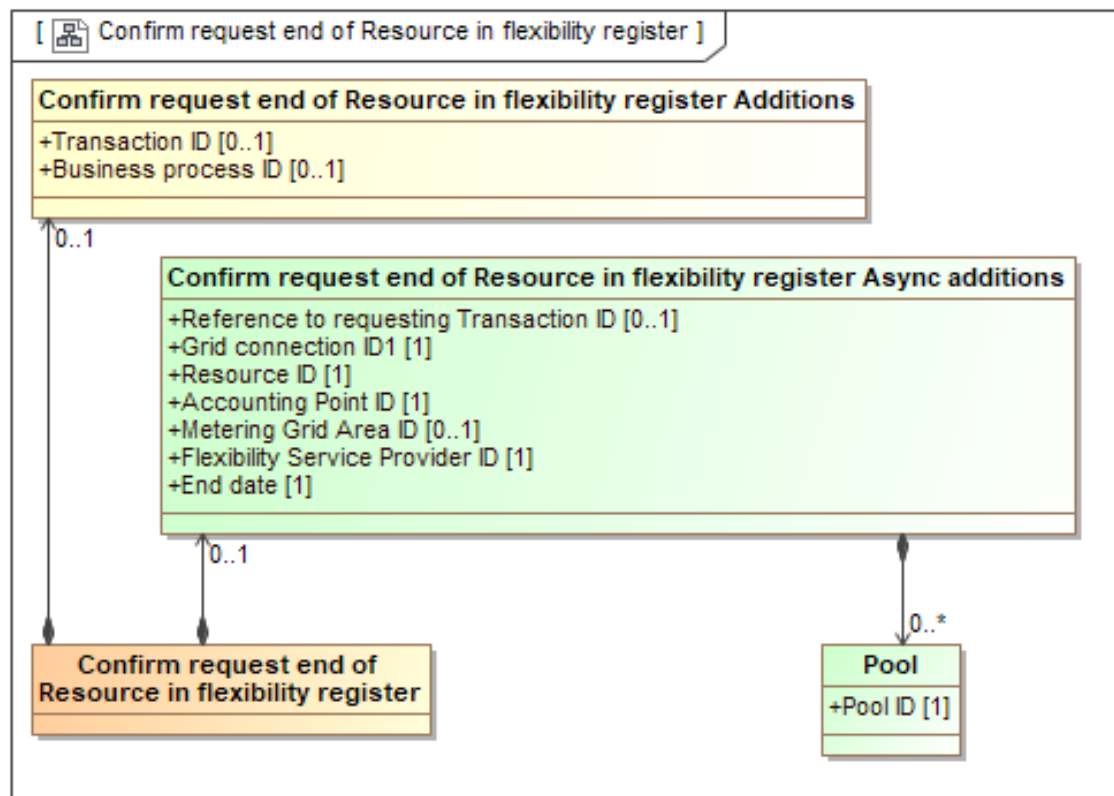


Figure 37 Class diagram: Confirm request end of Resource in flexibility register

4.9.1 Element definitions: Confirm request Resource registration

Class/attribute	Sector ¹⁹	Description
Confirm request end of Resource in flexibility register		The information set to be sent by the Flexibility Register Administrator to the requesting Flexibility Service Provider, to confirm his request for end (decommission) of the Resource in the flexibility register.
Confirm request end of Resource in flexibility register Additions		Additional information needed for technical reasons or to be agreed on a national level.
Transaction ID		The unique identification of this set of information.
Business process ID		The unique identification of the instance of the process that this transaction is a part of.
Confirm request end of Resource in flexibility register Async Additions		Additional information needed when using asynchronous communication.
Reference to requesting Transaction ID		The Transaction ID from the request that is confirmed.

¹⁹ It is assumed that Metering Points are uniquely dedicated to either electricity or to gas.

Class/attribute	Sector ¹⁹	Description
Grid connection ID		The unique identification of the grid connection the Resource and/or the Accounting Point is/are connected to.
Resource ID		The unique identification of the Resource the end is confirmed for.
Accounting Point ID		The unique identification of the Accounting Point the Resource is linked to in the flexibility register.
Metering Grid Area ID		The unique identification of the Metering Grid Area the Accounting Point of the Resource is linked to.
Flexibility Service Provider ID		The unique identification of the requesting Flexibility Service Provider responsible for the Resource
End date		The confirmed date when the registration of this Resource in the flexibility register will no longer be valid.
Pool		A repeatable class containing the Pool(s) the Resource is part of.
Pool ID		The unique identification of the pool of Resources the ending Resource is linked to.

4.10 Reject request end of Resource in flexibility register (Class Diagram)

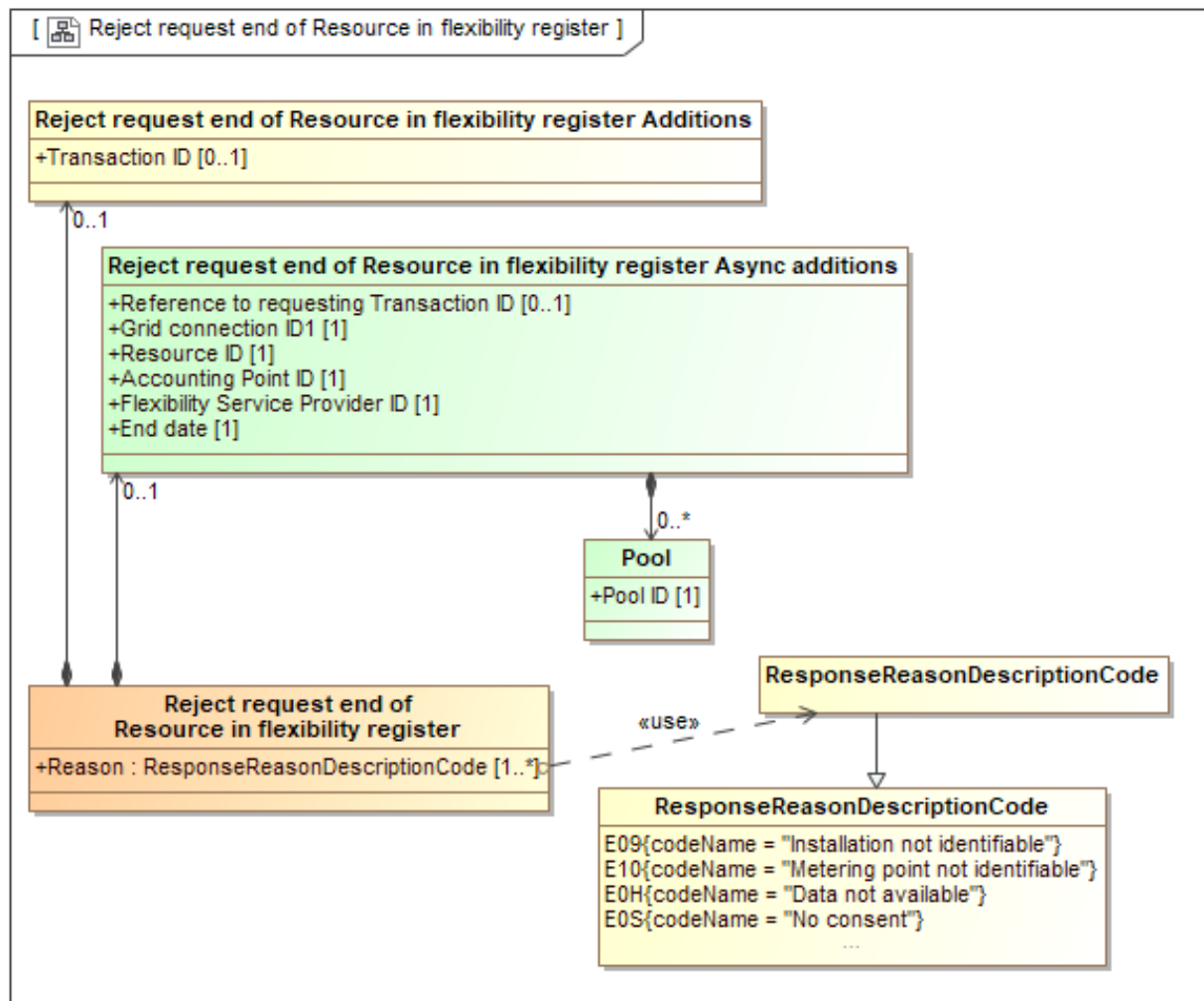


Figure 38 Class diagram: Reject request end of Resource in flexibility register

4.10.1 Element definitions: Reject request end of Resource in flexibility register

Class/attribute	Sector ²⁰	Description
Reject request end of Resource in flexibility register		The information set to be sent by the Flexibility Register Administrator to the requesting Flexibility Service Provider, to reject his request for end (decommission) of a Resource in the flexibility register.
Reason		A code specifying (one of) the reason(s) for the rejection of the request for ending the registration of the Resource in the flexibility register.

²⁰ It is assumed that Metering Points are uniquely dedicated to either electricity or to gas.

Class/attribute	Sector ²⁰	Description
Reject request end of Resource in flexibility register Additions		Additional information needed for technical reasons or to be agreed on a national level.
Transaction ID		The unique identification of this set of information given by the Flexibility Register Administrator.
Reject request end of Resource in flexibility register Async Additions		Additional information needed when using asynchronous communication.
Reference to requesting Transaction ID		The Transaction ID from the request that is rejected, given by the requestor.
Grid connection ID		The unique identification of the grid connection the Resource and/or the Accounting Point is/are connected to.
Resource ID		The unique identification of the Resource the request for ending of the registration is rejected.
Accounting Point ID		The unique identification of the Accounting Point the Resource is linked to in the flexibility register.
Flexibility Service Provider ID		The unique identification of the requesting Flexibility Service Provider.
End date		The requested date for ending (decommission) the Resource in the flexibility register.
Pool		A repeatable class containing the Pool(s) the Resource is part of.
Pool ID		The unique identification of the pool of Resources the Resource is linked to.

4.11 Notify end of Resource(s) at an Accounting Point in flexibility register because of Customer move out (Class Diagram)

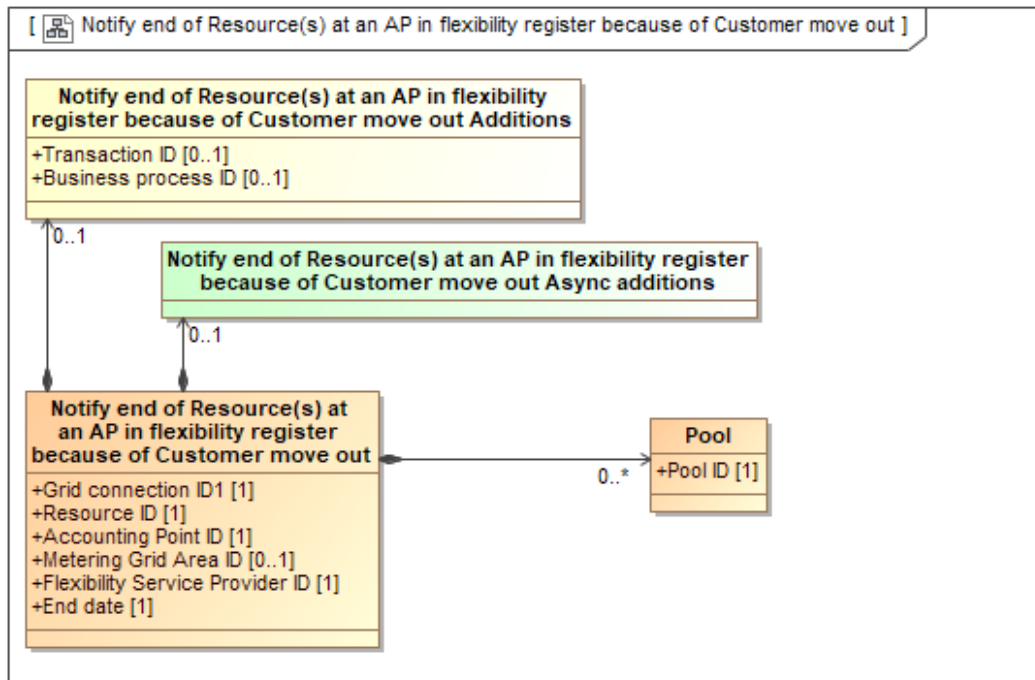


Figure 39 Class diagram: Notify end of Resource(s) at an Accounting Point in flexibility register because of Customer move out

4.11.1 Element definitions: Notify end of Resource(s) at an Accounting Point in flexibility register because of Customer move out

Class/attribute	Sector ²¹	Description
Notify end of Resource(s) at an Accounting Point in flexibility register because of Customer move out		The information set to be sent by a Flexibility Register Administrator to the Flexibility Service Provider when notifying end of Resource(s) at an Accounting Point in flexibility register because of Customer move out.
Grid connection ID		The unique identification of the grid connection the Resource and/or the Accounting Point is/are connected to.
Resource ID		The unique identification of the Resource that is ended in the flexibility register.
Accounting Point ID		The unique identification of the Accounting Point the Resource is linked to in the flexibility register
Metering Grid Area ID		The unique identification of the Metering Grid Area the Accounting Point of the Resource is linked to.
Flexibility Service Provider ID		The unique identification of the Flexibility Service Provider responsible for the ended Resource.

²¹ It is assumed that Metering Points are uniquely dedicated to either electricity or to gas.

Class/attribute	Sector ²¹	Description
End date		The date the registration in the flexibility register of this Resource ends because of Customer move out.
Pool		A repeatable class containing the Pool(s) the Resource is part of.
Pool ID		The unique identification of the pool of Resources the Resource is linked to.
Notify end of Resource(s) at an Accounting Point in flexibility register because of Customer move out Additions		Additional information related to the notification of end of FSP registration in the flexibility register to the Entitled Roles.
Transaction ID		The unique identification of this set of information given by the Flexibility Register Administrator.
Business process ID		The unique identification of the instance of the process that this transaction is a part of.
Notify end of Resource(s) at an Accounting Point in flexibility register because of Customer move out Async Additions		Additional information needed when using asynchronous communication.

4.12 Notify end of Resource in flexibility register (Class Diagram)

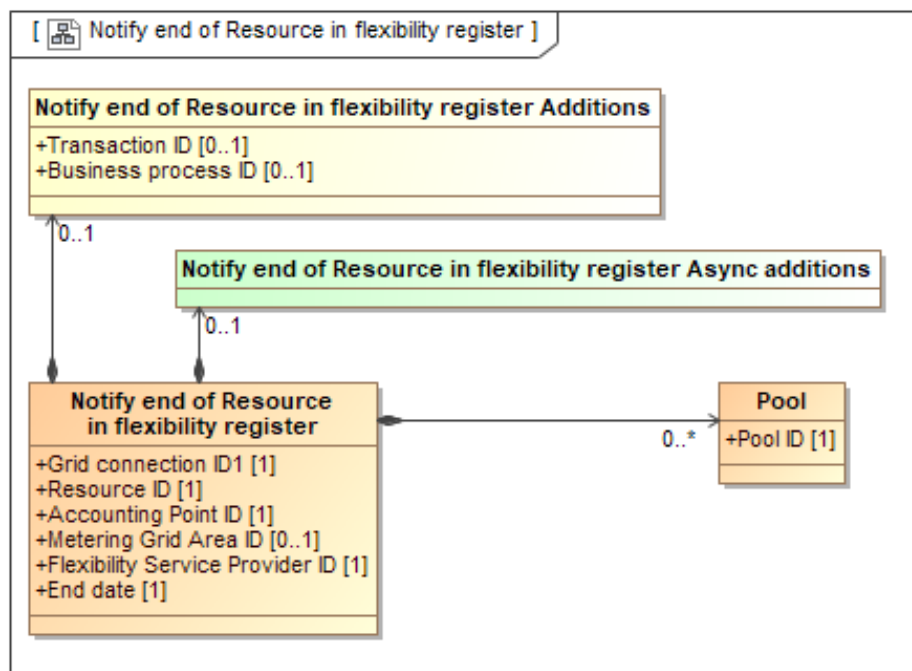


Figure 40 Class diagram: Notify end of Resource in flexibility register

4.12.1 Element definitions: Notify end of Resource in flexibility register

Class/attribute	Sector ²²	Description
Notify end of Resource in flexibility register		The information set to be sent by a Flexibility Register Administrator to the Entitled Roles for flexibility register information, such as Buyer of Flexibility, Consented Party, Flexibility Grid Qualifier, Flexibility Product Qualifier, Flexibility Settlement Responsible, Flexibility Service Provider, Market Operator, Resource Provider and/or System Operator, when notifying end of a Resource in the flexibility register.
Grid connection ID		The unique identification of the grid connection the Resource and/or the Accounting Point is/are connected to.
Resource ID		The unique identification of the Resource the registration in the flexibility register is ended for.
Accounting Point ID		The unique identification of the Accounting Point the Resource is linked to.
Metering Grid Area ID		The unique identification of the Metering Grid Area the Accounting Point of the Resource is linked to.
Flexibility Service Provider ID		The unique identification of the Flexibility Service Provider that was responsible for the ended Resource.

²² It is assumed that Metering Points are uniquely dedicated to either electricity or to gas.

Class/attribute	Sector ²²	Description
End date		The date for ending (decommission) the Resource in the flexibility register.
Pool		A repeatable class containing the Pool(s) the Resource is part of.
Pool ID		The unique identification of the pool of Resources the Resource is linked to.
Notify end of Resource in flexibility register Additions		Additional information related to the notification of Resource characteristics.
Transaction ID		The unique identification of this set of information given by the Flexibility Register Administrator.
Business process ID		The unique identification of the instance of the process that this transaction is a part of.
Notify end of Resource in flexibility register Async Additions		Additional information needed when using asynchronous communication.

4.13 Request flexibility register information (Class Diagram)

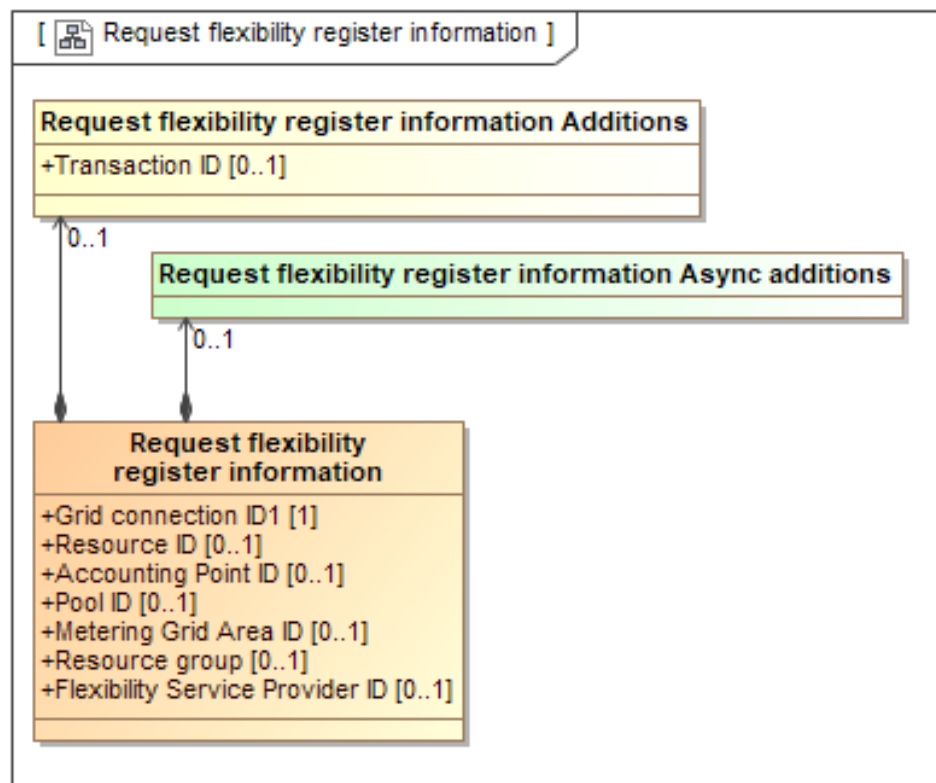


Figure 41 Class diagram: Request flexibility register information

4.13.1 Element definitions: Grid qualification information

Class/attribute	Sector ²³	Description
Request flexibility register information		The information set to be sent by an Entitled Role for flexibility register information, e.g. Buyer of Flexibility, Balance Responsible Party (BRP) for Flexibility Service Provider (FSP), Consented Party, Flexibility Grid Qualifier, Flexibility Product Qualifier, Flexibility Settlement Responsible, Flexibility Service Provider, Market Operator, Metered Data Administrator, Resource Provider and/or System Operator, to the Flexibility Register Administrator when requesting information of one or more Resource(s).
Grid connection ID		The unique identification of the grid connection the Resource and/or the Accounting Point is/are connected to.
Resource ID		The unique identification of the Resource information is requested for.

²³ It is assumed that Metering Points are uniquely dedicated to either electricity or to gas.

Class/attribute	Sector ²³	Description
Accounting Point ID		The unique identification of the Accounting Point information of linked Resources is requested for.
Pool ID		The unique identification of the pool of Resources information of linked Resources is requested.
Metering Grid Area ID		The unique identification of the Metering Grid Area information of linked Resources is requested.
Resource group		Indicates the group of Resources within this pool information of the Resources is requested.
Flexibility Service Provider ID		The unique identification of the Flexibility Service Provider responsible for the Resources information is requested for.
Request flexibility register information Additions		Additional information needed for technical reasons or to be agreed on a national level.
Transaction ID		The unique identification of this set of information given by the requesting Entitled Role for flexibility register information.
Request flexibility register information Async additions		Additional information needed when using asynchronous communication.

4.14 Reject request flexibility register information (Class Diagram)

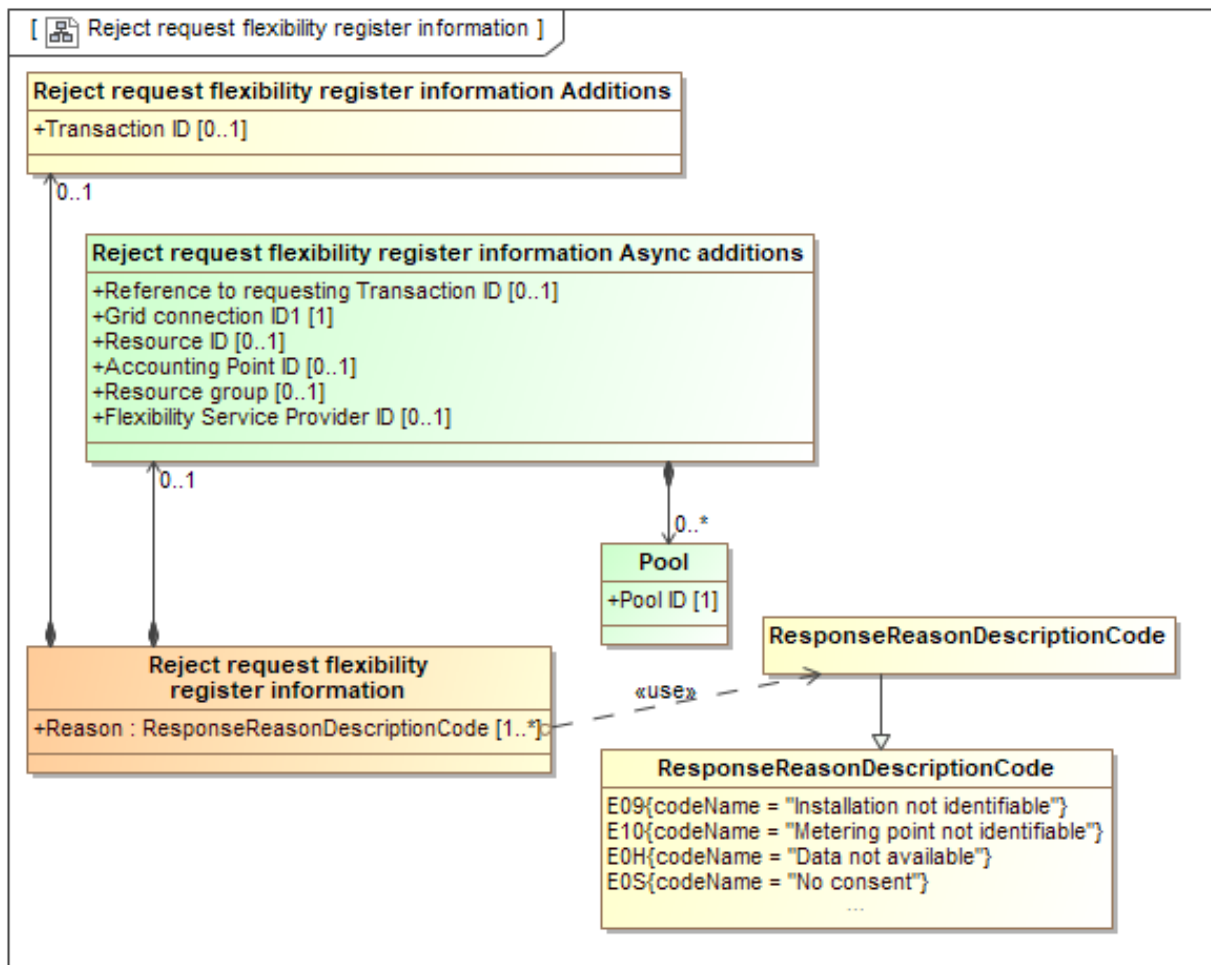


Figure 42 Class diagram: Reject request flexibility register information

4.14.1 Element definitions: Reject request flexibility register information

Class/attribute	Sector ²⁴	Description
Reject request flexibility register information		The information set to be sent by the Flexibility Register Administrator to the requesting Entitled Role for flexibility register information, e.g. Buyer of Flexibility, Balance Responsible Party (BRP) for Flexibility Service Provider (FSP), Consented Party, Flexibility Grid Qualifier, Flexibility Product Qualifier, Flexibility Settlement Responsible, Flexibility Service Provider, Market Operator, Metered Data Administrator, Resource Provider and/or System Operator, to reject his request for flexibility register information.

²⁴ It is assumed that Metering Points are uniquely dedicated to either electricity or to gas.

Class/attribute	Sector ²⁴	Description
Reason		A code specifying (one of) the reason(s) for the rejection of the request for Resource information from the flexibility register.
Reject request flexibility register information		Additional information needed for technical reasons or to be agreed on a national level.
Transaction ID		The unique identification of this set of information given by the Flexibility Register Administrator.
Reject request flexibility register information		Additional information needed when using asynchronous communication.
Reference to requesting Transaction ID		The Transaction ID from the request given by the requesting Entitled Role for flexibility register information.
Grid connection ID		The unique identification of the grid connection the Resource and/or the Accounting Point is/are connected to.
Resource ID		The unique identification of the Resource the request for information is rejected for.
Accounting Point ID		The unique identification of the Accounting Point the requested information of linked Resources is rejected for.
Resource group		Indicates the group of Resources within this pool the request for information of linked Resources is rejected for.
Flexibility Service Provider ID		The unique identification of the Flexibility Service Provider the request for information of linked Resources is rejected for.
Pool		A repeatable class containing the Pool(s) the Resource is part of.
Pool ID		The unique identification of the pool of Resources the request of linked Resources is rejected for.

Appendix A. Header and Context information for the class diagrams

This appendix shows the header and context information to be used when transferring documents through an electronic network. The information is on a technical level and meant for those who implements electronic documents in EDI-software.

A.1. Header and Context Information attributes definitions

Class/attribute	Sector ²⁵	Description
Header and Context Information		The set of information specifying the information to be added to this payload to enable the exchange as a document.
Document Type		A code representing the document type used for the exchange of this set of information.
Business Reason		A code representing the business reason for the exchange of this set of information.
Ancillary Business Process Role		A code representing the market role taking part in this exchange together with the Responsible Role, responsible for the process/this exchange.

A.2. Request Resource registration

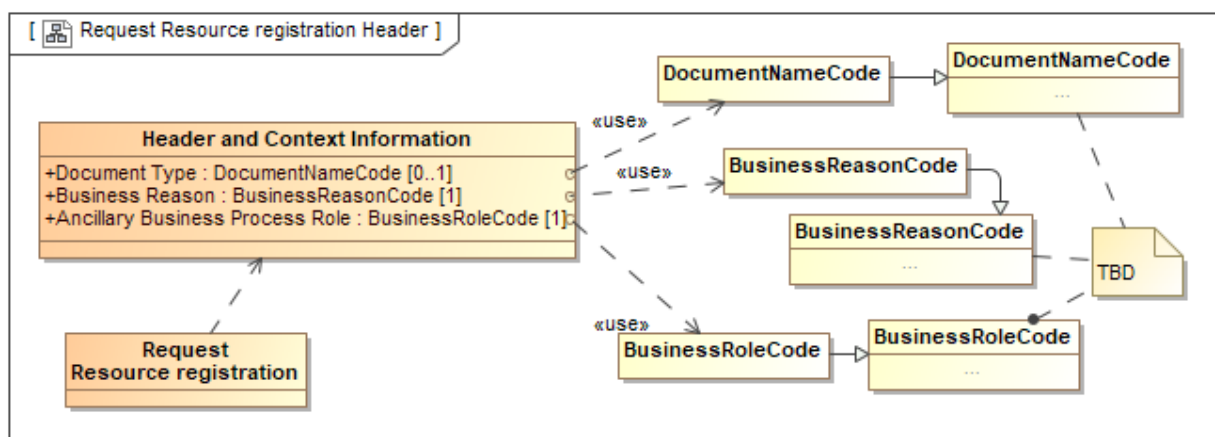


Figure 43 Class diagram: Header and Context information: Request Resource registration

²⁵ It is assumed that Accounting Points are uniquely dedicated to either electricity or to gas.

A.3. Confirm request Resource registration

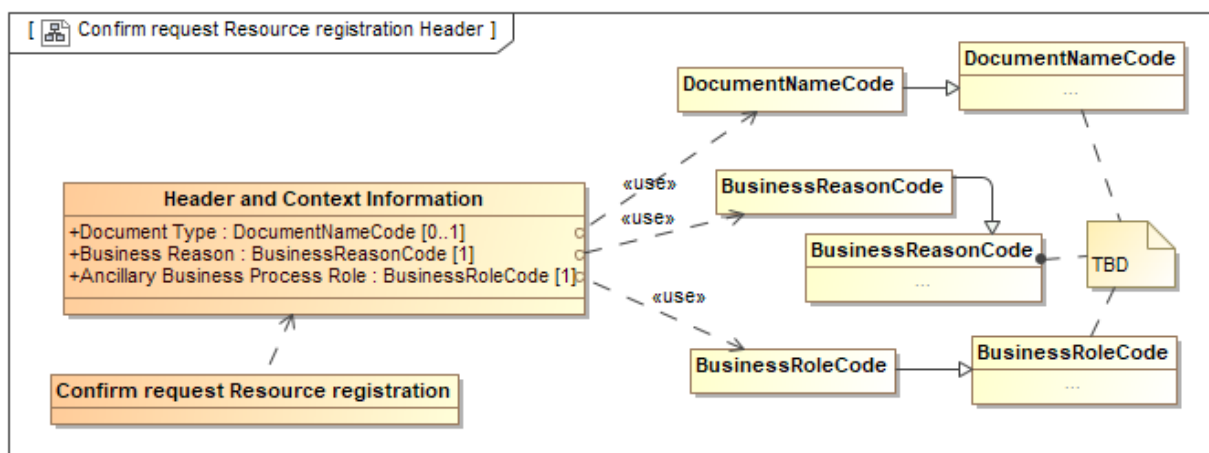


Figure 44 Class diagram: Header and Context information: Confirm request Resource registration

A.4. Reject request Resource registration

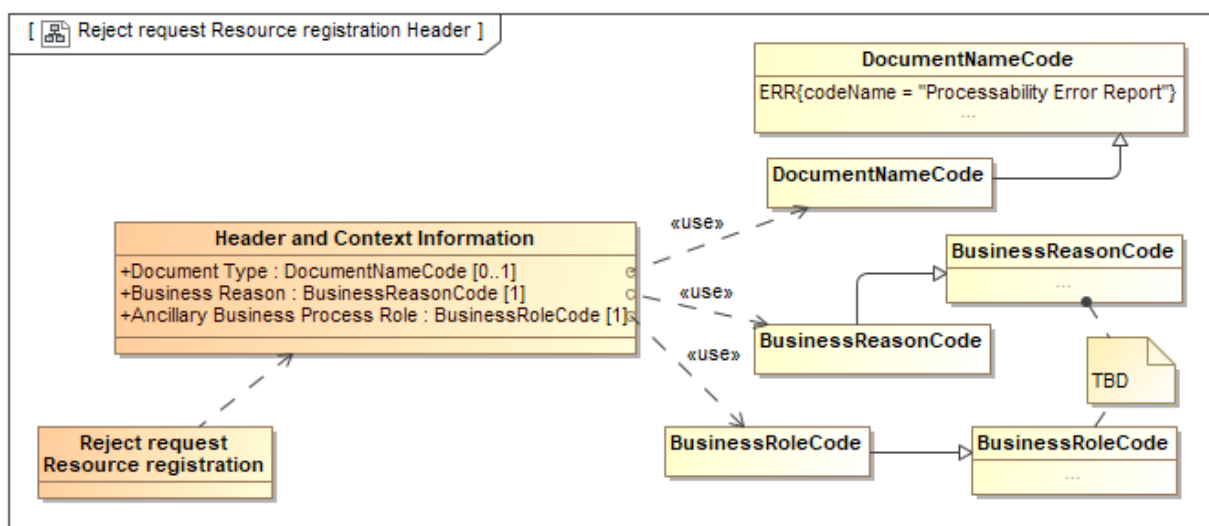


Figure 45 Class diagram: Header and Context information: Reject request Resource registration

A.5. Flexibility register information

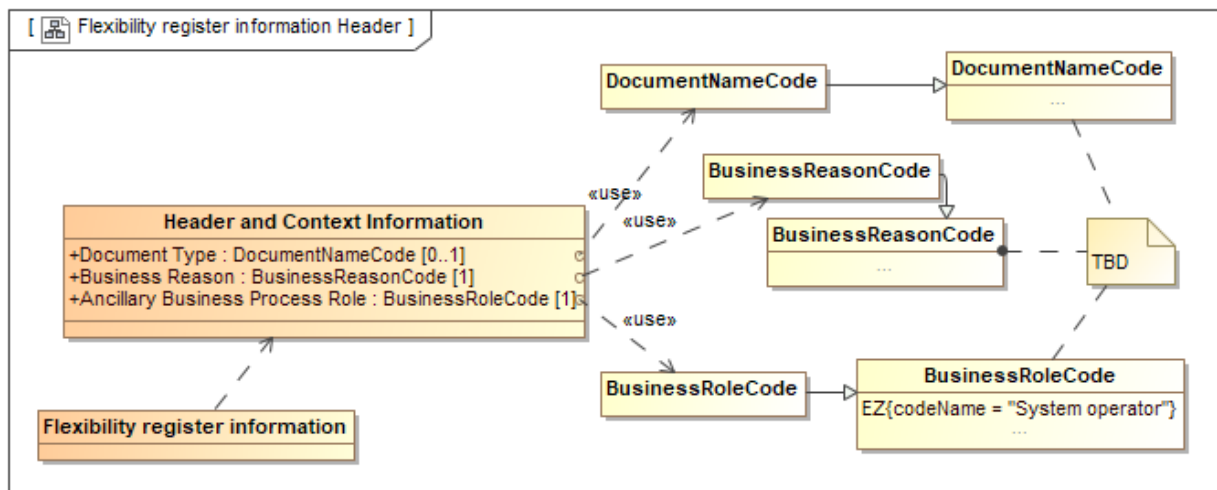


Figure 46 Class diagram: Header and Context information: Flexibility register information

A.6. Request update of Resource in flexibility register

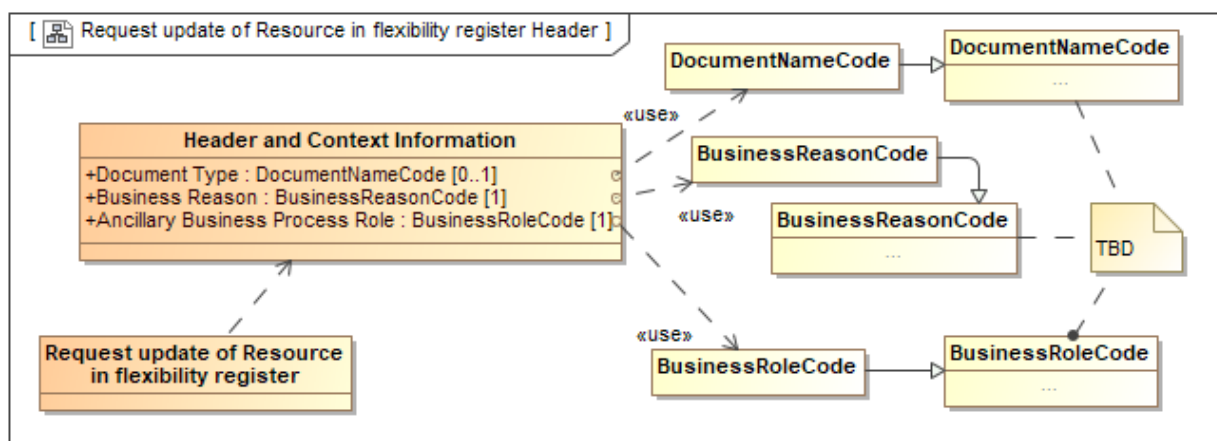


Figure 47 Class diagram: Header and Context information: Request update of Resource in flexibility register

A.7. Confirm request update of Resource in flexibility register

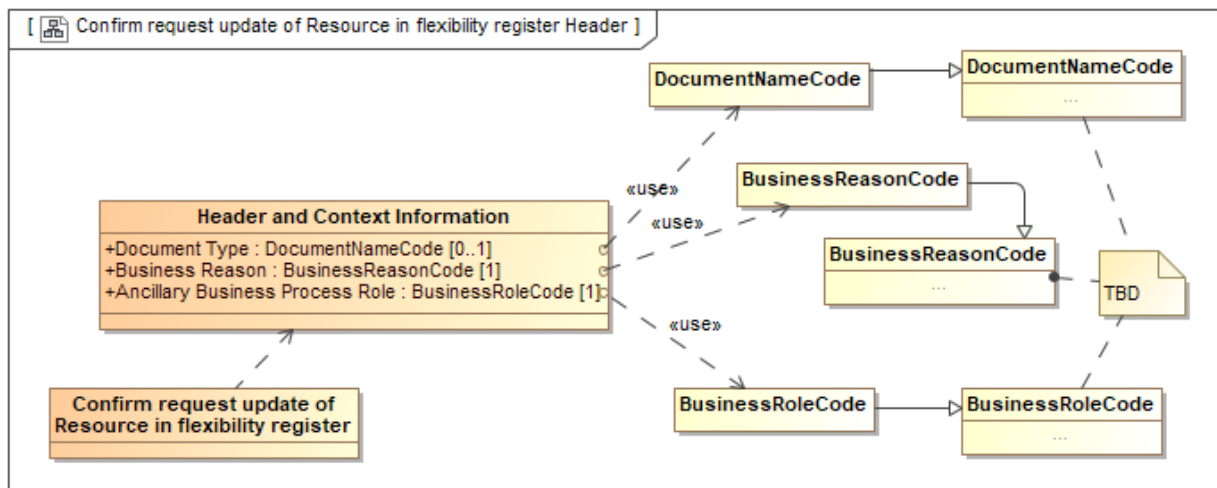


Figure 48 Class diagram: Header and Context information: Confirm request update of Resource in flexibility register

A.8. Reject request update of Resource in flexibility register

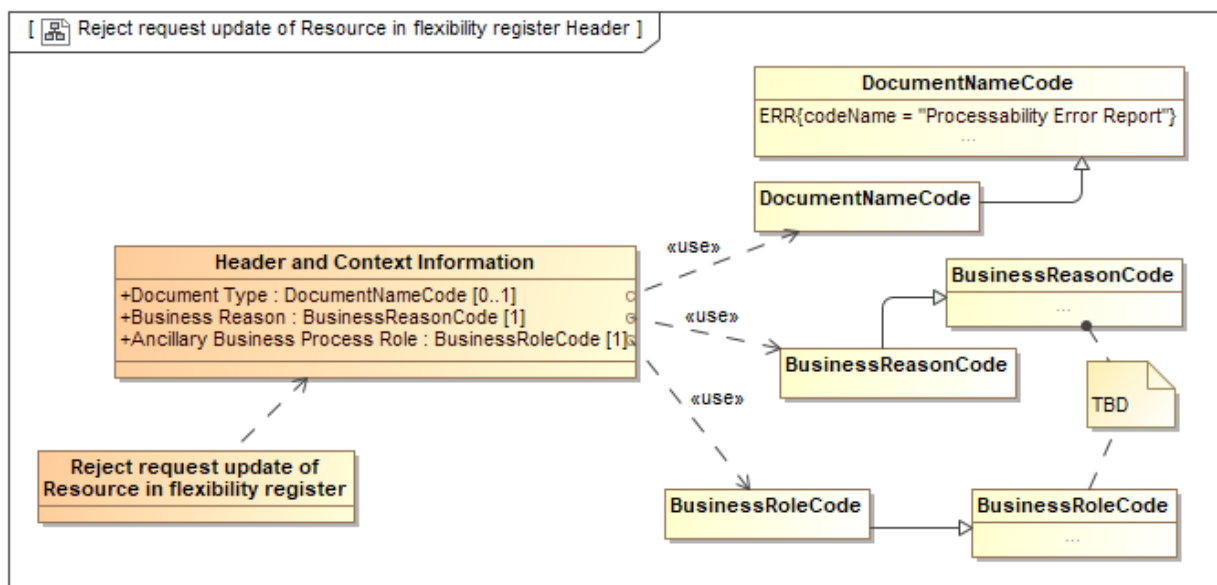


Figure 49 Class diagram: Header and Context information: Reject request update of Resource in flexibility register

A.9. Request end of Resource in flexibility register

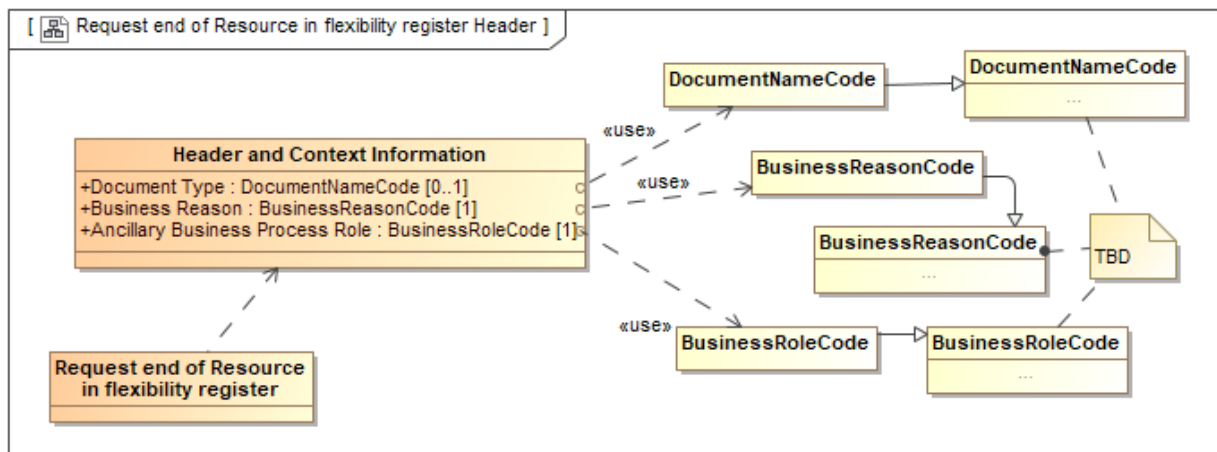


Figure 50 Class diagram: Header and Context information. Request end of Resource in flexibility register

A.10. Confirm request end of Resource in flexibility register

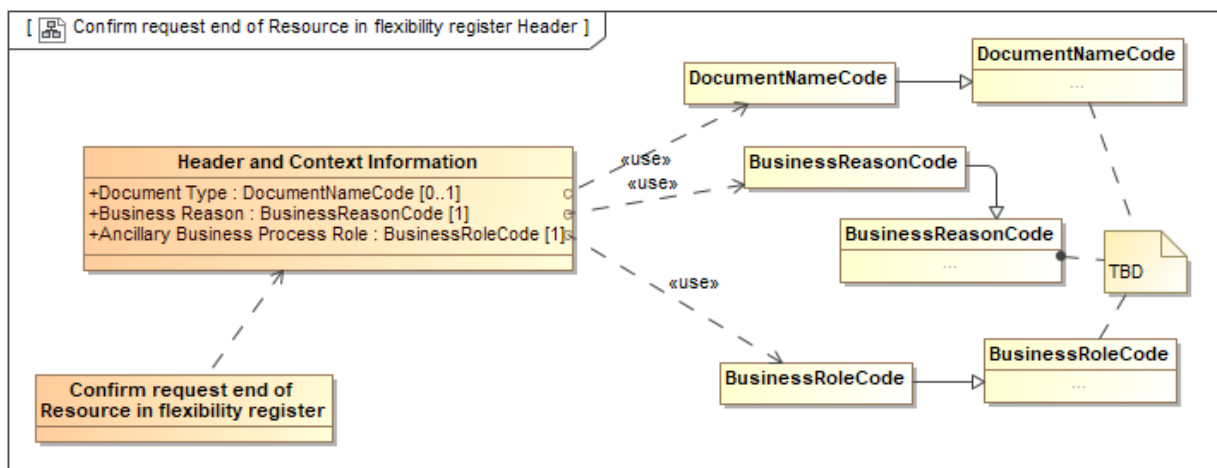


Figure 51 Class diagram: Header and Context information: Confirm request end of Resource in flexibility register

A.11. Reject request end of Resource in flexibility register

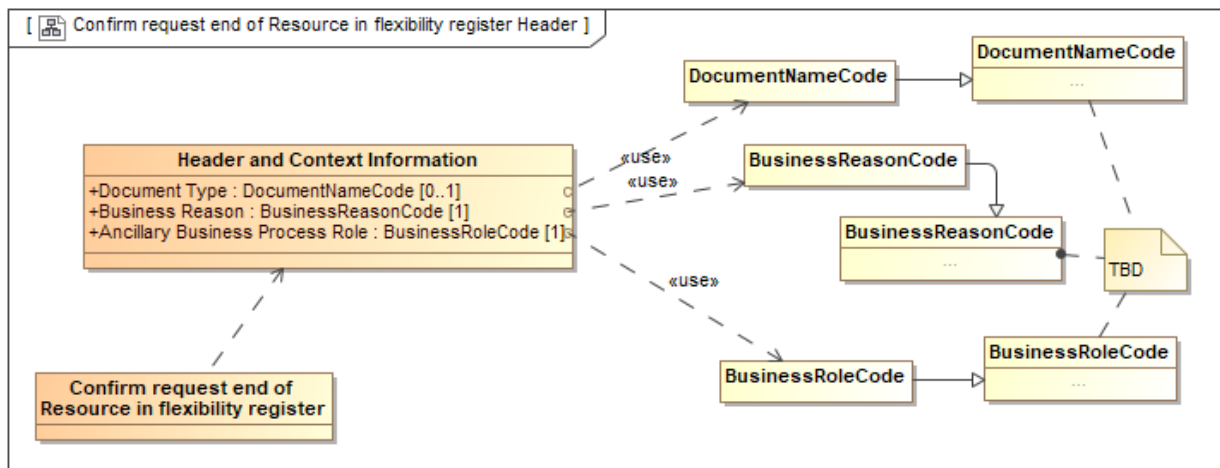


Figure 52 Class diagram: Header and Context information. Reject request end of Resource in flexibility register

A.12. Notify end of Resource(s) at an AP in flexibility register because of Customer move out

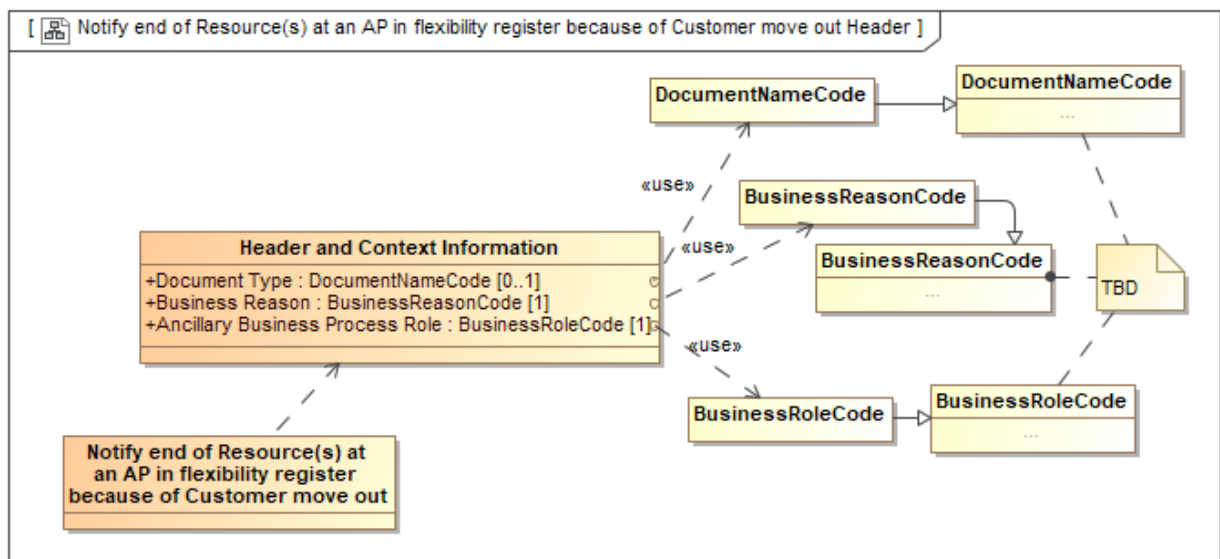


Figure 53 Class diagram: Header and Context information: Notify end of Resource(s) at an AP in flexibility register because of Customer move out

A.13. Notify end of Resource in flexibility register

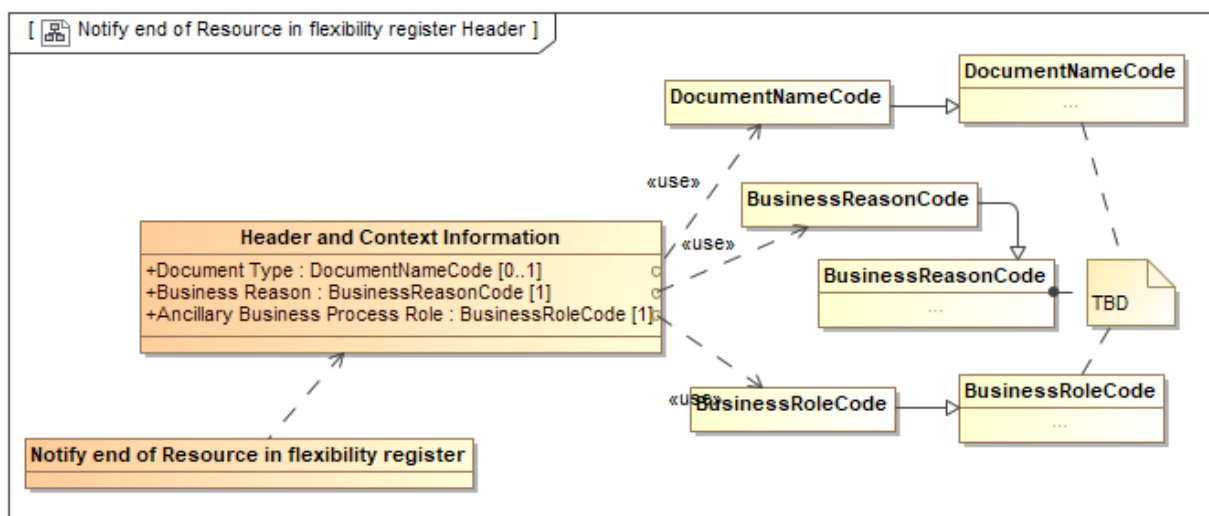


Figure 54 Class diagram: Header and Context information: Notify end of Resource in flexibility register

A.14. Request flexibility register information

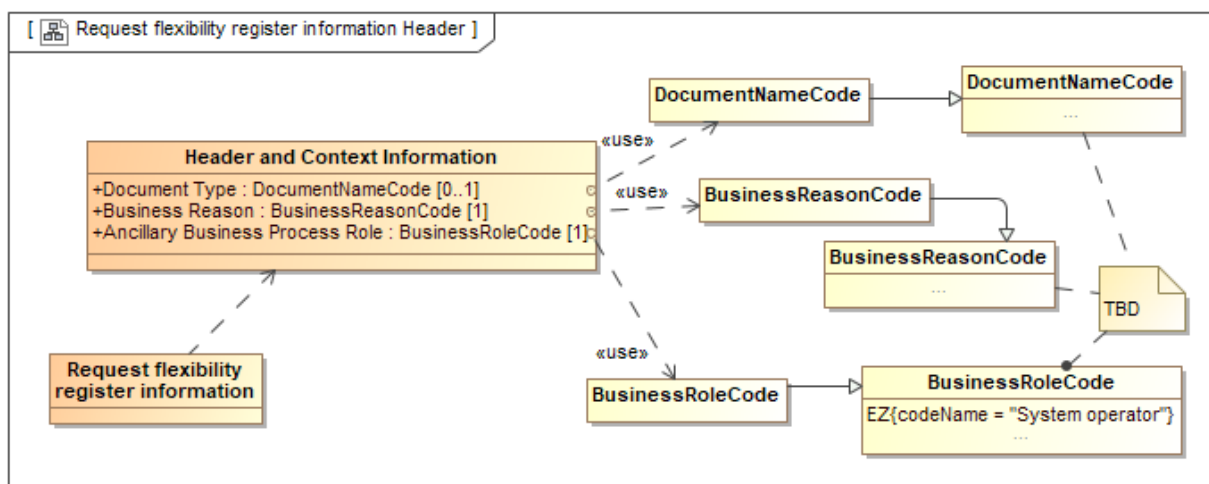


Figure 55 Class diagram: Header and Context information. Request flexibility register information

A.15. Reject request flexibility register information

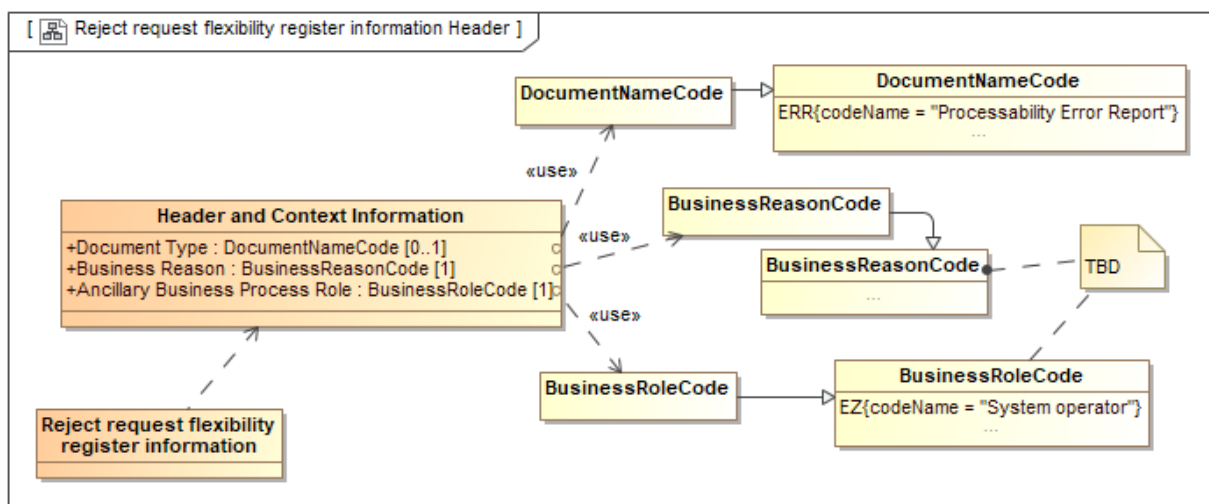


Figure 56 Class diagram: Header and Context information: Reject request flexibility register information

Appendix B. Overview of UseCases elaborated in this BRS for Flexibility register administration

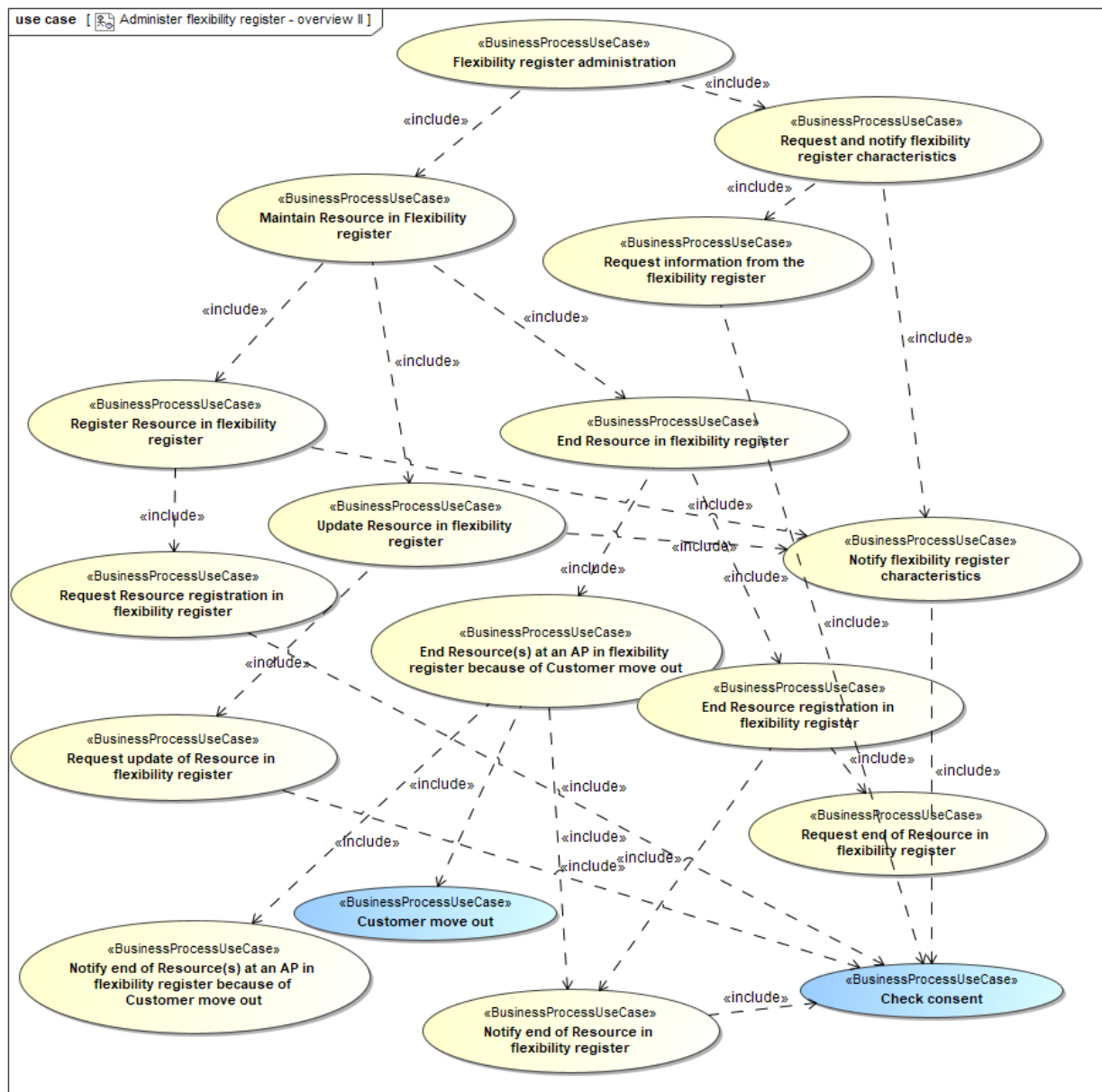


Figure 3: Overview of UseCases elaborated in this BRS for Flexibility register administration