Market Services Activation

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

1. Description of the use case

1.1. Name of use case

Use case identification		
ID	***Area(s)/Domain(s)/Zone(s)***	***Name of use case***
	Distribution Management, Users, Distribution System, Real-Time Operation, Energy Markets, Transmission System, Operational planning	Market Services Activation

1.2. Version management

Version management				
Version No.	***Date***	***Name of author(s)***	***Changes***	***Approval status***
1	2018-08-30	Nermin Suljanovic		Approved Version

1.3. Scope and objectives of use case

Scope and objectives of use case	
Scope	Activation of the balancing service resources connected to the distribution grid. This SUC also corresponds to a particular case when DSO use demand response to provide a service at the balancing market. Balancing service (product) is activated by TSO in transmission connect assets, by the DSO in distribution connected assets or market platform directly, with technical validation by the relevant system operator.
Objective(s)	Validate information exchange between TSO and DSO for the balancing market purpose. DSO provides balancing service at the balancing market.
Related business case(s)	

1.4. Narrative of Use Case

Narrative of use case
Short description
This SUC defines steps during balancing market service activation. Based on Merit Order List (MOL), which has been previously been technically validated by the relevant system operator, TSO sends activation signals to BSP in the transmission network and to DSO in the time interval when this balancing service is contracted. DSO will relay the order to the BSP within the distribution network (DSO may have to change BSP if the distribution system is affected by outages), BSP must acknowledge this activation signal and report status of the activated balancing assets to the relevant system operator. After acknowledge reception, TSO sends control message with the setup point (activated power MW) directly to the transmission connected assets and through the DSO to the distribution connected assets. During activation process, BSP sends real-time production measurements to the relevant system operator.
Complete description
This SUC defines steps necessary for balancing market service activation, which is for the activation of balancing energy offers for the delivery of balancing energy. Based on Merit Order List (MOL), which has been previously technically validated by the relevant system operators, TSO sends

activation signals to BSP in the transmission network and through the DSO to the distribution connected BSP in the time interval when this balancing service is contracted. BSP must acknowledge this activation signal and report status of the activated balancing assets, to the relevant system operator. After ACK reception, TSO sends control message with the setup point (activated power MW) directly to BSP in the transmission network and through the DSO to the distribution connected BSP. During activation process, BSP sends real-time production measurements to the relevant system operator.

1.5. Key performance indicators (KPI)

Key performance indicators			
ID	***Name***	***Description***	***Reference to mentioned use case objectives***
1	Quantity of demand response activated.		Validate information exchange between TSO and DSO for the balancing market purpose.
2	Number of successful activations in a given time period		Validate information exchange between TSO and DSO for the balancing market purpose. DSO provides balancing service at the balancing market.

1.6. Use case conditions

Use case conditions	
Assumptions	
Prerequisites	
1	DSO can offer balancing capacity at the balancing energy market.
2	DSO can use demand response mechanism to provide balancing energy.
3	Balancing energy market exists.

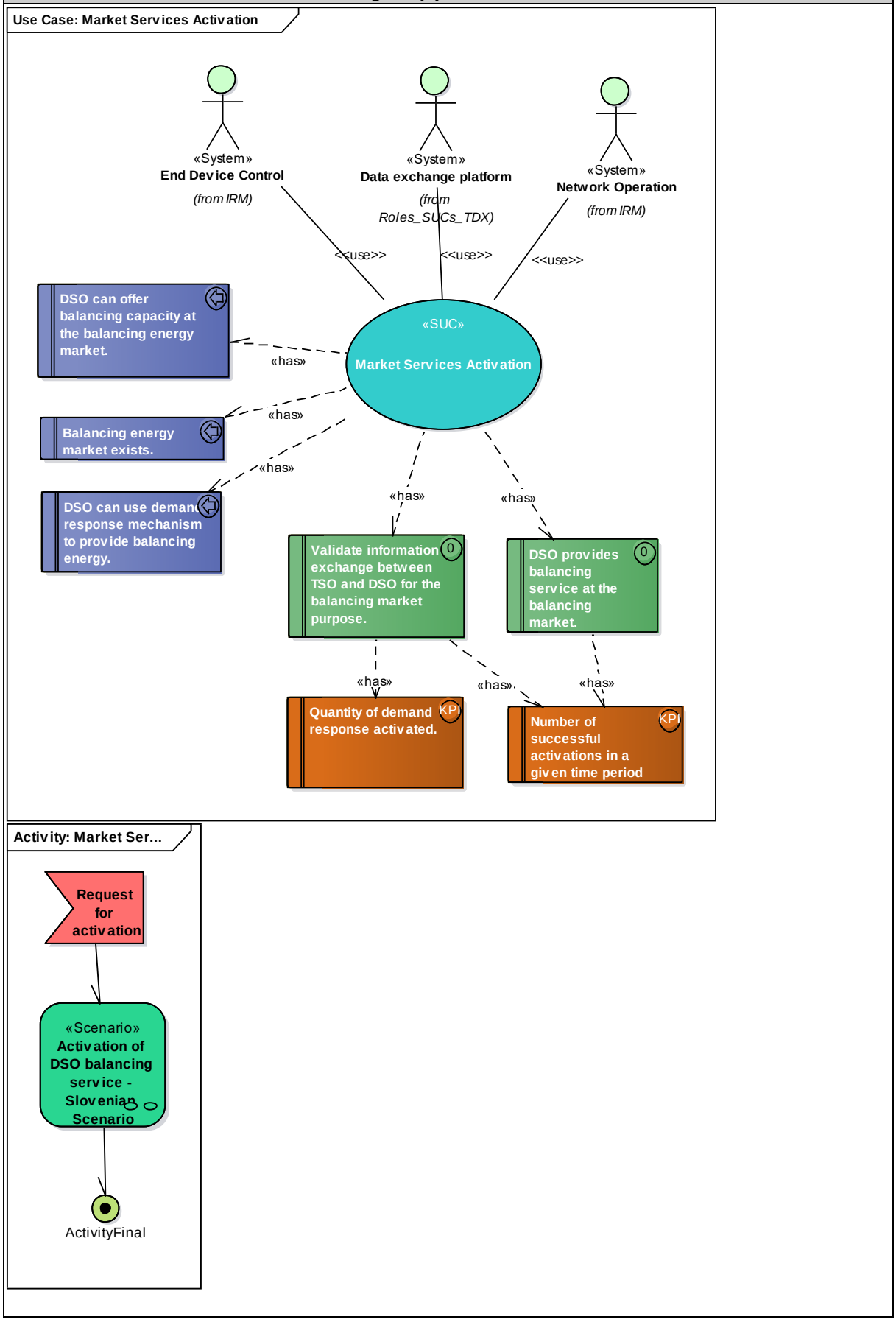
1.7. Further information to the use case for classification/mapping

Classification information
Relation to other use cases
<<BUC>> Activation of DSO-connected resources for balancing purposes in market environment <<BUC>> Optimize active power management by the System Operators for congestion management purposes <<SUC>> Information exchange using a collaborative platform <<SUC>> Market Offering
Level of depth
Prioritisation
High
Generic, regional or national relation
Generic
Nature of the use case
SUC
Further keywords for classification
Services Activation, Energy Markets

1.8. General remarks

2. Diagrams of use case

Diagram(s) of use case



3. Technical details

3.1. Actors

Actors			
Grouping (e.g. domains, zones)		***Group description***	
Actor name	***Actor type***	***Actor description***	***Further information specific to this use case***
Network Operation	System	The Network Operation function includes business activity directly involved with monitoring and operating the power grid as a whole system. • The phrase 'directly involved' indicates that the covered activities are limited to a hands-on focus on keeping the power grid running successfully, and more indirect influences on grid operation, such as energy markets, will be covered by other business functions. • The phrase 'as a whole system' indicates that local activity, such as operating a generating plant or substation, is excluded, and here the concern is a system perspective, such as is typical in transmission or distribution control centres.	
End Device Control	System	The End Device Control (EDC) business function include the ability to control the end device in regards to meet new configuration setting, operation (e.g. enabling demand response) or other system services control by network operation.	
Data exchange platform	System	Platform used by several entities to exchange information for different proposes. The 3 types of data (Real-time; scheduled and structural data) can be exchanged in this platform. The operational/control data are not included in the real-time type. The exchange of information related with markets is included in the scheduled data. The data-agnostic ICT infrastructure enables a secure and reliable information exchange for different purposes and within different time scales.	

3.2. References

4. Step by step analysis of use case

4.1. Overview of scenarios

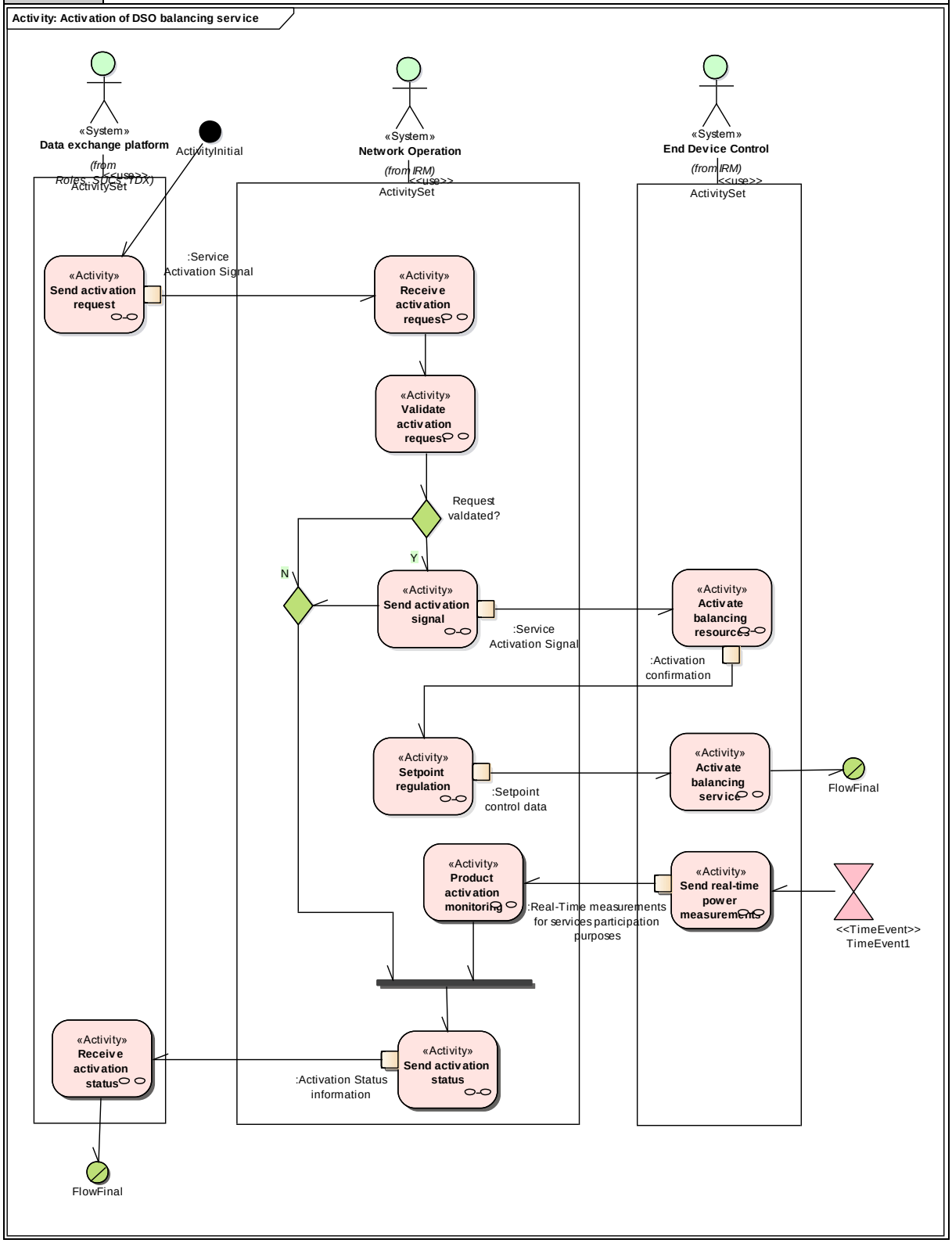
Scenario conditions						
No.	***Scenario name***	***Scenario description***	***Primary actor***	***Triggering event***	***Pre-condition***	***Post-condition***
1	Activation of DSO balancing service - Slovenian Scenario	The presented scenario intends to describe the activation mechanism of the accepted offers in the balancing market. This scenario is specific for Slovenian demonstrator due to the TSO can profit of the DSO demand response mechanism to balancing purposes.		Request for activation: TSO send request for activation to DSO in accordance with MOL. and operational schedule.		

4.2. Steps - Scenarios

4.2.1. Activation of DSO balancing service - Slovenian Scenario

Scenario step by step analysis

Scenario	
Scenario name	Activation of DSO balancing service - Slovenian Scenario



Step No	Event	Name of process/activity	Description of process/activity	Service	Information producer (actor)	Information receiver (actor)	Information exchanged (IDs)	Requirement, R-IDs
1.1		Send activation request			Data exchange platform	Network Operation	Info1-Service Activation Signal	
1.2		Receive activation request			Network Operation			
1.3		Validate activation request	Network operation of TSO receives the request for service activation according to MOL. Some analysis can be done in order to validate that product based on the DR will not cause problems for the current operation state of the grid (e.g. changed topology, less production of reactive power...).		Network Operation			
1.4		Send activation signal	In some systems, it is necessary firstly activate the service and only after the acknowledgement it is possible send the setpoint. This possibility is considered in the definition of the presented SUC. However in most common systems, the activation signal and the setpoint are included in the same message.		Network Operation	End Device Control	Info1-Service Activation Signal	

1.5		Activate balancing resources	Balancing resources refer to BSP portfolio which is used to provide balancing product/service. It can be generation source or demand response mechanism.		End Device Control	Network Operation	Info2-Activation confirmation	
1.6		Setpoint regulation			Network Operation	End Device Control	Info3-Setpoint control data	
1.7		Activate balancing service			End Device Control			
1.8		Send real-time power measurements	The BSP should provide real-time measurements allowing the monitoring of the service execution. When the BSP is the DSO, the BSP can also send voltage violation alerts. If any voltage violation was detected the DSO should inform the TSO to change the activation.		End Device Control	Network Operation	Info4-Real-Time measurements for services participation purposes	
1.9		Product activation monitoring	The TSO should monitor the participation in the service. The monitoring is useful for the settlement process but also to activate other resources if necessary.		Network Operation			
1.10		Send activation status			Network Operation	Data exchange platform	Info5-Activation Status information	
1.11		Receive activation status			Data exchange platform			

5. Information exchanged

Information exchanged			
Information exchanged, ID	***Name of information***	***Description of information exchanged***	***Requirement, R-IDs***
Info1	Service Activation Signal	Signal to activate the offer (product). TSO sends this signal in accordance with Merit Order List (MOL). Activation signal is sent by TSO SCADA or directly by Market Platform through the data exchange platform. Type: START, CHANGE, END	
Info2	Activation confirmation	This is acknowledgement for the activation request. It contains the following data: - Bid ID - Type balancing or re-dispatching [Balancing/Re-dispatching] - Status [Activated/Not activated] - Acknowledgement: Yes/No, BBID. - Store historical measurement data: Yes (option)	
Info3	Setpoint control data	- Balancing service BBID - Type balancing or re-dispatching [Balancing/Re-dispatching] - Setpoint of required capacity, [-1000, 1000] [MW], 0.001 MW resolution - Acknowledgement: Yes/No - Store historical measurement: Yes/No	
Info4	Real-Time measurements for services participation purposes	Measurements P, Q, V After activation, BSP sends real-time measurements to TSO. These measurements include measured active power P, base line (load profile without activate aFRR/mFRR), requested activated power P, activated power P and state.	
Info5	Activation Status information	Data about activation status, activated power, voltage violation in the distribution grid Asset status: activated/available/off Production: P (MW) Voltage violation: no/node voltages	

6. Requirements (optional)

7. Common terms and definitions

8. Custom information (optional)