Verify and settle activated flexibilities

Based on IEC 62559-2 edition 1
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1. Description of the use case

1. Name of use case

Use case identification		
ID	***Area(s)/Domain(s)/Zone(s)***	***Name of use case***
	Balance management,Market for flexibilities,Operational planning and forecasting	Verify and settle activated flexibilities

2. Version management

Version management				
Version No.	***Date***	***Name of author(s)***	***Changes***	***Approval status***
1	2018-04-05	Marco Pietrucci (Terna)		
2	2018-06-25	Ricardo Jover (EDF), Eric Suignard (EDF)		
3	2018-07-19	Ricardo Jover (EDF), Eric Suignard (EDF)	- Network operators involved, instead of BRPs. - Use of baseline, instead of winning bids. - Imbalance calculation changed into flexibility verification. - Calculation of delivered flexibilities and verification of delivered flexibilities in two steps. - Imbalance fees changed into penalties. - Invoice out of scope.	
4	2018-07-30	Eric Suignard (EDF)		
5	2018-08-02	Eric Suignard (EDF)		
6	2018-09-21	Eric Suignard (EDF), Ricardo Jover (EDF)	Remarks from Innogy and EirGrid.	
7	2018-10-04	Eric Suignard (EDF)	Version post WP5&9 physical meeting in Tallinn	
8	2018-10-17	Eric Suignard (EDF)	Version reviewed by WP5&9 partners	
9	2019-05-07	Eric Suignard (EDF)	WP6-7-8 demos alignment and miscellaneous changes	
10	2019-07-09	Eric Suignard (EDF)	Elering review	
11	2020-06-16	Eric Suignard (EDF)	innogy's and Elering's review	

3. Scope and objectives of use case

Scope and objectives of use case	
Scope	Verification of the flexibilities actually delivered by Flexibility Service Providers.
Objective(s)	Calculate actually delivered flexibility as response to activation request. Verify that flexibility delivered matches with flexibility requested. Calculate the penalty if flexibility delivered is less than flexibility requested.
Related business case(s)	

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

4. Narrative of Use Case

Narrative of use case
Short description
Actual flexibility delivered is calculated as the difference between baseline and metered consumption/generation of that Flexibility Service Provider. The verification takes place by comparing the actually delivered flexibility and flexibility requested by the System Operator. Settlement means that a Flexibility Service Provider is asked for a penalty if actually delivered flexibility is less than requested flexibility. Imbalance settlement process follows but is out of the scope of this use case.
Complete description
Summary of use case • **Flexibility verification and settlement** Description: ▪ Provide metering data Description: Real generation/consumption data measured by certified meters data and/or sub-meter data collected by Data Hubs. ▪ Provide baselines Description: Baselines stored at Flexibility Platform and collected previously (see "Calculate flexibility baseline" SUC) by Market Operators, FSPs or System Operators. ▪ Provide requested activation volumes Description: Volumes of requested flexibilities by System Operators (in "Manage flexibility activation" SUC). ▪ Forward metering data Description: ▪ Calculate the actually delivered flexibilities Description: The Flexibility Platform calculates the difference between the metered consumed/produced energy (delivered energy) and the baseline. ▪ Verify the delivered flexibilities Description: The Flexibility Platform calculates the differences between the actually delivered flexibilities and the requested activation volumes. ▪ Calculate penalties Description: Penalties of the requested but not delivered flexibilities.

5. Key performance indicators (KPI)

6. Use case conditions

Use case conditions	
Assumptions	
1	Market participant baselines (i.e. from any FSP: aggregator, individual consumer, individual generator) have been previously defined.
2	Activation volumes requested by System Operators have been previously registered in a Flexibility Platform.
3	Metering data have been previously loaded in Data Hubs.
4	Penalties are defined in the contracts between System Operators and Flexibility Service Providers. However, there may be market designs where that kind of bilateral contracts are not required. In these cases, penalties may be correlated to imbalance price

5	Meter data, baselines and information on requested flexibilities are available based on data access permission or legal obligation.: Meter data can be consumption or production data. They can be provided by certified meters or sub-meters.
Prerequisites	
1	For the verification and the calculation of penalties, the values of actual inputs / withdrawals must be obtained through accurate, reliable and certified instruments (metering data). Meter data, baselines and activation requests are needed.
2	Meter data (incl. sub-meter data) and baselines are available for the process.

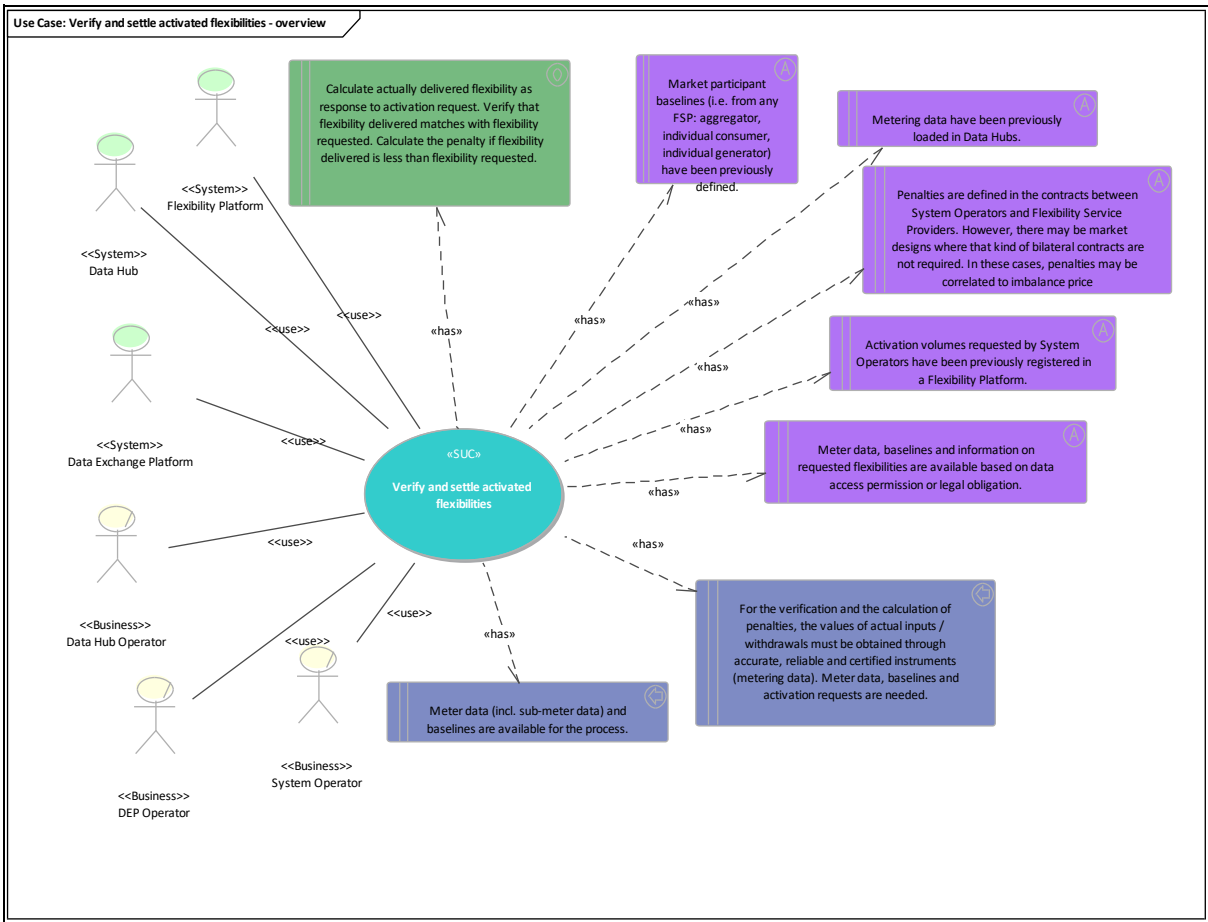
7. Further information to the use case for classification/mapping

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

8. General remarks

2. Diagrams of use case

Diagram(s) of use case



3. Technical details

1. Actors

Actors			
Grouping (e.g. domains, zones)		***Group description***	
Actor name	***Actor type***	***Actor description***	***Further information specific to this use case***
Data Exchange Platform	System	Data exchange platform (DEP) is a communication platform the basic functionality of which is to secure data transfer (routing) from data providers (e.g. data hubs, flexibility service providers, TSOs, DSOs) to the data users (e.g. TSOs, DSOs, consumers, suppliers, energy service	

		providers). DEP stores data related to its services (e.g. cryptographic hash of the data requested). The DEP does not store core energy data (e.g. meter data, grid data, market data) while these data can be stored by data hubs. Several DEPs may exist in different countries and inside one country.	
Data Hub	System	Data Hub is an information system which main functionality is to store and make available measurements (e.g. meter data, operational data) and associated master data. Data Hubs are not necessarily centralized in a country or in a region.	
System Operator	Business	System Operator means a natural or legal person responsible for operating, ensuring the maintenance of and, if necessary, developing the system in a given area and, where applicable, its interconnections with other systems, and for ensuring the long-term ability of the system to meet reasonable demands for the distribution or transmission of electricity (cf. ENTSOE-EFET-ebIX harmonized role model 2019). Can be: • A Transmission System Operator (cf. definition in T3.3 deliverable), for frequency control, congestion management and voltage control on transmission network, • A Distribution System Operator (cf. definition in T3.3 deliverable), for congestion management and voltage control on distribution network. NB: In some countries (e.g. Germany and Poland), the high voltage network is part of the distribution grid and in other countries (e. g. France and Italy) the high voltage network is part of the transmission grid. A System Operator can be: • A Primary System Operator, • A Secondary System Operator.	
Flexibility Platform	System	Flexibility Platform (FP) for System Operators and Flexibility Service Providers that enables the trading of different flexibility products and services. A FP is operated by a Market Operator. Available to System Operators and Flexibility Services Providers. It is used to support the prequalification, the bidding, the activation and the verification processes, ensuring coordination between activities undertaken by several operators using the same flexible resources. Several national and regional FPs may exist.	
DEP Operator	Business	Data exchange platform operator owns and operates a communication system which basic functionality is data transfer.	
Data Hub Operator	Business	Data hub operator owns and operates an information system which main functionality is to store and make available electricity (also gas, heat) metering data and associated master data. Can be : • Grid Data Hub Operator in the sphere of a System Operator • Market Data Hub Operator in the sphere of a Market Operator • Meter Data Hub Operator in the sphere of a Metered Data Operator • Sub-meter Data Hub Operator in the sphere of an Energy Service Provider	

2. References

4. Step by step analysis of use case

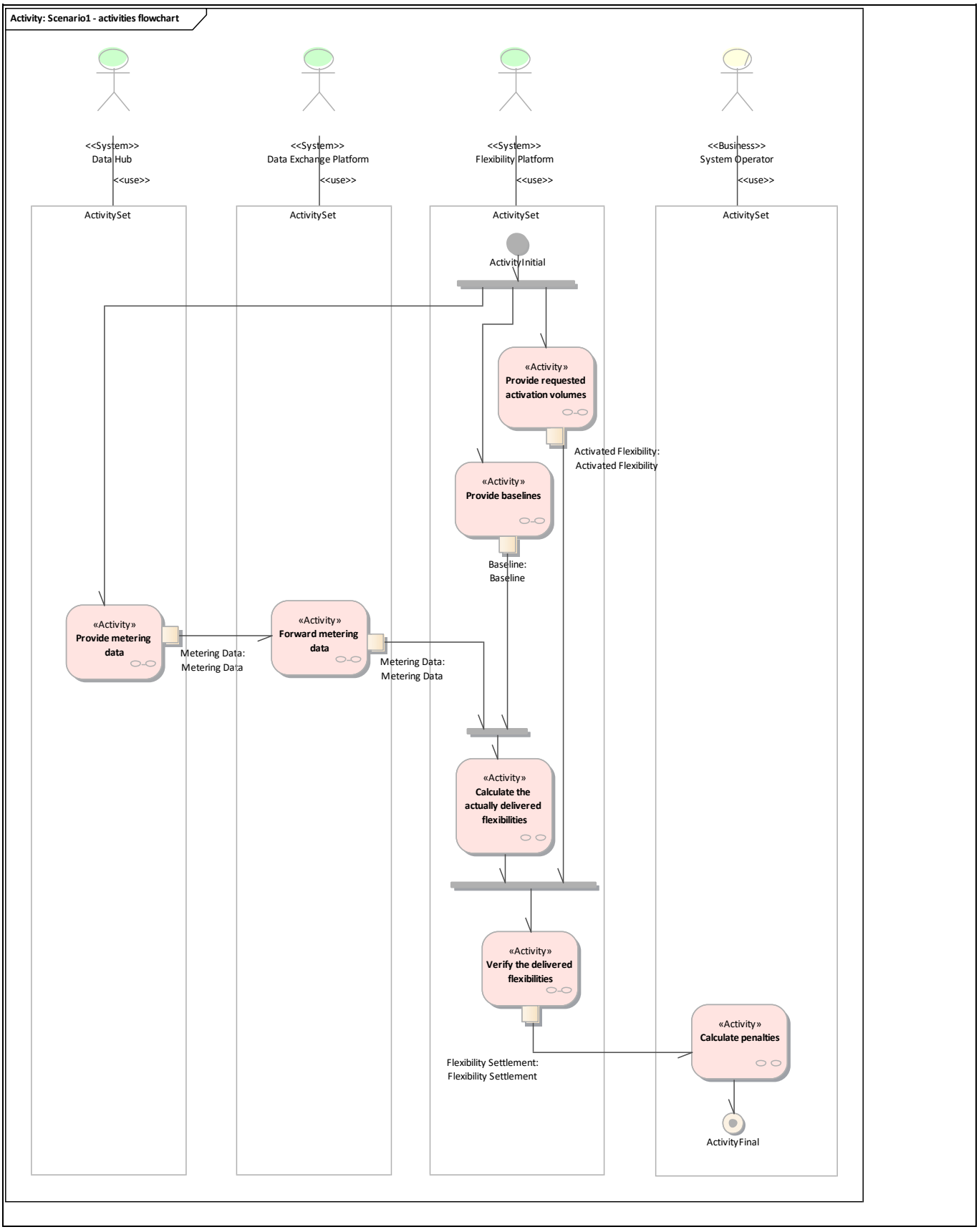
1. Overview of scenarios

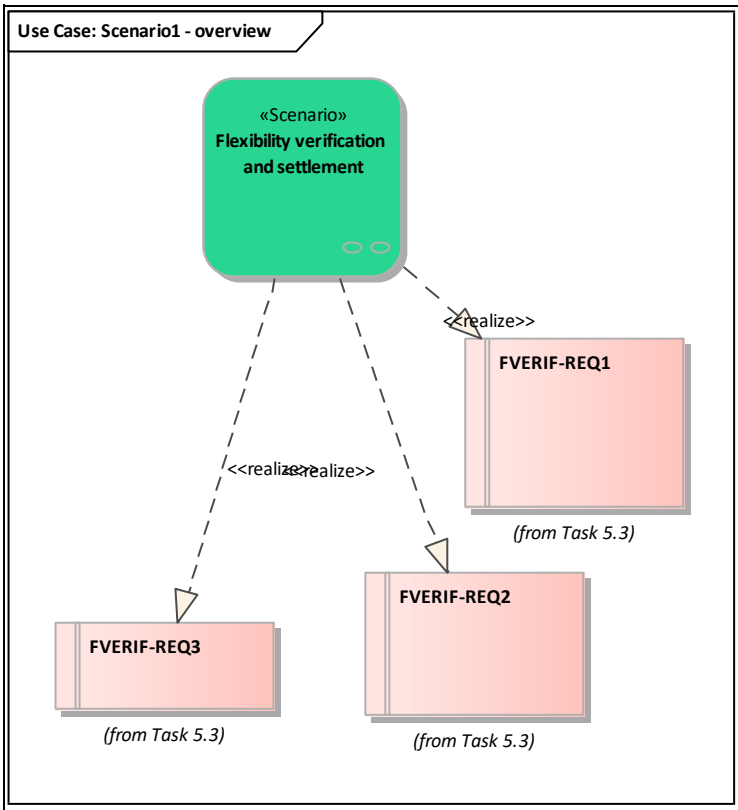
Scenario conditions						
No.	***Scenario name***	***Scenario description***	***Primary actor***	***Triggering event***	***Pre-condition***	***Post-condition***
1	Flexibility verification and settlement					

2. Steps - Scenarios

1. Flexibility verification and settlement

Requirement list (refer to "Requirement" section for more information)	
Requirement R-ID	***Requirement name***
Cat1.Req1	FVERIF-REQ1
Cat1.Req2	FVERIF-REQ2
Cat1.Req3	FVERIF-REQ3


Activity: Scenario1 - activities flowchart
<<System>>
Data Hub
<<use>>
ActivitySet
<<System>>
Data Exchange Platform
<<use>>
ActivitySet
<<System>>
Flexibility Platform
<<use>>
ActivitySet
<<Business>>
System Operator
<<use>>
ActivitySet
ActivityInitial
«Activity»
Provide requested activation volumes
Activated Flexibility:
Activated Flexibility
«Activity»
Provide baselines
Baseline:
Baseline
«Activity»
Provide metering data
Metering Data:
Metering Data
«Activity»
Forward metering data
Metering Data:
Metering Data
«Activity»
Calculate the actually delivered flexibilities
«Activity»
Verify the delivered flexibilities
Flexibility Settlement:
Flexibility Settlement
«Activity»
Calculate penalties
ActivityFinal



Scenario step by step analysis

Scenario								
Scenario name	Flexibility verification and settlement							
Step No	**Event**	**Name of process/activity**	**Description of process/activity**	**Service**	**Information producer (actor)**	**Information receiver (actor)**	**Information exchanged (IDs)**	**Requirement, R-IDs**
1.1		Provide metering data	Real generation/consumption data measured by certified meters data and/or sub-meter data collected by Data Hubs.		Data Hub	Data Exchange Platform	Info1-Metering Data	
1.2		Provide baselines	Baselines stored at Flexibility Platform and collected previously (see "Calculate flexibility baseline" SUC) by Market Operators, FSPs or System Operators.		Flexibility Platform	Flexibility Platform	Info2-Baseline	
1.3		Provide requested activation volumes	Volumes of requested flexibilities by System Operators (in "Manage flexibility activation" SUC).		Flexibility Platform	Flexibility Platform, Flexibility Platform	Info3-Activated Flexibility	

1.4		Forward metering data			Data Exchange Platform	Flexibility Platform	Info1-Metering Data	
1.5		Calculate the actually delivered flexibilities	The Flexibility Platform calculates the difference between the metered consumed/produced energy (delivered energy) and the baseline.		Flexibility Platform			
1.6		Verify the delivered flexibilities	The Flexibility Platform calculates the differences between the actually delivered flexibilities and the requested activation volumes.		Flexibility Platform	System Operator	Info4-Flexibility Settlement	
1.7		Calculate penalties	Penalties of the requested but not delivered flexibilities.		System Operator			

- 1.1. Provide metering data

Business section: Flexibility verification and settlement/Provide metering data
Real generation/consumption data measured by certified meters data and/or sub-meter data collected by Data Hubs.
Information sent:

Business object	***Instance name***	***Instance description***
Metering Data	Metering Data	

- 1.2. Provide baselines

Business section: Flexibility verification and settlement/Provide baselines
Baselines stored at Flexibility Platform and collected previously (see "Calculate flexibility baseline" SUC) by Market Operators, FSPs or System Operators.
Information sent:

Business object	***Instance name***	***Instance description***
Baseline	Baseline	

- 1.3. Provide requested activation volumes

Business section: Flexibility verification and settlement/Provide requested activation volumes
Volumes of requested flexibilities by System Operators (in "Manage flexibility activation" SUC).
Information sent:

Business object	***Instance name***	***Instance description***
Activated Flexibility	Activated Flexibility	

- 1.4. Forward metering data

Business section: Flexibility verification and settlement/Forward metering data

Information sent:

Business object	*Instance name*	*Instance description*
Metering Data	Metering Data	

- 1.6. Verify the delivered flexibilities

Business section: Flexibility verification and settlement/Verify the delivered flexibilities
The Flexibility Platform calculates the differences between the actually delivered flexibilities and the requested activation volumes.
Information sent:

Business object	*Instance name*	*Instance description*
Flexibility Settlement	Flexibility Settlement	

5. Information exchanged

Information exchanged			
Information exchanged, ID	*Name of information*	*Description of information exchanged*	*Requirement, R-IDs*
Info1	Metering Data		
Info2	Baseline		
Info3	Activated Flexibility		
Info4	Flexibility Settlement		

6. Requirements (optional)

Requirements (optional)		
Categories ID	*Category name for requirements*	*Category description*
Cat1	Task 5.3	Requirements integrated from Task 5.3.
Requirement R-ID	*Requirement name*	*Requirement description*
Req1	FVERIF-REQ1	Calculation of actually delivered flexibility as a response to an activation request
Req2	FVERIF-REQ2	Verification that flexibility delivered matches with flexibility requested
Req3	FVERIF-REQ3	Calculation of the penalty if flexibility delivered is less than flexibility requested

7. Common terms and definitions

8. Custom information (optional)