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**Platone****PLATform for Operation of distribution NEtworks**

**D1.1 v1.0**

**H – Requirement No. 1**

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**Nature:** Internal Template related to T1.1.

**Version:** V1

**Total number of pages:**

**Abstract**This template provides the conceptual framework for mapping the different use cases in the PlatOne demos.

**Keyword list**

**Disclaimer**All information provided reflects the status of the Platone project at the time of writing and may be subject to change.

Executive Summary

This template is part of the Task 1.1. Use case definition and operation specifications. The objective of this template is to provide a conceptual framework for the mapping of the architecture applied to the demos and their respective use cases.

The framework developed within T.1.1 will be used throughout the project to ensure a consistent reference for business models, functional requirements, communication, and data model standards among all the demos.

The PlatOne demos are in WP3 Italian Demo, WP4 Greek Demo and WP5 German Demo.

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# **Introduction**

Platone introduces various platforms for trading flexibility in energy production and consumption. The technical and, possibly, market platform mediates between the end-users (who are customers of the electricity distribution system operator, but may also produce and store energy), the grid operators on transmission and distribution levels and aggregators who match energy supply and demand. The field trials of Platone will take place in three countries (Italy, Greece and Germany), where end-users, conceivably, will be recruited to participate in the market platform.

### List of abbreviations

|  |  |
| --- | --- |
| DER | Distributed Energy Resources |
| DMS | Data Management System |
| DSO | Distribution System Operator |
| EU | European Union |
| IEC | International Electrotechnical Commission |
| KPI | Key Performance Indicator |
| POV | Point Of View |
| SGAM | Smart Grid Architecture Model |
| TSO | Transmission System Operator |
| UML | Unified Modelling Language |
| WP | Work Package |

### Definitions of roles

* DSO: A Distribution System Operator acts as a facilitator in activating a flexible distribution energy network to deliver electricity at low and medium voltage, optimising the use of DER and enabling the end-user to be securely and affordably producers and consumers.
* TSO: A Transmission System Operator operates to safely deliver power in high voltage from the electricity generation side to distribution networks, providing access to electricity market players.
* Balance responsible party: A chosen representative responsible in the energy market for the imbalances on the electricity grid.
* Balance service provider for transmission resources: It implements the balance service for unforeseen fluctuations on the transmission side of electricity grid by quickly modifying the power output.
* Balance service provider for distribution resources (aggregator): It manages the flexible loads to provide services to DSO and balance responsible party, and it enables the coordination between flexibility customers.
* Flexibility provider: It has the goal of balancing supply and demand at a given moment in time by adjusting the power involved among different actor, thanks to structural connection on the location of connection points.
* Service provider: The organization supplying services to electrical customers and utilities.
* Market operator: A player that communicate with TSO and DSO for managing all the network constrains.
* Resources owner: An entity capable of authorizing access to a protected resource.
* End-user (not as flex. provider): Member of the electricity network with no flexibility capability.
* Residential consumer: Final end user to denote a typical commodity residential consumption with capability of neither generation nor storage.
* Residential prostormer: End user able to consume, store and produce electricity onsite at residential level.
* Commercial consumer: Final end user to denote a typical commodity commercial consumption with capability of neither generation nor storage.
* Commercial prostormer: End user able to consume, store and produce electricity onsite at commercial level.
* Energy community: Association of citizens that pool their energy and benefits from renewable energies subsides.

### Scope of the document

This template is part of the Task 1.1. Use case definition and operation specifications. The objective is to provide a conceptual framework for the mapping of the architecture applied to the demos and their respective use cases.

The template is based on the SGAM and shall contribute to ensuring a consistent reference for business models, functional requirements, communication, and data model standards among all the demos.

The template is to be filled out by each of the demo leaders for each of their use cases scenario. The information gathered in this process shall be used to facilitate the comparison among the different use cases in the PlatOne project and later to support the scalability and replicability efforts of WP6 and 7.

# **Use Case Questionnaire**

### Overview

This questionnaire consists of 6 parts to be filled out by the use case authors or demo leader. The questionnaire is built on SGAM and other questionnaires carried out for projects, where the use case in different countries have been compared by the help of templates, such as the CoordiNet project.

The first section, ‘General description’ aims to give project partners, not involved in the use case in question, a general overview; where the first 2 boxes are related to the demo site as a whole, whereas the rest of the section it use case specific. The second section shall develop on the technical details related to the use case; the third section shall cover information exchange with a view to the purpose of the exchange, the parties involved and the information they transfer. The fourth section aims to explain terms which may be specific to the use case. In the fifth section, this information will be structured visually in diagrams, it allows the smooth start of the SGAM development and its subsequent analysis for a detailed explanation. The last section is dedicated to KPI proposals.

### General description

Please supply a technology description for the purpose of demo site harmonisation and delivery of the technologies within PlatOne framework (if needed), e.g. state estimation tool

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| *Technology developed inside the demo* |
| Avacon Local Flex Controller: An IT-system to acquire and process local field data and handle monitoring and control of the flexibility in a single low-voltage network or local energy community to maintain an externally determined setpoint for the power exchange with the feeding MV line.  PlatONe Use Case Module (UCM): An IT-system to determine the setpoints for ALF-C. UCM contains use case-specific algorithms to determine a constant setpoint or schedule for the interaction of local system and feeding system. |

Please fill up the below table, in case some services (such as algorithms, tools, UI) or components (Market, DSO, Blockchain Access) are needed.

|  |
| --- |
| *Technology dependencies* |
| 1. Blockchain Access Layer for upstream (data acquisition) and downstream (relay of control signals) data exchange. 2. Interface to market platform (optional) 3. UCM-UI (to be developed in WP5) 4. UCM algorithms (to be developed in WP5) 5. ALF-C algorithms (to be developed in WP5) 6. UCM / UC-algorithms could potentially be deployed onf DSO technical platform (currently not in scope) |

Please provide a short name that comprises the activity of the use case (max 1 sentence) and indicate its authors. If the use case point of view is not that of the DSO, or if the capability/role of the DSO goes further, you can use the last line to further specify.

|  |  |
| --- | --- |
| *Use Case Short Name* | UC1 – Island Mode |
| *Author(s)* | Thorsten Gross |
| *Use case POV* | Local Energy Community (DSO to fill this role for the purpose of the project field trial) |

Please describe concisely the objective of the use case, followed by an elaboration of the scope of the use case including using the boxes to indicate which markets and networks are under study.

|  |  |  |
| --- | --- | --- |
| *Objective* | | |
| Enable local islanding and maximize consumption of locally produced energy is geographic proximity | | |
| *Scope* | | |
| A local energy community – changes check | | |
|  | *Networks* | LV |
|  | *Markets* | None |

Please provide a short narrative of the use case which will allow for a brief overview of what is done within the scope.

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| --- |
| *Short description* |
| Use case 1 is anticipated to emerge as a result of the Clean Energy Package, driven by the bottom.up demand of customers and local communities. It is a prerequisite for the advanced use cases 2-4 which investigate ways to coordinate the interconnected distribution network with local energy communities. |

### Technical details

Please mark with X the actors involved in the use case. If there are actors involved in the use case which do not appear in this list, please specify under *Other*.

|  |  |  |  |
| --- | --- | --- | --- |
| *Involved actors* | | | *Additional technical specifications* |
| X | DSO | | ADMS, SCADA |
|  | TSO | |  |
|  | Market Operator | |  |
| X | Residential consumer | |  |
| X | Residential prostormer | |  |
| (X) | Commercial consumer | | Not in scope of PlatONe field trial |
| (X) | Commercial prostormer | | Not in scope of PlatONe field trial |
| X | Energy community | | Confined to a single low voltage betwork |
|  | Retailer | |  |
|  | Local authority (eg. municipality) | |  |
| (X) | Aggregator/Flexibility operator | | Not in scope of PlatONe field trial |
|  | Balance responsible party | |  |
|  | Service provider | |  |
|  | Other: |  | … |

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| *Events which trigger the use case* |
| Operator input (UI or file-based interface) |

|  |
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| *Context (standards and reports relevant to the use case)* |
| … |

### Information exchange

|  |  |
| --- | --- |
| *What information is exchanged* | * Generation (15-min) * Consumption (15-min) * Power at point of connection (real time) * Battery SOE / SOC * Weather conditions * Individual setpoints for flexibilities |
| *Which actors exchange the information* | * DSO * Flex-Controller * Consumer / Prosumer / Prostormer * Third parties (weather data) |
| *What is the purpose of the information exchange* | * Data acquisition to model and predict network and customer behaviour * Setpoint transmission to steer flexibilities to achieve use case target |
| *How is the information exchanged (process)* | * ? |
| *Which rules apply to the process* | * ? |

### Use case terms and definition

|  |  |
| --- | --- |
| *Specific domain and use case vocabulary* | |
| *Term:* | *Definition:* |
| … | … |

### Diagrams and activities list

Please develop the following diagrams according to the use case characteristic.

IEC 62559 Use Case Templates:

* UML Use Case Diagram
* UML Sequence Diagram

Moreover, this below box is related to the sequence diagram but aims to provide a more detailed explanation.

|  |
| --- |
| *Required activities for realisation of the use case* |
| … |

### KPIs

|  |
| --- |
| *Please propose KPIs relevant to the use case* |
| …  …  … |

# **List of references**

* Gürses-Tran, G. et al. H2020 Coordinet: D1.5 – Business Use Cases