DOME

(Distributed Open Marketplace for Europe)

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DOME requirements V1

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Acronyms

Acronym	Definition
AI	Artificial Intelligence
API	Application Programming Interface
CAGR	Compound Annual Growth Rate
CSP	Cloud Service Provider
CSV	Comma-Separated Values
DoW	Description of Work
Dx.y	Deliverable ‘x.y’
EC	European Commission
eIDAS	electronic IDentification, Authentication and trust Services
EU	European Union
EUCS	EU Cloud Services Scheme
GDPR	General Data Protection Regulation
IA	Identity and Access
IAM	Identity and Access Management
IaaS	Infrastructure as a Service
IoT	Internet of Things
ISO	International Organisation for Standardisation
IP	Intellectual Property
IPR	Intellectual Property Rights
IT	Information Technology
JSON	JavaScript Object Notation

KPI	Key Performance Indicator
MoSCoW	Must have, Should have, Could have, Won’t have
NIS	Network and Information Systems
PaaS	Platform as a Service
RAMP	Robotics and Automation MarketPlace
SaaS	Software as a Service
SLA	Service Level Agreement
SME	Small and Medium-sized Enterprise
SotA	State of the Art
SQL	Structured Query Language
VC	Verifiable Credentials
VP	Verifiable Presentation
UI	User Interface
WPx	Work Package ‘x’

1 Introduction

1.1 Executive Summary

Cloud computing has become a central piece of Europe's digital future, enabling European businesses and public organisations to support their digital transformation by providing them with the necessary data processing technology. The European Commission has pledged to facilitate the setup of a cloud services marketplace for EU users from both the private and public sectors. DOME is the envisioned online marketplace that will materialise this pledge by providing the means for accessing trusted services, including cloud and edge services, building blocks deployed under the Common Services Platform, and any software and data processing services developed under EU programs such as the Digital Europe Program, Horizon 2020, or Horizon Europe.

The purpose of this document is to define the requirements of the DOME system from the stakeholders perspective. It describes the motivation behind why the system is being implemented and documents the top-level requirements from the needs of different stakeholders, derived from the context of use. It serves as the basis for stakeholders' active participation in the requirement processes and includes business and user requirements.

In summary, this document provides a comprehensive understanding of the DOME platform and its requirements to ensure that it meets the needs and expectations of stakeholders. It defines the processes and policies/rules under which the system is used, and the business environment in which it operates. It also describes the business operational models, business operational quality, and the concept of the proposed system. With this document, stakeholders will have a clear understanding of the DOME system's requirements, which will facilitate the system's successful implementation and operation.

1.2 Intended audience

The requirements defined in this document aim to clarify the context and scope of the DOME features, and provide a common understanding as to what the DOME platform will offer. As such, it is addressed to the different stakeholders of DOME:

- EC, as the political body promoting and partially subsidising the DOME project.
- DOME ecosystem users, from both sides of the market:
  - Providers, who offer cloud and edge services, and
  - Customers, who seek cloud and edge services to fulfil their specific needs.
- Marketplace owners, which will participate in the DOME federation.
- DOME consortium partners who are developing the DOME platform and therefore will be the owners of some of the technical components used by the platform.

The document is addressed to various different responsibility positions within the above stakeholders organisations, including project managers, quality assurance testers, designers, developers and business analysts.

1.3 Structure of the document

This document is divided into 6 chapters:

Chapter 1: Introduction - provides a summary of this document and some general concepts to better understand the document contents.

Chapter 2: Describes the project context, the main categories of stakeholders involved in the project and their expectations

Chapter 3: Summarises the strategic objectives of DOME

Chapter 4: Derived from the consolidation of stakeholder requirements, described in chapter 2, and in alignment with the strategic objectives of DOME, described in chapter 3, this chapter describes the main operational processes that take place in the DOME platform, at business level.

Chapter 5: In this chapter the logical features of the DOME platform are summarised, and, the operational processes, described in chapter 4, are further broken down into more tangible features that the platform needs to address, taking into account the stakeholder requirements. Then, the structured requirements are documented.

Chapter 6: Concludes the document and summarises the requirements that need to be further validated in the follow up actions.

1.4 Related documents and resources

While the requirements in this document are utilised across all the DOME project activities, the most relevant follow-up deliverables are:

- D1.5 Final IPR Report: Features implemented will be items of IP to be managed.
- D2.2, D2.4, D2.7, D2.10 Marketing plan / reports: This document explains how DOME addresses the expectations of stakeholders and is used for designing the marketing activities.
- D2.3, D2.6, D2.9 Ecosystem: This document provides a brief overview of what DOME is and its features in order to provide the basis of establishing collaborations with other entities.
- WP3 & WP4 deliverables: These deliverables will provide the technical details of the implementation and operation that meet the requirements specified in this document.
- WP5 deliverables: Deliverables of this WP provide the business design of DOME and may derive refinements on the requirements documented in this report.

1.5 Requirements elicitation and management

1.5.1 Methodology

Requirements elicitation is an important process for the platform implementation, as it ensures that the final outcome meets the stakeholders' expectations:

- Avoids misunderstandings & conflicts based on a common understanding of what needs to be developed
- Helps prioritise and focus on the most important requirements
- Improves communication between stakeholders
- Ensures alignment with business objectives
- Facilitates effective planning & management

In DOME, the requirements are collected and elicited in a structured approach to ensure that the systems to be developed and/or used in the platform are fit for their purpose. The overall requirements elicitation process at this stage includes the following main sources:

1. Setting the platform background, purpose and boundaries. Documented in Sections 2.1 and 2.2 and inspired by the study of the European Union carried out by Capgemini Invent "Building a European Cloud Marketplace -Conceptualization Study-", made in August 2021 [1].
2. Review of literature concerning marketplaces functionalities and the different stakeholders. (see References)
3. Analysing the DOME partners' experience in the field of digital marketplaces, for they represent a rich and varied set of companies and institutions with different backgrounds and experiences in commercialising cloud and edge services, and the related technologies they already have developed, which is worth taking advantage of.

   The complete roadmap will include a 4th step represented by a direct market analysis through a set of interviews of relevant market actors where we will validate the defined set of requirements and we will collect the possible delta of topics that has not been included yet (if any). This step will be performed in the next months and the results will be included in the next version of the document.

The description of the steps followed for gathering the requirements of the platform, and their subsequent refinement, combine at the same time two different approaches, the so-called bottom-up and top-down requirements gathering (Figure 1). The quality of the system under development depends strongly on the quality of the elicitation process [6]:

- Bottom-up requirements gathering refers to the ones that come from technology push, State of the Art features and functionalities that are contracted or expected to be included in the platform. It is the viewpoint where the technology is taken as the starting point. Existing systems and technologies are within the most important sources of needs. In fact these contain the accumulated wisdom of years of practical application. [6] These are then aligned with the stakeholder expectations and refined into requirements.
- Top-down requirements gathering refers to the ones that are inferred from the platform high-level goals and the stakeholders, in the sense of how they expect to use the platform. [6] These are analysed into specific needs and then decomposed into specific requirements.

The collected requirements from both approaches are then managed through analysis and classification, ensuring that the stakeholder expectations do meet the platform objectives in terms of desired features and technologies.

Figure 1: Requirements in DOME are collected in both bottom-up and top-down approaches [24]

The definition of the requirements of the DOME platform is an iterative process, and after the first documentation of the requirements within this document, the process is re-launched to validate the requirements already collected and perform changes. More specifically, in DOME, there are 3 large iterations, with version 1 (v1.1 of this document) documenting the requirements with mostly consortium internal knowledge and expertise, literature analysis and technology push (contracted and State of the Art), while the follow up versions (D2.4 DOME requirements (v2) -due by M14- and D2.8 DOME requirements (v3) -due by M28-) will validate and extend the already collected requirements. [1]

For these next versions of the requirements, new requirements sources will be taken into account, for validating and extenting the requirements reported in this document. In v2, the Consortium will rely on the direct input from the stakeholders, for it is planned that, during November 2023, the Consortium Partners will reach out external stakeholders included in the categories of Customers, Providers and Federable Marketplaces and gather their direct inputs by the means of a survey form to be filled out by them and, when needed, followed by a structured interview in order to clarify or further elaborate the answers they give. This is without prejudice to other valuable inputs that may be worth to take into account, such as the already mentioned Business Model (D5.1), that will highlight the need of certain functionalities enabling the extraction of value from the platform utilisation and its monetization and the Governance Structure (D5.2). The consortium has committed to engaging a total of more than 180 relevant stakeholders.

In the third and final version of the DOME requirements, more elements will be used to further enrich and/or validate the functionalities of the platform. More specifically, the real-life testing on the platform will allow the identification of weaknesses and feature gaps that need to be addressed. Stakeholders will be able to use the real solution and give concrete feedback and suggestions for improvements. In addition to any other inputs brought by other versions of the deliverables (D5.3 DOME Business Model (intermediate version) -due by M18- and D5.4 DOME Governance Structure (final version) -due by M24- the platform's requirement will benefit from the real-world market experience derived from the exploitation of the marketplace, which is set to start by M18.

At this stage, the legal entity set for operating the DOME platform will actively participate in the determination of the functionalities roadmap, which will again meet the Business Model and the Governance Structure.

During the whole process of requirements analysis the needs and expectations are derived at different levels, in the sense of understanding the needs for the platform at conceptual level, down to structured and specific requirements. The documentation of these is illustrated in figure 2, referencing the relevant document sections where these are documented.

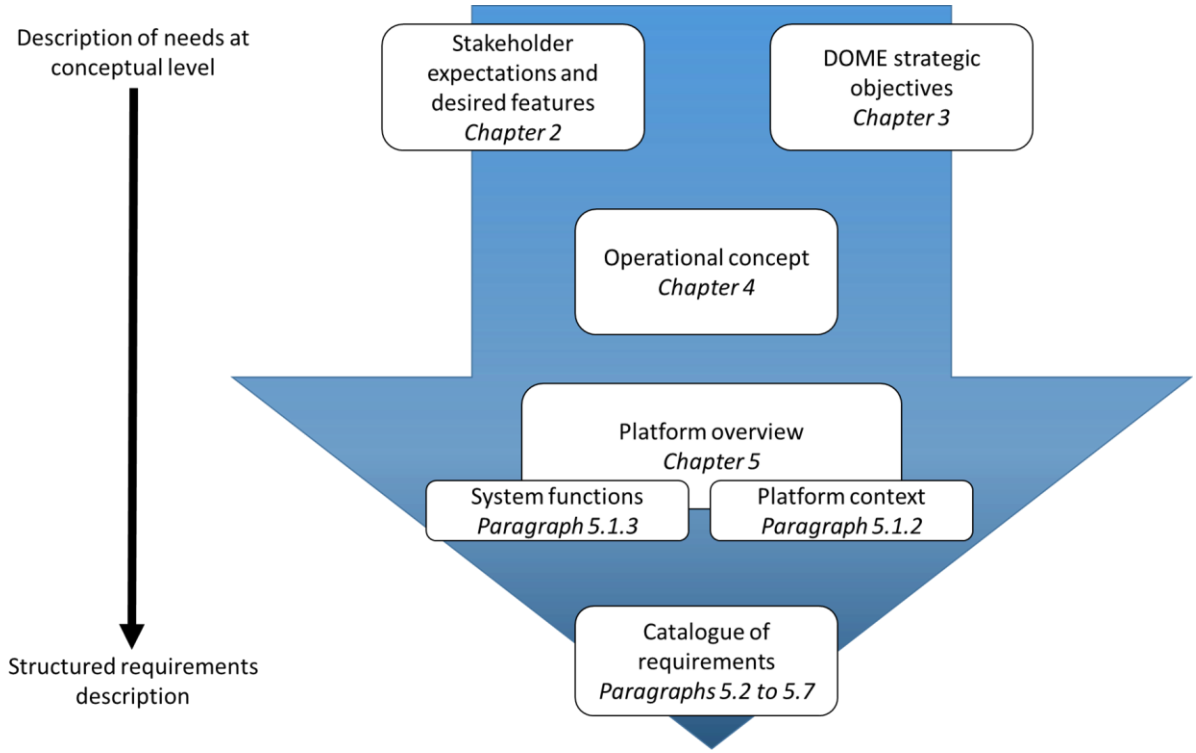

Figure 2: Illustration of the requirements analysis from conceptual to structured level and document section correspondence

1.5.2 Access to communities for further elicitation

In the first iteration, the expertise of the consortium partners was utilised to draft an initial requirements version, as per DOME DoW. The wide spectrum of the expertise and capacity for both top-down and bottom-up analysis can be summarised per partner as follows:

Top-down analysis (access to relevant stakeholders):

- Expertise on Marketplaces for cloud services: ENG, DHUB, FF, EG, EHT, OUTSCALE, CF, DWX, INNOV
- Expertise on Vertical Marketplaces and specific-sector communities: EDGR (**Manufacturing**), TD (**Agriculture**), FICODES (**Ports**), PORTEL (**Ports**), IDOM (**Ports**), GOLEM (**Smart Cities**), BEIA (**Energy** & **Agrifood**), UW (**5G** & **Smart cities**), Libelium (**Air quality monitoring**), DA (**Livestock**), DEMX (**Healthcare**), AOA (**Health**), HOPU (**Smart Cities**)
- Expertise on marketing (access to wider community): FF, FBR, FBC, INNOV

Both top-down and bottom-up analysis:

- Expertise on cloud and software services provisioning: ENG, DHUB, ED, EDGR, IONOS, ELLIOT, FICODES, OCHK, TOP-IX, FF, iSHARE, EXAI, Innofocus, ACK, CSI Piemonte, HASH, DigiteITS, IN2, NICOS

Bottom-up analysis:

- Expertise on identity management: OBS, FICODES, ALASTRIA, iSHARE
- Expertise on certification: DEKRA, TECNALIA
- Expertise on legal and ethics: PONS IP, TLX, ECR

The partners represent some stakeholders themselves, while for the follow up requirements analysis iterations (D2.4 DOME requirements (v2) and D2.8 DOME requirements (v3)) they will give access to specific stakeholders (extending the top-down analysis to external stakeholders). This is further elaborated in paragraph 2.3.3, after the stakeholder analysis, where they are mapped to the specific stakeholder groups they provide access to.

1.5.3 Activities

The activities carried out to collect input, in accordance with the steps above, in this first iteration are:

Step 1) Analysis and alignment with EU vision and DOME concepts:

Includes EU vision on the EU Marketplace according to the "Building a European Cloud Marketplace - Conceptualisation Study" published on 2021 [1] and the objectives of DOME (see DOME Grant Agreement [14])

Step 2) Analysis of literature and state of the art - Market, stakeholders and technology analysis:

>20 literature items of market analysis, stakeholder needs and technology state of the art, (see References section) were reviewed, focusing on **stakeholders** identification, **expectations** analysis and desired **features**. The analysis also includes evidence from pre-DOME relevant structured surveys on online marketplaces with >150 external stakeholders and thorough market research of >20 existing marketplaces conducted in previous similar efforts (Marketplace specifications) such as DIH² Marketplace in an engineering perspective or L4MS project for automated logistics [9] [10].

Step 3) DOME partners' expertise input:

- Interactive live workshop in DOME kick off meeting and further follow-up, focused on setting the DOME **boundaries**, **scope** and initial set of **stakeholders** and desired **features**.
- Structured collection with predefined forms, following up on the **stakeholders** analysis, **expectations** and desired **features** (see Annex B for the form used).
- Analysis of work in progress by DOME development sub-teams, focused on expected **features**. This was an activity that took place in parallel with the sub-teams' work for the technical implementation. Each sub-team holded weekly meetings with a focus on identifying the concrete features that need to be implemented, mainly in accordance with the strategic objectives of DOME, and elaborate on the design of the different components. In order to elaborate on the requirements, every team detailed implementation requirements in the form of 'user stories' in the format of "As a <actor>,

I want to <function> so that <value>". The identified user stories by the sub-teams were analysed one by one to cross-check which are in alignment with the stakeholder expectations. Further cross-analysis of the user stories derived from the different sub-teams was then conducted, in order to eliminate duplications and group the relevant ones into the aggregation level of requirements documentation that is used at the requirements catalogue included in this document. Additionally, many technical-level user stories were omitted from this report in order to not overpopulate with requirements that are more targeted to implementation than to understanding the platform functionality. This activity represents the larger portion of the bottom-up technology approach of the methodology described. Sub-teams consist of all relevant partners from the DOME consortium and are: Decentralised persistence layer, Trust Anchor and IAM Framework, Portal and Payment. The list of user stories, along with the traceability to the requirements documented later in this report can be found in the following document: https://docs.google.com/spreadsheets/d/1qAhPLEqDDxS2DhyDnKL4tt57FMgCdgp5W8ovp9HiiDQ/edit?usp=sharing

- **Consolidation** of all information collected, keeping results within DOME boundaries.

1.5.4 Use of ISO standards

The activities and documentation followed an accordingly adapted use of activities and documentation items defined in ISO 15288 [32] and ISO 29148 [31]. More specifically:

ISO 15288, §6.4.2.3, defines the following activities and tasks for the 'Stakeholder needs and requirements definition process', which are documented in this deliverable as follows:

- Prepare for stakeholder needs and requirements definition, which includes the identification of stakeholders, described in paragraph 2.6.1, and the requirements strategy, described in paragraph 1.5.
- Define stakeholder needs, which includes the definition of the context of use, reported in chapter 3, and the identification of stakeholder needs, described in paragraph 2.5.2.
- Develop the operational concept, described in chapter 4.
- Transform stakeholder needs and analyse into stakeholder requirements, described in chapter 5.
- Manage the stakeholder needs and requirements definition, which is a follow-up activity.

In alignment with the above, ISO 29148 defines the documentation structure for documentation of the stakeholder (§8.2) and system (§8.3) requirements, which are also followed in a tailored approach in this deliverable as follows:

Information item in ISO 29148, §8.2	**Paragraph in this document**
1. Introduction	1 Introduction
1.1 Business purpose	2.1 Purpose of the DOME platform
1.2 Business scope	2.2 Boundaries of the DOME platform
1.3 Business overview	*Already in previous '1.1 Executive Summary'*
1.4 Definitions	*Not included*

2. References	*Already in previous '1.4 Related documents and resources'*
3. Business management requirements	3 DOME strategic objectives
3.1 Business environment	2.4 Market overview
3.2 Goal and objective	3.1 Goals and objectives
3.3 Business model	3.2 Supported selling models 3.3 Sustainability and business requirements
3.4 Information environment	*Not included*
4. Business operational requirements	4 Operational concept
4.1 Business processes	4.1 Processes
4.2 Business operational policies and rules	4.2 Operational policies
4.3 Business operational constraints	4.3 Operational constraints
4.4 Business operational modes	*Out of the scope of this deliverable (too technical)*
4.5 Business operational quality	*Out of the scope of this deliverable (too technical)*
4.6 Business structure	*Out of the scope of this deliverable (too technical)*
5. User requirements	*See next row*
Information item in ISO 29148, §8.3	**Paragraph in this document**
1.1 System purpose	*Already in previous '2.1 Purpose of the DOME platform'*
1.2 System scope	*Already in previous '2.2 Boundaries of the DOME platform'*
1.3 System overview	5.1 Platform overview
1.3.1 System context	5.1.2 Platform context
1.3.2 System functions	5.1.3 Platform functions
1.3.3 User characteristics	5.1.1 User characteristics
1.4 Definitions	*Not included*
2. References	*Already in previous '1.4 Related documents and resources'*

3. System requirements	
3.1 Functional requirements	5.2 Functional requirements
3.2 Usability requirements	5.3 Usability requirements
3.3 Performance requirements	*Out of the scope of this deliverable (too technical)*
3.4 System interface	5.4 System interfaces
3.5 System operations	*Not applicable*
3.6 System modes and states	*Out of the scope of this deliverable (too technical)*
3.7 Physical characteristics	*Not applicable*
3.8 Environmental conditions	*Not applicable*
3.9 System security	5.5 Platform security
3.10 Information management	5.6 Information management
3.11 Policies and regulations	*Already in previous '4.2 Operational policies'*
3.12 System lifecycle sustainment	*Out of the scope of this deliverable (too technical)*
3.13 Packaging, handling, shipping and transportation	*Not applicable*
4. Verification	6.2 Follow-up validation of requirements

2 Context of the DOME platform

This chapter is the first step in the stakeholder analysis, introducing the main aspects of the system, the stakeholders and their main expectations. Initially it explains the reasons and background for which the DOME platform is being implemented. It also summarises how the platform contributes to meeting these objectives. The boundaries of the DOME platform in terms of planned features are then specified. The DOME consortium assets that will be utilised for implementing the platform are also summarised. In alignment with the DOME platform purpose and boundaries, the main stakeholders are then identified and their expectations are documented.

2.1 Purpose of the DOME platform

From a strategic point of view, one of the primary goals the EU is aiming at by partially funding this Project is to create a powerful European-based new actor in the cloud and edge services marketplace, capable of balancing the influence and dominance of the non-EU players who are currently largely shaping the market and raising harsh entry barriers to new actors. This is clearly stated in the Capgemini Invent's study "Building a European Cloud Marketplace -Conceptualization Study-" already mentioned earlier [1]. By doing this, it is expected that new conditions would be set in the sector, fostering the creation of a more diverse offering of transparent and trusted cloud services -in particular, cloud services that comply with EU's specific regulatory requirements- developed and managed by European based players.

For meeting these global policy objectives, DOME will aim to implement a pan-European marketplace, i.e. the DOME platform:

- Providing a consolidated, fair and trusted platform that consolidates a wide range of European cloud offerings, increasing their visibility ("findability") and simplifying the acquisition of cloud services across providers,
- Ensuring value for money and ease of access to services tailored to EU market needs,
- Promoting compliance with EU laws and policy priorities, enhancing trust in cloud services.

To achieve the objectives above, DOME project aims to create a digital marketplace where providers of cloud and edge services can list their services and reach a wider market of potential customers, outside of the influence area of the non-EU hyperscalers, along with a network of federated marketplaces that are connected to a shared digital catalogue of cloud and edge services. It provides its customers with a single point of access to a wide range of cloud and edge services available on DOME directly and through further marketplaces federated to it, while guaranteeing compliance with applicable standards and regulations.

As reference, it is possible to consider a relevant analysis from CapGemini titled 'Building European cloud marketplaces conceptualization study. This analysis includes a detailed scope of features and services to be provided by a cloud marketplace including the description of a set of baseline functionalities that any cloud platform, as the proposed by DOME project, should implement considering the current state of the art. These functionalities are classified as mandatory and optional features upon context [1]:

Mandatory features

- **Service listing function:** at the heart of the marketplace lies the service. It takes the form of a standardised, ordered and detailed list of services made available by providers to customers.
- **Search & browsing function**: this feature lets customers find the specific service they are looking for.
- **Certification system:** a key demand from public and private customers of cloud services in Europe is the need to access a reliable source of information on the sovereignty and trust of potential cloud services. As a result, a basic service certification system must be included even in the most basic EU Cloud Marketplace scenarios.
- **Identity and Access Management (IAM) system:** a robust identity and access management system will be required to ensure trust in the information listed on the platform by providers, as well as to enable customers to order services, manage their profile and benefit from a tailored experience. A basic IAM could be implemented by integrating a third party IAM solution. The marketplace could then build or connect to a federated IAM such as the service due to be provided by Gaia-X.
- **Reporting and analytics system**: customers, providers, and the operator will require metrics to monitor activity and adoption, identify sources of improvement and detect and correct issues.
- **Customer service**: customer service is an essential component of improved customer experience within the context of (online) cloud marketplaces.

Optional features

Other 'optional' features could be included in order to improve the user experience and performance of the DOME platform

- **Advanced search/browsing algorithms:** building upon the basic search functions illustrated previously, it is possible to design and implement more advanced features with the goal of connecting shoppers with relevant products as quickly as possible.
- **Brokerage features:** within the context of a European Cloud Marketplace addressing public and private customers (probably, with limited maturity in terms of the adoption of cloud services), different brokerage services could improve the customer experience significantly.
- **Financial simulation:** to favour user adoption and competition within the several CSPs, the marketplace should include a financial simulation feature.
- **Advanced payment and order management**: under certain advanced scenarios, the European Cloud Marketplace may offer payment functionalities to process the purchase of services made via the marketplace.

The most essential features through which the DOME platform is going to attain its objectives are: a distributed shared catalogue, a transactions ledger, a distributed identity and access management, advanced search and browsing functionalities, reporting and analytics, service brokerage, and integration with federated marketplaces and service delivery environments.

2.2 Boundaries of the DOME platform

DOME is a comprehensive platform that provides centralised access to a wide range of cloud (software and infrastructure) services. The platform includes:

- A composable digital catalogue (Distributed Shared Catalogue) with all the available service offerings by different marketplaces in various sectors.
- A Transactions Ledger that tracks service usage and maintains an up-to-date record of all transactions.
- A feature-rich search and browsing functionality, which enables users to easily discover service offerings based on specific criteria. The platform leverages the TMForum APIs [2] to provide a standardised approach to service management and delivery.
- A Distributed Identity and Access Management system that enables users to securely access services on the platform.
- Reporting and analytics capabilities, which enable service providers and customers, but also the DOME operator, to monitor activity and adoption, identify sources of improvement, and detect and correct issues.
- A Service Brokerage functionality that enables automated or procedural services to facilitate match-making between customers and providers. This ensures that service providers can connect with the right customers based on their specific offerings.
- Verifiable Credentials, which are used to represent Service offerings and users (both providers and customers), to enable secure and authorised access to all services on the platform.
- Payment and Billing mechanisms, which incorporate either direct payment through the DOME payment gateways, or allowing the use of payment and billing mechanisms of service providers and federated marketplaces.
- Integration of Federated Marketplaces and service delivery environments, enabling interoperability and allowing users to access different services offered across the DOME ecosystem.
- Guaranteeing the Quality of Service offered within the DOME ecosystem, through legally supported authentication, auditing for certifications and standards compliance, trusted transactions tracking, conflict resolution, etc.

Overall, DOME is designed to be a seamless and secure platform that enables easy access to a wide range of cloud services.

2.3 DOME consortium backlog

Several DOME consortium partners are providers aiming to publish their own products (e.g., IaaS, PaaS and SaaS) on the DOME catalogue, while they have several ready technologies for the DOME platform implementation. This set of contents will be the baseline of the catalogue and platform and will act as a testing field to implement the showcase of the platform.

Services that will be published as own products of the DOME partners, which act as a baseline for the DOME catalogue:

- Cloud infrastructure (GDPR-compliant) by IONOS
- Cloud infrastructure (GDPR-compliant) by CSI PIEMONTE
- Cloud infrastructure (GDPR-compliant) by DHUB
- Cloud services platform by OCHK
- Smart City Monitor cloud IoT platform by GOLEM
- IoT devices, monitoring and data processing by Libelium
- IoT devices & cloud platform by DIGITANIMAL

In the same way some of the consortium members are Marketplace owners too and they will be the first federated nodes to build the DOME ecosystem.

- RAMP marketplace by ED
- Agricolus marketplace platform by TeamDev
- Data exchange and marketplace platform by DWX
- Simulation infrastructure marketplace by OUTSCALE
- Infrastructure marketplace by CF
- 5G/Smart cities & edge marketplace by UW
- Data spaces marketplace by Onedata
- Activage marketplace by ACT

DOME partners are also providing enabling technologies that will help in leveraging the DOME platform implementation, speeding up the implementation process and increasing the reliability of the platform itself:

- Blockchain and identity management by ALASTRIA
- AI for natural language processing by EXAI
- Trust framework for Data spaces by iSHARE
- Data-preserving data spaces for exchanging data by EG
- FIWARE-compliant persistence, APIs and interfaces by FF
- TMForum API implementation and Opplafy marketplace platform by FICODES
- Cloud marketplace and asset management platform by ELLIOT
- Distributed Identity Access Management by OBS
- Cloudesire marketplace platform by ENG & DHUB
- Cloud infrastructure (GDPR-compliant) by IONOS
- eProcurement platform by ED

In terms of API implementation, DOME consortium has decided to utilise the TMForum APIs. TM Forum is a global industry association that develops open standards, frameworks, and best practices for digital services providers, including those in the telecommunications and cloud services sectors. The Association has over 850 member companies, including the world's top 10 telecommunications providers, that collectively serve 5 billion customers across 180 countries. More than 70[1] world-class, leading organisations have adopted and certified for their API implementation. This ensures that the wide adoption of TMForum standard is already secured, and its future maintenance is also guaranteed.

[1] https://www.tmforum.org/conformance-certification/open-api-conformance/

2.4 Market overview

The environment of DOME is shaped by several factors, including the growing demand for cloud and edge services, the need for seamless integration across multiple providers and marketplaces in a 'one-stop-shop' fashion, and the importance of compliance with EU regulations and standards.

The European market has witnessed a significant increase in the adoption of cloud and edge services in recent years. Despite tug of war and economic pressures, public cloud services spending in Europe will reach $148 billion in 2023 and will reach $258 billion by 2026, growing at a 22% 5-year 2021-2026 CAGR. Professional services, banking, and discrete manufacturing will remain the top spending industries (Figure 3), with a focus on cost-effective IT solutions, hybrid work and digital transformation acceleration. [19]

Figure 3: European Public Cloud market [27]

DOME recognizes this trend and aims to capitalise on the growing market by providing customers with a platform that offers a diverse range of services from various providers and marketplaces. By offering seamless integration and access to a shared digital catalogue, DOME addresses the need for a unified and comprehensive solution for customers in the European market.

Despite the above, Europe still lags behind other regions. In a market dominated by non-European cloud providers, the so-called hyperscalers, many European businesses and public sector authorities are still hesitant about adopting cloud computing. The absence of a functional EU Single Market for cloud computing deprives European customers of the benefits that come with a vibrant and competitive market. [17] The fragmented nature of the cloud and edge service market in Europe poses challenges for customers who seek to integrate services from multiple providers. DOME addresses this challenge by acting as a service brokerage platform that facilitates the integration and management of services from different providers and marketplaces. By providing a centralised platform with search, browsing, and service brokerage capabilities, DOME enables customers to efficiently discover, compare, and integrate services according to their specific requirements.

Compliance with EU regulations and standards is a crucial aspect of doing business in the European market. With the introduction of regulations like the GDPR and the EU Cloud Code of Conduct, organisations must ensure that their service providers comply with data protection and privacy requirements. DOME recognizes the importance of compliance and incorporates features such as distributed identity and access management, secure transactions ledger and

Verified Credentials for certifications assessment to safeguard customer data and ensure adherence to applicable regulations.

2.5 De facto features in market

In the following paragraph, a comprehensive recap of the de facto functionalities of various types of online marketplaces, based on the market research included in [9] and [10], corresponding to DIH² and L4MS projects. These compose a fundamental set of functionalities that stakeholders expect when using 'online marketplaces' and have become inherent features in the digital marketplace experience. It is essential to include different kinds of marketplaces to gain a holistic view and identify overarching trends that have become industry norms, and gain insights on widely accepted best practices, tailored to the DOME boundaries.

The market research includes the following marketplaces: Alibaba, Amazon Business, DHgate, EC21, Etsy, Europe Factory, Europe Enterprise Network, FGM Vendors, Field Engineer, FIWARE Marketplace, Global Sources, Fortissimo, IndiaMART, IP Marketplace, MFG, OFweek, SME Markethub, ThomasNet, TradeIndia, TradeKey, yet2, Wholesale Central.

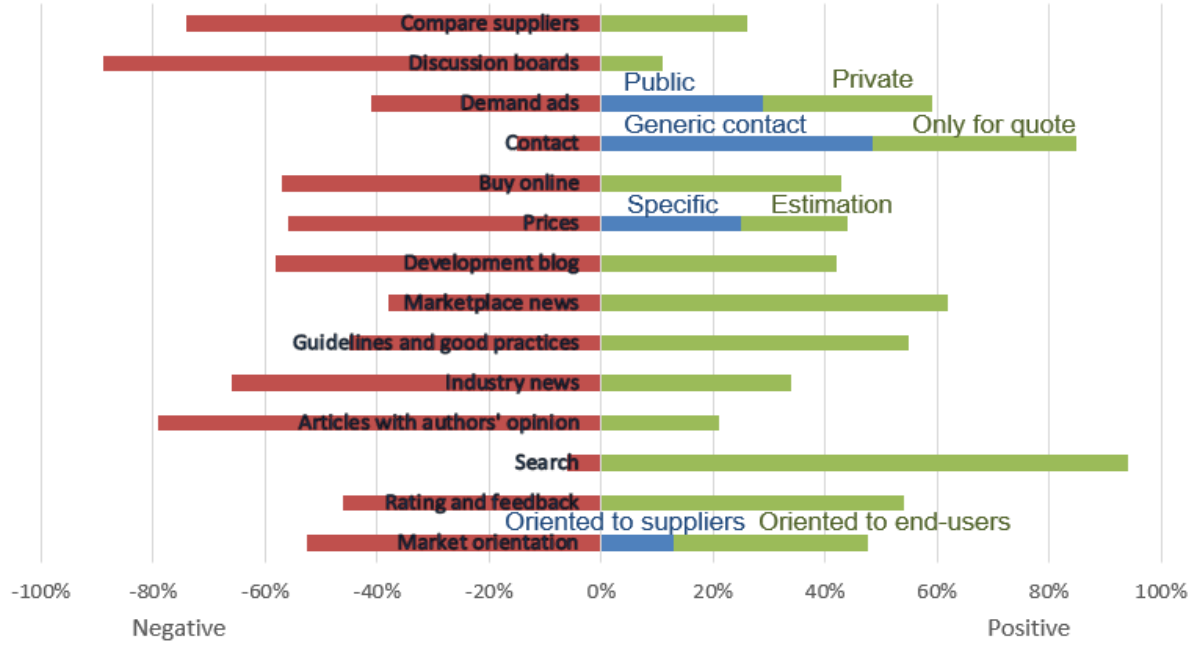

Figure 4: Statistics of features of different kinds of Marketplaces concluded in [10]. 'Positive' means that the marketplaces include these features, while negative means the do not

Based on the statistical results of the above research the common features across the different types of online marketplaces can be classified as follows:

- De facto features: Common across marketplaces, stakeholders expect these features to be in all different kinds of marketplaces
  - Demand advertisements (simplified tendering)
  - Contacting suppliers, negotiation
  - Searching of products/services
- Features that sometimes are implemented: Not expected per se, but can be considered as additional features

    - Guidelines, tutorials, good practices, etc.
    - Ratings
    - Price tags
    - Buying online
- Low-value features: These are not usually implemented and do not represent features that stakeholders would de facto expect
    - Articles
    - News
    - Discussion boards, forums
    - Compare of providers

2.6 Stakeholders

Under the generic Stakeholders term we're grouping any entity that may directly or indirectly have an interest in the way we're designing and conducting the DOME platform. This includes all the "business chain" potential actors but also external entities that may in some way influence or provide valuable inputs in the platform development.

The analysis approach is to group those Stakeholders in homogeneous classes with the same interest or business scope, while, when needed, identify and list some relevant specificities that may require a specific management in the platform.

Being this consortium a large aggregation of different market actors, covering from the small business to the enterprise grade or to the public sector market and having the capability to deal with external entities that are in some way sponsor of the project we believe that the defined list could be the right level of classification for the requirements analysis.

2.6.1 Identified Stakeholders classes

As the scope of the services that may be provided through DOME is wide and involves different kinds of stakeholders, the categorization of stakeholders is done based on their characteristics in different aspects. Below an identification of stakeholders is given in stakeholder 'classes' including significant subclasses.

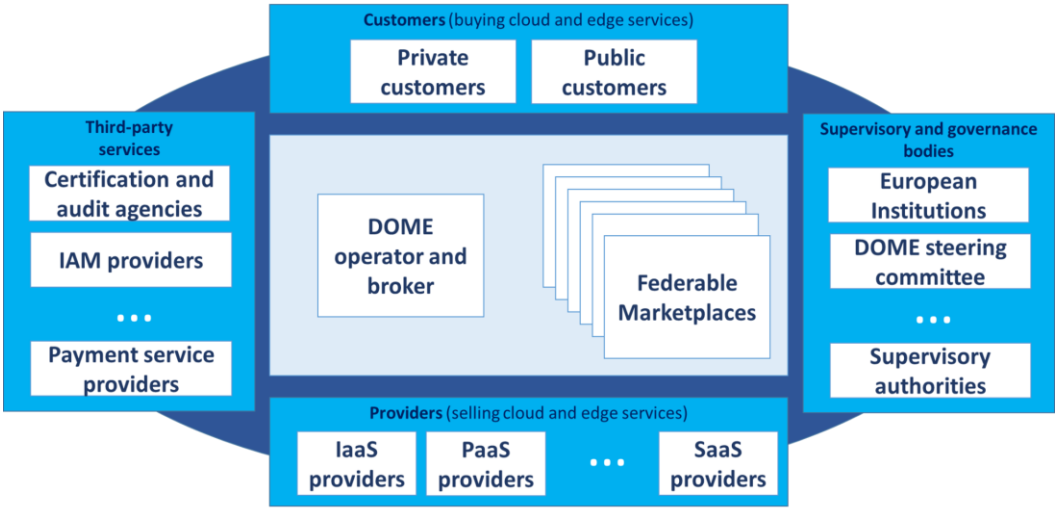

Figure 5: Illustration of the different DOME platform stakeholder classes

The following table describes the profiles of each stakeholder class.

Stakeholder class	Class description
Customers	They utilise or/and use cloud applications or/and services. ● Private: Depending on the size and organisation-specific processes they may utilise 1-to-1 purchase negotiations or more structured procurement approaches. ● Public: They mostly implement formal tendering mechanisms for service acquisition.
Providers	They create and offer cloud/edge applications or/and services. ● IaaS: They offer underlying infrastructure, such as servers, storage and networking, as a service to host and manage applications and data on the cloud. ● PaaS:They offer a platform for developing, deploying, and managing applications without the need to manage the underlying infrastructure. ● SaaS: They deliver software applications over the internet, eliminating the need for users to install and manage the software locally.
DOME operator and broker	The DOME entity that operates the platform
Supervisory and governance bodies	Institutions and bodies that carry out activities impacting the DOME platform operation: ● European Institutions are public sponsors of the DOME platform, defining guidelines and overall strategy. ● DOME Steering Committee, which consists of the DOME consortium members. These are valid representatives of the different market sectors covering both private, enterprise and

	public sector and with experience in both the buyer or the seller role. This is a valuable experience and it's the baseline leveraged to design the platform baseline. ● Supervisory authorities that provide guidelines or legislations in specific sectors.
Third-party services	Third-parties that provide key services: ● Certification and audit agencies are concerned with providing certified assurances on the services offered in DOME. ● IAM providers provide 3rd-party identification and access to the DOME platform, in addition to the DOME IAM management. ● Payment service providers provide 3rd-party payment services, processing the DOME payments and in addition to the DOME payment services.
Federable Marketplaces	They offer access and marketplace functionalities for Cloud Services / Consulting or/and other supporting services offered by own or/and by third-parties, or vertical services in a specific industry/sector.

2.6.2 Stakeholder expectations

The main expectations of the DOME stakeholder classes are elaborated in this paragraph. Following the activities performed in this iteration, each expectation is traced to its source, which may be one or more of the following:

- Internal DOME discussions and feedback based on market expertise and interactions, and DOME goals, as described previously, indicated as [DOME]
- Derived from literature analysis, indicated as [number], where number is the relevant reference number in the References.
- Supported from the relevant surveys with external stakeholders and market analysis conducted in previous (pre-DOME) work (i.e. DIH² project and L4MS project). [10] [9]

The information collected is summarised in the following synthetic table describing for every class the list of identified expectations. This list will evolve over time because any new entity involved in the ecosystem may bring new requirements and the market itself is going to change, introducing different ways to approach the business.

In the following table 'Features identified by DOME' are abstracted, and are all considered as required. However, as these are then disaggregated into smaller functions, their priority is specified, mostly in alignment with [1], partners expertise, DOME strategy and feature feasibility. The prioritisation is given per-requirement in the comprehensive requirements catalogue, in chapter 5.

Note: [n] labels refer to references that can be found in the References chapter.

Stakeholder	Stakeholder Expectations	Features identified by DOME to support expectations
Customers	Easily discover and select their desired cloud services. [23] [10] [9] [DOME]	Comprehensive service catalogues with detailed descriptions, specifications,

	Seamless, easy and fast provisioning of cloud services. [18] [DOME] Flexible, portable and scalable usage of cloud services. [18] Robust security and compliance of acquired services, high-quality services. [20] [DOME] Procurement costs reduction [3] [7] [DOME] Generate their own benefits, like improving productivity, quality, costs, new business models, etc. (private) [25] Formal tendering mechanisms (public or large enterprises) [8] [DOME]	pricing information, and user reviews, Simplification of purchasing and contracting and different pricing models (depending on the provider), robust security and compliance framework, like access controls, identity management, compliance and quality assurances, online procurement and tendering (public customers)
Providers	Access to a wide and diverse data market (of customers). Reach new customers across different industries and geographies. [4] [DOME] Robust security procurement process. [DOME] Compliance controls and qualification. [DOME] Comprehensive business monitoring and analytics [10] [DOME] Accurate and transparent billing and accounting. [22] Tools and frameworks that facilitate the configuration and management of their cloud services. [18]	Comprehensive service catalogues with detailed descriptions, specifications, pricing information, and user reviews, robust security and compliance framework, like identity management, compliance monitoring, etc., business metrics, billing and accounting that handles customer billing inquiries.
DOME operator and broker	Efficiently manage the DOME platform [DOME] Develop sustainable business that effectively addresses stakeholders expectations [DOME]	Unified identity management, robust security, Easy platform administration, smooth integration and communication with federated Marketplaces by using standard APIs, Metrics and KPIs
Supervisory and governance bodies	Promote transparency and ease of access to cloud services. [26] [48] [DOME] Develop sustainable business that effectively addresses stakeholders expectations [DOME]	Comprehensive service catalogues with detailed descriptions, specifications, pricing information, and user reviews, robust security and compliance framework Metrics and KPIs

Third-party services	Adherence and compliance to industry-level security and privacy measures and standards. [DOME] Access catalogue and use payment services in DOME using 3rd-party IAM and payment services [DOME]	Unified identity management, While no more specific features may be directly used in DOME (these are supervisory and compliance entities), it is essential to meet their expectations, as security and compliance certifications would provide many benefits: ● Increased trust and confidence [26] ● Competitive advantage [28] ● Compliance to regulations [29] ● Risk mitigation [30] ● Customer confidence and satisfaction [28]
Federable Marketplaces	Meet the expectations of their respective sector providers and customers. In addition: Aggregate and combine services into a unified offering. [27] Centralised management of services lifecycle. [21] [DOME]	Unified identity management, service orchestration to enable seamless interoperability for the acquisition of different cloud services, service provisioning, deployment, monitoring, scaling, and termination, centralised dashboard or control panel for managing the business metrics of their listed services.

Summarising the above, the most important expectations across the different stakeholder classes can be summarised as follows:

- STA-1: Unified identity management
- STA-2: Robust security and compliance framework
- STA-3: Easy platform administration
- STA-4: Smooth integration and communication with federated Marketplaces by using standard APIs
- STA-5: Business metrics and KPIs in centralised dashboard
- STA-6: Comprehensive service catalogues with detailed descriptions, specifications, pricing information, and user reviews
- STA-7: Transparent billing and accounting
- STA-8: Simplification of purchasing and contracting
- STA-9: On-demand scaling, elastic resource allocation and different pricing models (depending on the provider)

- STA-10: Procurement and tendering
- STA-11: Service orchestration to enable seamless interoperability for the acquisition of different cloud services, service provisioning, deployment, monitoring, scaling, and termination

3 DOME strategic objectives

This chapter summarises the strategic objectives of the DOME project that impact the platform implementation. This involves a summary of the business environment in which the DOME platform will operate, in order to understand the significance and potential of the platform. The goals and objectives for the DOME platform are also elaborated, as these include strategic features and technologies that will be implemented. Finally, the transactional models that are targeted to be supported in DOME, as well as the sustainability are briefed, as these impact the requirements to be implemented.

3.1 Goals and objectives

The objectives of DOME [14] define strategic purpose of the platform and its scope, and can be summarised as follows:

1. Implement and open standard-based, vendor-neutral technical architecture and reference framework for federating marketplaces.
2. Integrate state-of-the-art identity and access management services, to support its operations.
3. Use open source for the development of common services, bring transparency, vendor independence and neutrality in the offering of services.
4. Build over the cloud-to-edge middleware platform.
5. Have a strong customer focus, user-friendliness and inclusion and equality principles.
6. Operate according to security, energy and resource efficiency, data protection, ethical standards and portability requirements.
7. Bring curation/vetting processes for services, notably for sector-specific services in regulated sectors (e.g., health, energy, finance, etc.).
8. Put in place the required mechanisms to offer a seamless and integrated user experience, where other marketplaces already exist.
9. Develop an agile and future-proof revenue model to cement long-term commercial viability.
10. Define clear rules for the open, fair and transparent functioning of the marketplace, including how these would be guaranteed in the long term through an appropriate governance structure.
11. Simplify procurement
12. Make services easy to find
13. Create opportunity for selling over more marketplaces
14. Manage federation and distribution while ensuring trustworthiness
15. Ensure cost control and visibility on what is really offered (no hidden costs)
16. Business continuity. Being a production service it should be always available
17. Scalability. The platform should be flexible enough to sustain the workload

3.2 Supported ordering and payment models

The real market cloud services are procured in different ways. DOME aims to support all of those ordering options approaching them in a sequential, incremental way , during the project lifetime:

- Off-the-shelf services
- Tailored services
- Tendering

Off-the-shelf services are pre-built and readily available solutions, designed to meet common needs across businesses. These have standard configurations and features, allowing customers to quickly deploy and use cloud resources. This type of services targets businesses that seek immediate solutions, saving time and costs, as described on “Bespoke vs Off-the-shelf Cloud Solutions”. [13]

Tailored services are bespoke cloud solutions, designed to meet specific and unique business needs. Customers and providers collaboratively work closely to understand application needs, enabling custom configurations, integrations and optimisations. Even though more time is needed to make the cloud services available to the customer, tailored solutions offer personalised benefits, such as flexibility, expert assistance, security, cost efficiency, etc. [12]

Tendering is needed by organisations, such as public organisations and large corporations, which incorporate more complex procurement processes. Tendering involves bids or proposals from multiple cloud service providers, encouraging competition to secure the most fitting solution to the most competing price. Tendering allows organisations to define comprehensive service requirements and select providers through a rigorous evaluation process. The tendering process promotes transparency, accountability, and fairness in the selection of cloud services (see as an example eXceeding Limited [11]).

The ordering mode is not the only functionality that a marketplace must support. In alignment with the relevant cloud service providers portals, DOME will then support different selling models and will be able to manage:

One-off - for products with a one shot payment like devices for edge computing, perpetual licensing and so on.

Fixed fee - for products/services that have a flat and recurrent fee.

Pay per use - for products/services that will be paid upon an usage rate

The same product may be sold in different modes (selling plans) with specific price plans applied to the different configurations and in some cases the same product may require both a one-off price for the activation and a recurring or pay per use fee for the service usage.

3.3 Sustainability and business requirements

Aiming the creation of a business entity that will operate autonomously on the market, the DOME project should consider not only the technical requirements but also all those “accessories” needed by a market operator to survive on the market starting from the economics control. The design of a sustainable business model starts from a clear understanding of the role that the organisation will cover on the market. As a marketplace

platform DOME will be an enabler allowing the matching from demand and offer. This position classifies the DOME federation (the aggregation of all the federated marketplaces) as a potential reseller of the cloud services/products that several providers will publish on the catalogue. In this role the capability to collect revenues that can help in sustaining the business infrastructure may be referred to some subscription fee or to a revenue sharing model. An additional revenue stream may be the capability to provide some “pay per use” service but this is something that is over the core focus of the service. Independently by the form of the revenue stream the primary identified requirement is that it should not impact the capability of the customer to have his own business. This means that the DOME operator must design a business model that can be flexible enough to follow the customer business without creating issues to his growth. The other relevant factor to ensure sustainability is the cost containment. The big issue in this sense is that costs will have a starting baseline (you should implement an infrastructure and employ some staff) while revenues will grow up upon business development). This leads to the following requirements: the need to create (as much as possible) a scalable service infrastructure (growing up with the business), the usage of the higher level of automation as possible in order to reduce the staff need, a strong focus on standardisation to reduce complexity and understandability of the model. Due the need to be in the market as an active operator the organisation another relevant topic to be addressed is the contractual framework that should be addressed both on the relationship between the DOME operator and the partners but also trying to address some standardisation of the contracts between sellers and buyers increasing the trust level on the ecosystem.

All the above concepts will be explored in detail in deliverable D5.1.

4 Operational concept

This chapter brings together the findings on the previous chapters and consolidates them into the main processes, at operational level, that will take place within the DOME platform. On the one hand these processes aim to address the stakeholder expectations in the sense of desired features (chapter 2), being aligned with the strategic objectives of the DOME platform (chapter 3). The operational concept describes, at conceptual level, the business processes in which the DOME platform is intended to be used, along with the conditions of using it.

The processes targeted to be addressed within the DOME platform explain at high/operational level in which activities the DOME platform will play an active role. Additionally, the main policies, at operational level, and constraints that will be taken into account during the DOME platform implementation and operation are briefed.

4.1 Processes

In this paragraph we're describing the main business-level processes which revolve around the use of the DOME platform for the core business interaction of cloud/edge service provision. These processes describe the customer-oriented journey from discovering a service to final monitoring.

Figure 6: Business processes in DOME core interaction

While a 'customer-oriented' overall sequence is indicated, the description of each process itself, along with the policies and constraints in the follow-up paragraph, give indications for the needed functions for all the different user roles of the platform, which will be analysed in the follow up chapter 5.

4.1.1 Service discovery and selection

This process involves the activities related to service discovery and selection by the cloud services customers. DOME provides a user-friendly interface where customers can search and browse through the shared catalogue of cloud services that are available across the DOME ecosystem. Customers can utilise various search criteria and filters to find services that meet their specific requirements. The platform interface enables customers to view detailed information about services, including pricing, features and providers details. Users can compare different services, read reviews, and assess service quality before making their selection.

This process is related to the stakeholders' expectations in terms of comprehensive service catalogues with detailed descriptions, specifications, pricing information, and user reviews.

4.1.2 Service negotiation and agreement

This process focuses on the negotiation and agreement activities between cloud services customers and providers. Applicable for 'tailored services' and 'Tendering', during this process customers can initiate service requests and negotiate terms, such as pricing, service-level agreements and contract duration. DOME facilitates communication and collaboration between customers and providers, providing features for negotiation and tailored offers. Once the terms are agreed upon, DOME can serve as the third-party where the contract is recorded for future reference.

Based on the type of service, there are two approaches in which this process is implemented:

- For the 'Tailored services', the customer initiates a negotiation with a specific provider, based on a service they have available in the DOME catalogue.
- For the 'Tendering', the customer defines a set of service requirements and different providers make offers and proposals. After the evaluation and selection, which may be different for each customer, further one-to-one negotiation may also take place.

This process is related to stakeholders' expectations in terms of simplification of purchasing and contracting, on-demand scaling, elastic resource allocation and different pricing models (depending on the provider), procurement and tendering, smooth integration and communication with federated Marketplaces by using standard APIs, simplification of purchasing and contracting, online procurement and tendering, service orchestration to enable seamless interoperability for the acquisition of different cloud services.

4.1.3 Service provisioning and activation

This process involves the activities related to service discovery and selection by the cloud services customers. This includes the possibility that a 'bundle' may consist of services that are provided by different cloud service providers. Upon agreement, the DOME platform initiates the provisioning process by sending service requests to the respective providers of the multi-cloud composed service bundle. The platform interfaces with service provider systems to automate the provisioning of the selected services. The platform tracks the provisioning progress and updates customers on the status of their service activations. Once the services are provisioned, the platform triggers the activation process, ensuring that customers can access and utilise the services according to their agreed terms.

This process is related to stakeholders' expectations in terms of smooth integration and communication with federated Marketplaces by using standard APIs, on-demand scaling, elastic resource allocation and different pricing models (depending on the provider), service provisioning, deployment, monitoring, scaling, and termination.

4.1.4 Service management and monitoring

This process encompasses activities related to ongoing service management and monitoring. The DOME platform provides interfaces for customers to provide a first-level management and monitoring of their subscribed services. Comprehensive service management and

monitoring is performed through the provider's system for each specific service. Customers can view and modify main service configuration that the provider may make available through DOME, monitor service usage and performance, and receive alerts or notifications related to their services. The platform may interface with service providers' monitoring systems to collect relevant data and provide real-time insights to customers. The platform enables customers to troubleshoot issues and request support in using the DOME platform.

Additionally, it allows customers to request mediation by DOME in service-related conflicts. It needs to be noted that, in this case, DOME will act only as a neutral arbitrator that facilitates the mutual agreement by both sides (provider-customer), and may proceed to remediation actions regarding the use of the DOME platform. However, it does not have authority over legal-binding actions. The feature of having arbitration for conflict management integrated in the platform is an important trust-enhancing feature, as it allows parties to try and reach a mutual agreement before proceeding to legal actions.

This process is related to stakeholders' expectations in terms of smooth integration and communication with federated Marketplaces by using standard APIs, billing and accounting.

4.1.5 Reporting and analytics

This process focuses on the generation of reports and analytics based on platform usage and service consumption data. The DOME platform collects and aggregates data related to customer activities, transactions, and service usage that take place on the platform. The platform interfaces with providers' reporting and analytics tools to generate various reports and visualisations. Customers can access these reports through the platform, gaining insights into their service usage patterns, costs, and performance. The platform supports customization of reports based on customer preferences.

This process is related to stakeholders' expectations in terms of metrics and KPIs, business performance metrics, centralised dashboard or control panel for managing the business metrics of their listed services.

4.2 Operational policies

Policies and rules refer to logical propositions that govern the behaviour and decision-making within the above-mentioned processes. They outline guidelines, principles, and conditions for conducting the business activities. Policies and rules define how the system should operate, what conditions must be met, and what actions should be taken. Stakeholder expectations impose the need of these, more specifically in terms of unified identity management, robust security, compliance and quality framework, transparency.

4.2.1 Service availability and eligibility

This policy ensures that services listed in the shared catalogue are available and eligible for customers to access and integrate. Relevant processes: 4.1.1, 4.1.3.

1. Only services that are currently active and meet the specified eligibility/compliance criteria are included in the shared catalogue.

2. Service providers are responsible for maintaining the availability, eligibility and compliance of their listed services.
3. The DOME platform periodically verifies the availability and eligibility of listed services and updates the catalogue accordingly.
4. The DOME platform ensures that the service providers and federated marketplaces are equally and fairly treated in respect to how their services are presented.

4.2.2 Compliance with regulations and standards

This policy ensures that all services offered through DOME comply with applicable regulations and standards. Relevant processes: all.

The details of the qualification conditions and processes will be defined in detail in the context of the DOME task T4.3, and reported in the deliverable “D4.2 Methodological framework for the continuous compliance of cloud services in DOME”, due in M18. An early indication of high-level conditions for the qualification are briefly stated in this report.

1. Service providers are required to comply with relevant data protection, privacy, and security regulations. In summary, indicative regulations include at least:
    - General Data Protection Regulation (GDPR): GDPR is the cornerstone of EU's data protection and privacy laws. It regulates the processing of personal data of individuals in the EU, including cloud service providers, ensuring the protection of privacy and data security.
    - Network and Information Systems Directive (NIS Directive): NIS Directive focuses on the security of network and information systems and is applicable to operators of essential services, including cloud service providers, requiring them to ensure the security of their systems and report significant incidents.
    - ePrivacy Directive: The ePrivacy Directive addresses privacy and confidentiality in the digital communications sector. It provides more stringent rules for electronic communications, including cloud-based services
    - EU Cloud Rulebook (upcoming): The Rulebook will provide a single European framework relevant binding and non-binding rules for cloud service users and providers in Europe.
    - European Data Act (upcoming): The Data Act aims to boost the EU's data economy by unlocking industrial data, optimising its accessibility and use, and fostering a competitive and reliable European cloud market. It seeks to ensure that the benefits of the digital revolution are shared by everyone.
    - EU Cloud Services Scheme (EUCS): The scheme aims to further improve the Union’s internal market conditions for cloud services by enhancing and streamlining their cybersecurity guarantees. It intends to harmonise the security of cloud services with EU regulations, international standards, best industrial practices, as well as with existing certifications in EU Member States.

    More specifically, DOME will have a formal process to verify compliance against reference standards. While DOME won’t certify services itself, it will guarantee that services are certified, based on their Verified Credentials. DOME will also assess the “continuous compliance of the EUCS” during the lifecycle of a service in DOME, and offer supporting services to providers to be EUCS compliant.

2. The federated marketplaces perform an initial non-binding assessment of service providers' compliance with regulations and standards before onboarding them. DOME will perform the final audit on compliance to regulations, standards and certifications.
3. Service providers are periodically audited to ensure ongoing compliance with regulations and standards.

4.2.3 Transparent pricing and terms

This policy promotes transparency and ensures that customers have access to accurate pricing and terms for the services they select (either for fixed price services or for customer-specific offers). Relevant processes: 4.1.1, 4.1.2, 4.1.5.

1. Service providers are required to provide detailed and up-to-date pricing information for their services.
2. Pricing displayed in the shared catalogue includes all relevant costs and fees associated with the service (i.e., no hidden costs).
3. The federated marketplaces verify, in complement to the DOME auditing, the accuracy of pricing and terms provided by service providers and take measures to address any discrepancies.
4. Service providers are required to provide clear terms of their services, including details about usage limitations, contractual obligations, access management, data location and use, additional fees, as well as currency and payment methods, and dispute resolution policies.

4.2.4 Secure identity and access management

This policy ensures secure authentication and authorised access, with a single account, to the DOME platform, the federated marketplaces and the available services. Relevant processes: 4.1.2, 4.1.3, 4.1.4.

1. Customers and providers must authenticate themselves using valid credentials before accessing the platform.
2. Access to specific services within the platform is determined based on customers' authorization levels and agreements with service providers.
3. The DOME platform employs encryption and other security measures to protect user identities and prevent unauthorised access.
4. Customers and providers must use the DOME identity and access management mechanisms, and follow the set of relevant rules that actors in the DOME ecosystem agree to follow.

4.2.5 Service level agreements

This policy governs the establishment and enforcement of service level agreements between customers and service providers. Relevant processes: 4.1.4, 4.1.5.

1. Service providers are required to define and communicate their SLAs, including performance metrics, uptime guarantees, and support response times.
2. Customers can negotiate and agree upon SLAs with service providers.

3. The DOME platform acts as an arbitration medium to address potential conflicts related to SLA violations.

4.3 Operational constraints

Operational constraints are conditions or limitations imposed on the platform or the processes. These constraints may arise from performance requirements, management requisites, or other factors that impact the operation of the platform. Operational constraints define specific boundaries, restrictions, or requirements that need to be met during the execution of the processes.

4.3.1 Response time

- The DOME platform shall aim to provide fast and responsive user experience. This includes page load time optimization, responsiveness across devices and screen sizes, smooth navigation and interactions, and in general a user-centric design.
- Business processes, such as service discovery and selection, service negotiation and agreement, and service provisioning, should be completed within a reasonable time frame to ensure customer satisfaction.
- The platform should strive to minimise latency and delays in processing customer requests and interactions.

4.3.2 Scalability and capacity

- The DOME platform should be able to handle increasing volumes of users, transactions, and service providers. This includes a scalable architecture, flexible cloud-based infrastructure, scalable databases, load balancing, caching strategies, and other approaches.
- The platform should be scalable to accommodate growth in the number of users and service offerings without compromising performance.
- Capacity planning and resource management should be implemented to ensure that the platform can effectively handle the load and maintain optimal performance.

4.3.3 Monitoring and logging

- Every occurrence of the business processes outlined in paragraph 4.1, taking place within DOME, should be monitored and recorded for auditing, troubleshooting, and analysis purposes.
- platform logs should capture relevant information about user interactions, transactions, service provisioning, and platform performance.
- Monitoring tools should be in place to track platform health, resource utilisation, and identify potential bottlenecks or issues.
- Tracking information should be available for further processing (chatbot, automatic analysis and troubleshooting)

- Operational information, troubleshooting, workarounds must be further elaborated for creating a knowledge base

4.3.4 Security and privacy

- The DOME platform must enforce strict security measures to protect customer data, service provider information, and system integrity.
- Access control mechanisms must be implemented to ensure that only authorised users and service providers can access the platform and relevant data.
- Encryption and secure communication protocols must be used to safeguard data transmission and storage.
- Compliance with data protection and privacy regulations, such as GDPR, must be ensured to protect customer rights and privacy.

4.3.5 Service level agreements

- The DOME platform should keep a record of the agreed-upon SLAs with service providers.
- Service provisioning, availability, performance, and support must meet the SLA requirements specified in the agreements.
- DOME could arbitrate in addressing SLA compliance conflicts and take appropriate actions in case of SLA violations.

5 Platform requirements

This chapter systematically analyses the findings of the previous chapters into more concrete documentation. This includes the breakdown of the needed services of the DOME platform and of the operational processes (Chapter 4) into actual features (i.e., 'functions') to be implemented. Then, the stakeholder requirements (Chapter 2) and DOME strategic objectives (Chapter 3) are classified and documented into structured requirements to be handed over to the implementation teams. The documentation starts by giving the overview of the DOME platform and its functions, at a logical level. Then the functional and non-functional, for different aspects, requirements are structurally documented.

5.1 Platform overview

5.1.1 User characteristics

The DOME platform involves several user roles that interact with the platform in distinct capacities. This provides a systematic division of the stakeholders, depending on how they are expected to use the platform. These roles include customers, providers, (federated) marketplace operators, and administrators.

Customer: Customers are the primary end users of the DOME platform, engaging with the platform to discover, select, negotiate, and manage services. They interact with the platform to explore the shared catalogue, evaluate service offerings, negotiate agreements, and manage their subscribed services.

Provider: (Qualified) providers utilise the DOME platform to list and manage their services, monitor performance, and engage with customers. They are responsible for publishing their service offerings to the shared catalogue, managing service configurations, monitoring service performance, and establishing communication channels with customers. This role includes any kind of user / organisation that provides services, not only those of cloud services, but also value-added services, such as compliance, legal, integration, etc.

(Federated) Marketplace Operator: Marketplace operators serve as aggregating gateways, connecting sector-specific service providers to a broad range of potential customers. They facilitate the operation of federated marketplaces, curate service offerings and ensure compliance with regulations.

Administrator: Administrators are tasked with the operation and maintenance of the DOME platform, addressing technical and operational issues. They maintain the platform infrastructure, ensure system availability, perform updates and maintenance tasks, and provide support to customers, providers, and marketplace operators. **Support personnel** is a sub-role with less privileges that refers to the DOME operational personnel that provides user support.

Any User and **Authenticated User**: This is used as an abstract role for features that are relevant either to all users (Any User) or to all of the logged in roles above (Authenticated User). Unless explicitly stated the opposite, requirements associated with this role are applicable to all of the above roles as well.

The traceability of the identified stakeholders into the above user roles is given below:

Stakeholder class	User roles
Customers	Customer
Providers	Provider
DOME operator and broker	Administrator
Supervisory and governance bodies	Customer (by default, in order to inspect the platform)
Marketplaces	(Federated) Marketplace Operator
Third-party services	N/A (not platform end-users) / Provider (in case they offer value-added services)

5.1.2 Platform context

According to the available technologies and the DOME strategic objectives, as well as the stakeholder expectations and operational processes to address, a logical representation of the platform to implement is given in this paragraph.

DOME marketplace is a web-based platform that serves as a network of federated marketplaces, including the DOME portal as one of these federated marketplaces, connecting customers with providers of cloud and edge services. The platform involves a number of different elements to enable the seamless access and integration of services that come from different providers and marketplaces. A logical representation of the DOME platform is given in Figure 7 (more details will be defined in DOME deliverable D3.1) and consists of the following groups:

- Portal: The basic user-oriented features of DOME marketplace, which users are expected to use when directly using DOME as a marketplace.
- Third-party services: Supporting components that enable advanced features.
- Persistence layer: the main decentralised backend service to enable the sharing features of services across the DOME federation.

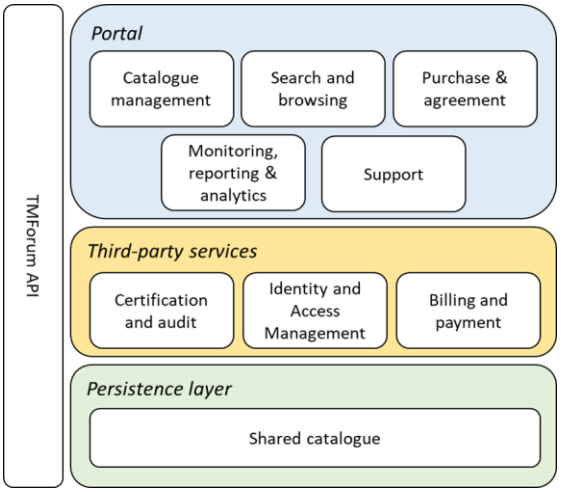

Figure 7: Logical representation of the DOME system building blocks

The more detailed building blocks, which will be traced for each requirement in the requirements catalogue, are identified as follows (Figure 7):

- **B1- Catalogue management**: manages catalogue of service/resources/product specifications and offerings.
- **B2 - Search and browsing**: exposes functionalities to search and browse offerings, either through structured queries or via natural language inquiries. Includes ranking and customisation of the result set, depending on user preferences, domain, similarities, etc.
- **B3 - Purchase & agreement**: provides brokerage services for procurement and placing orders.
- **B4 - Monitoring, reporting & analytics**: provides business monitoring functionalities.
- **B5 - Support**: includes features for providing user support.
- **B6 - Certification and audit**: ensures that providers and products meet compliance standards. It also tra
- **B7 - Identify and Access Management**: enables the trusted operation with the platform without requiring a central entity intermediating in all interactions.
- **B8 - Billing and payment**: manages the setup of billing per offering and the payment for services through DOME.
- **B9 - Shared catalogue**: manages indexing, storage of and access to information associated with a) the shared catalogue of product specifications and product offerings defined by service providers, and b) product orders and products along their lifecycle, as well as information about actual usage of products.
- **B10 - TMForum API**: APIs, following the TMForum specification, for interacting with external systems and the federated marketplaces.

5.1.3 Platform functions

A logical division of the DOME platform functions is given in this paragraph. Each process (paragraph 4.1) is systematically broken down into actual functions that the DOME platform needs to implement in order to effectively support these processes, taking also into account the stakeholder expectations (Chapter 2) and DOME strategic plans (Chapter 3), as well as

support where needed the policies established in paragraph 4.2. These serve as high-level descriptions of features that address the above findings, and in which the relevant detailed requirements are grouped.

Figure 8 illustrates in a use case diagram the way users are expected to interact with the DOME platform. In order to keep the image clean, details on the level or local features that are used per role are simplified.

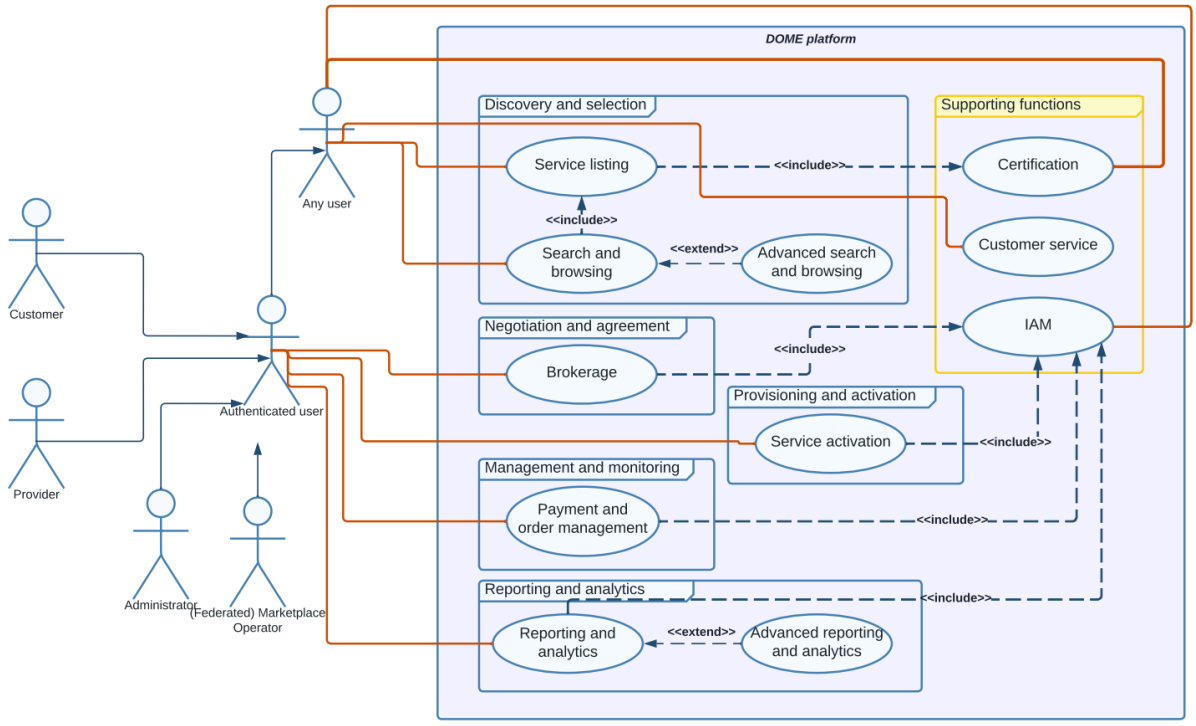

Figure 8: Use case diagram depicting how the users are expected to interact with DOME

The main platform functions, grouped according to the most relevant processes described previously, are:

- PROC-1. Discovery and selection
  - FUNC-1.1. **Service listing**: support listing of services available in the DOME ecosystem.
  - FUNC-1.2. **Search & browsing**: enable search of services through structured queries, as well as filtering and sorting of service offerings based on criteria such as price, performance, provider reputation, and compliance standards.
  - FUNC-1.3. **Advanced search & browsing**: Implements advanced searching through natural language processing, ranking and customization of search results based on user preferences, domain relevance, similarities, and other factors.
- PROC-2. Negotiation and agreement
  - FUNC-2.1. **Brokerage:** manage and track negotiation discussions, including the ability to exchange messages and documents securely (referring to interaction between a Customer and a Provider).Capture and store/record the agreed-upon terms and conditions in a transparent and auditable manner.
- PROC-3. Provisioning and activation

  - FUNC-3.1. **Service activation**: Coordinate the communication and integration with service providers' systems to initiate service provisioning. Facilitate the activation process by providing necessary configurations, access credentials, and instructions to customers.
- PROC-4. Management and monitoring
  - FUNC-4.1. **Payment and order management**: Allow customers to view and update service configurations, access control settings, and billing information. Alerting and notification mechanisms to inform customers about critical events or service disruptions
- PROC-5. Reporting and analytics
  - FUNC-5.1. **Reporting and analytics**: Provide dashboards and visualisations to enable insights into service consumption and optimise decision-making.
  - FUNC-5.2. **Advanced reporting and analytics**: Support customisation of analytics dashboard, historical data and personalised visualisations.
- Supporting functions
  - FUNC-6.1. **Certification**: Assure that services offered in catalogue are duly certified.
  - FUNC-6.2. **Customer service**: Provide support to the platform users, including conflict resolution.
  - FUNC-6.3. **IAM**: Advanced Identity and Access Management

5.2 Functional requirements

The requirements are documented according to the following format:

ID <ID>	**Function(s)** <related function(s)>	**Source**
Title <Requirement description>		
DOME blocks <related DOME blocks, B1 to B10, as in 5.1.1>		

The requirement description follows the format:

(While <operational condition>), the <user/system> <must/should/could/won't have> be able to <capability>.

Where the **priority** is specified according to the MoSCoW method [17], i.e. integrated on the verb that is used in the statement following the format above (*must/should/could/won't have)*:

- Must: Critical, part of the minimum usable product.
- Should: Important, but not necessary.
- Could: Desirable, mostly for enhancing user experience or customer satisfaction.
- Won't (have): For the avoidance of doubt, specifies a feature that will not be implemented.

A summary of the requirements classified by the above format is also given in Annex C.

The source of each requirement can be as follows (can be more than one):

- Identified feature, derived from stakeholder expectation with ID STA-1 to STA-11, as summarised in paragraph 2.6.2.

- Identified by DOME supporting requirements needed for the platform implementation (i.e., supporting or core requirement), indicated with the ID 'CORE'.
- Derived from another requirement, in this case the source requirement ID is indicated.

The indication '-NV' refers to features that are not 'core' and their priority will be validated with external stakeholders, in the follow-up activities.

Additional statements may be appended to requirements, in order to provide clarifications or examples of implementation. The format of the additional statements is "*<item> may <clarification>"*.

An additional simplified summary of the features, along with traceability to [1], catalogued requirements and stakeholders, is also given in Annex D.

5.2.1 Discovery and selection

ID RQ-01	**Function(s)** FUNC-1.1	**Source** STA-6
List of services Any User must be able to view the list of services that are available for provisioning in DOME. The list may be in the form of a detailed text list or in the form of UI 'cards' [16].		
DOME blocks B1, B2, B9		

ID RQ-01-01	**Function(s)** FUNC-1.1	**Source** RQ-01
List a service – provider The provider must be able to add a service for provisioning in DOME. The service addition may be done either by using the DOME Web User Interface, or by using an API.		
DOME blocks B1, B7, B6, B9, B10		

ID RQ-01-02	**Function(s)** FUNC-1.1	**Source** RQ-01
List a service – marketplace operator The marketplace operator must be able to add in DOME a service for listing, by utilising an API. The API must follow the TMForum APIs standard. [2]		
DOME blocks B1, B7, B6, B9, B10		

ID RQ-01-03	**Function(s)** FUNC-1.1	**Source** RQ-01
List a service – administrator delete The administrator must be able to remove (delete) a service from the list of services.		
DOME blocks B1, B7, B9		

ID RQ-02	**Function(s)** FUNC-1.1	**Source** STA-6-NV
List of services – list information While viewing the list of services, Any User should be able to view at least a) service image, b) the service summary, c) the name of the service provider, d) the service domain, e) the overall rating and f) the indicative price, for each service, g) related services (e.g., migration, substitution, dependencies), h) lifecycle status ('in study', 'in design', 'in test', 'active', 'rejected', 'launched', 'retired' or 'obsolete'), i) product catalogue title, in the respective list entry.		

DOME blocks B1, B2, B9

ID RQ-02-01	**Function(s)** FUNC-1.1	**Source** RQ-02, RQ-04
List a service – provider data entry The provider should be able to enter for a service at least a) an illustrative image, b) the service summary, c) the service domain, d) the price, e) detailed description, f) use cases/success stories, g) related services (e.g., migration, substitution, dependencies), and h) criteria for publishing the service in different marketplaces (at least geographical, domain, time-based, legal, compliance, specific marketplaces), i) Lifecycle status ('in study', 'in design', 'in test', 'active', 'rejected', 'launched', 'retired' or 'obsolete'), k) visibility criteria (based on customer profile), l) product catalogue title. The data entry may be done also after the service has been published in the DOME list of services (edit).		
DOME blocks B1, B6, B7, B9		

ID RQ-02-02	**Function(s)** FUNC-1.1	**Source** RQ-02, RQ-04, RQ-01-02, RQ-13
List a service – marketplace operator data entry The marketplace operator should be able to provide for each service at least a) service image, b) the service summary, c) the service domain, d) the indicative price, e) detailed description, f) use cases/success stories and, g) the name of the service provider, h) related services (e.g., migration, substitution, dependencies), and i) service page on the federated marketplace, j) criteria for publishing the service in different marketplaces (at least geographical, domain, time-based, legal, compliance, specific marketplaces), k) Lifecycle status ('in study', 'in design', 'in test', 'active', 'rejected', 'launched', 'retired' or 'obsolete'), l) visibility criteria (based on customer profile), m) product catalogue title.		
DOME blocks B1, B6, B7, B9		

ID RQ-03	**Function(s)** FUNC-1.1	**Source** STA-6
Service page Any User must be able to view a page with more information, in respect to the list of services, about each service.		
DOME blocks B1, B2, B9		

ID RQ-04	**Function(s)** FUNC-1.1	**Source** STA-6-NV
Service page - information While viewing the service page, Any User should be able to view at least: a) service image, b) the service summary, c) the name of the service provider, d) the service domain, e) the overall rating, f) the indicative price, g) detailed description, h) details of the ratings/reviews, i) source of the service (name of federated marketplace or DOME), j) use cases/success stories, and k) related services (e.g., migration, substitution, dependencies), l) Lifecycle status ('in study', 'in design', 'in test', 'active', 'rejected', 'launched', 'retired' or 'obsolete'), m) product catalogue title		
DOME blocks B1, B2, B9		

ID RQ-21	**Function(s)** FUNC-1.1	**Source** STA-6, STA-8, STA-11
Federated marketplace listing The marketplace operator should be able to define the acceptance criteria (at least geographical, domain, time-based, legal, compliance, specific marketplaces) for publishing a service listed in DOME to their federated marketplace.		

Acceptance criteria refer to a set of conditions that a service published in DOME needs to adhere to, so as to be re-published in the federated marketplace.
DOME blocks B1, B9

ID RQ-21-01	**Function(s)** FUNC-1.1	**Source** RQ-21
Show in federation The provider should be able to define the acceptance criteria (at least geographical, domain, time-based, legal, compliance, specific marketplaces) for (re)publishing a service listed in DOME to the federated marketplaces that participate in the DOME federation. Acceptance criteria refer to a set of conditions that a service published in DOME needs to adhere to, so as to be re-published in the federated marketplace.		
DOME blocks B1, B9		

ID RQ-23	**Function(s)** FUNC-1.1	**Source** STA-6
Provider list Any User must be able to view the list of providers that have at least one service listed.		
DOME blocks B1, B2, B9		

ID RQ-24	**Function(s)** FUNC-1.1	**Source** STA-6-NV
Provider profile While viewing the list of providers, Any User should be able to view the profile of each listed provider, including at least a) name, b) summary, c) domains, d) overall rating (aggregated from listed service), e) detailed description, f) list of offered services (links to service pages), g) use cases/success stories (aggregated from listed services), h) linked federated marketplace (if applicable)		
DOME blocks B1, B2, B9		

ID RQ-64	**Function(s)** FUNC-1.1	**Source** STA-6-NV
Leave rating While there is a service contract between a Customer and a Provider, the Customer should be able to leave one rating for the linked service listed in DOME. The rating may be in the form of 1 to 5 stars.		
DOME blocks B1, B2, B9		

ID RQ-05	**Function(s)** FUNC-1.2	**Source** STA-6
Filter by keyword Any User must be able to filter the services shown in the ‘Service list’ by using a key text (word or phrase). The phrase is searched in all the available fields of the services, and those that contain it are shown.		
DOME blocks B1, B2, B9		

ID RQ-06	**Function(s)** FUNC-1.2	**Source** STA-6
Filter by field Any User should be able to filter the services shown by each available service field.		
DOME blocks B1, B2, B9		

ID RQ-07	**Function(s)** FUNC-1.2	**Source** STA-6-NV
Filter by natural language Any User should be able to filter the services shown by using natural language queries, i.e., search by text semantics and not exact text.		

DOME blocks B1, B2, B9

ID RQ-20	**Function(s)** FUNC-1.2	**Source** STA-6-NV
Filter by tree Any User could be able to filter the services shown by using categories organised in tree structure.		
DOME blocks B1, B2, B9		

ID RQ-20-01	**Function(s)** FUNC-1.2	**Source** RQ-20
Filter by tree - categories The administrator could be able to define the titles and structure of the categories of the listed services.		
DOME blocks B1, B2, B9		

ID RQ-08	**Function(s)** FUNC-1.3	**Source** STA-6
Sorting - standard While viewing the list of services, Any User should be able to sort the services listed at least by a) title, b) name of the provider, c) overall rating, and d) indicative price.		
DOME blocks B1, B2, B9		

ID RQ-09	**Function(s)** FUNC-1.3	**Source** STA-6-NV
Sorting – relevant to me While viewing the list of services, the authenticated user could be able to sort the services listed by relevance to their profile. The relevance may be calculated based on the user's previous activity, purchased services, industry, domain, etc.		
DOME blocks B1, B2, B7, B9		

ID RQ-10	**Function(s)** FUNC-1.3	**Source** RQ-07, RQ-09
Sorting – Natural language While viewing the list of services and services are filtered by using natural language queries, Any User could be able to sort the services listed by relevance to their query.		
DOME blocks B1, B2, B9		

ID RQ-11	**Function(s)** FUNC-1.3	**Source** STA-6-NV
List of services - hide While viewing the list of services, the authenticated user could be able to hide a service from the list of services.		
DOME blocks B1, B2, B7, B9		

ID RQ-22	**Function(s)** FUNC-1.3	**Source** STA-6-NV
Suggestions While viewing the service page, the customer could be able to view other suggested services that are available in the service list. The suggestion of services may be based on the similarity of different service fields and on customer profile.		
DOME blocks B1, B2, B7, B9		

ID RQ-25	**Function(s)** FUNC-1.3	**Source** STA-6-NV

Private lists The customer could be able to define private lists that consist of listed services.
DOME blocks B1, B2, B8, B9

ID RQ-55	**Function(s)** FUNC-1.3	**Source** STA-7-NV
Simulate costs While the provider has provided metrics for billing, the customer could be able to simulate the total cost of a service based on defining values for these metrics.		
DOME blocks B1, B8, B9		

5.2.2 Negotiation and agreement

ID RQ-12	**Function(s)** FUNC-2.1	**Source** STA-10
Initiate message exchange While the customer is viewing a service, the customer should be able to initiate a message exchange with the respective service provider. The message exchange may be linked to the specific service from which it was initiated.		
DOME blocks B1, B3, B7, B9		

ID RQ-12-01	**Function(s)** FUNC-2.1	**Source** STA-10
Reply to message exchange While a customer has initiated a message exchange linked with a service, the provider should be able to participate in the message exchange. Participates include viewing and replying to the messages sent.		
DOME blocks B1, B3, B7, B9		

ID RQ-12-02	**Function(s)** FUNC-2.1	**Source** STA-10
Messages - files While a customer has initiated a message exchange linked with a service, the provider and the customer could be able to send and receive files within the messaging user interface.		
DOME blocks B1, B3, B7, B9		

ID RQ-13	**Function(s)** FUNC-2.1	**Source** STA-6, STA-8, STA-11
Access service at federated marketplace While viewing (a service page or a message exchange linked with a service) and the service is listed on a federated marketplace, the customer should be able to visit the service page on the federated marketplace. The visited page may be accessible or not, according to the specified marketplace policies.		
DOME blocks B1, B3, B7, B9		

ID RQ-14	**Function(s)** FUNC-2.1	**Source** STA-10
Make an offer While viewing a message exchange linked with a service and a customer, the provider could be able to upload an offer for the service, in the form of a contract.		
DOME blocks B1, B3, B7, B9		

ID RQ-14-01	**Function(s)** FUNC-2.1	**Source** RQ-14

Accept an offer While viewing a message exchange linked with a service and the provider has uploaded an offer (contract), the customer should be able to accept the contract. The actual contract template will be defined later during the DOME project.
DOME blocks B1, B3, B7, B9

ID RQ-14-02	**Function(s)** FUNC-2.1	**Source** RQ-14
Accept an offer - notification While the customer has accepted an offer (contract), the provider should be able to view a confirmation that the customer has accepted the offer.		
DOME blocks B1, B3, B7, B9		

ID RQ-14-03	**Function(s)** FUNC-2.1	**Source** STA-11
Instant buy While a service supports it, the customer must be able to instantly buy a service. The service may include preconfigured options.		
DOME blocks B1, B3, B7, B9		

ID RQ-14-04	**Function(s)** FUNC-2.1	**Source** STA-11
Multi-service order The customer should be able to select more than one service and combine them in one order. Services may be offered by different providers.		
DOME blocks B1, B3, B7, B9		

ID RQ-15	**Function(s)** FUNC-2.1	**Source** STA-8, STA-9
List of offers and contracts The customer and the provider should be able to view a list of their active offers and contracts.		
DOME blocks B1, B7, B9		

ID RQ-66	**Function(s)** FUNC-2.1	**Source** STA-10
Procurement processes management The customer should be able to create, configure and manage procurement processes. Procurement processes may be composed of standard activities that the customer configures to be included or not. Standard activities may include procurement needs creation, requests for proposals creation, setup of public or invite-only proposals, binding, eligibility check, evaluation, selection, negotiation, and contracting.		
DOME blocks B3, B6, B7		

ID RQ-66-01	**Function(s)** FUNC-2.1	**Source** STA-10
Invite in procurement The customer could be able to invite specific providers to participate with proposals in a procurement process.		
DOME blocks B3, B6, B7		

ID RQ-66-02	**Function(s)** FUNC-2.1	**Source** STA-10
Compare in procurement The customer could be able to compare side-by-side, and per specified need in a procurement, the proposals that providers have submitted.		

DOME blocks B3, B6, B7

ID RQ-66-03	**Function(s)** FUNC-2.1	**Source** STA-10
Accept proposal in procurement The customer should be able to accept at least one submitted proposal in a procurement process.		
DOME blocks B3, B6, B7		

5.2.3 Provisioning and activation

ID RQ-16	**Function(s)** FUNC-3.1	**Source** STA-8, STA-11
Contract activated While a contract offer has been accepted by the customer, the provider and the customer should be able to exchange messages, linked to the contract.		
DOME blocks B7, B9		

ID RQ-17	**Function(s)** FUNC-3.1	**Source** STA-9, STA-11
Configuration for active contract While a contract offer has been accepted by the customer, the customer could be able to send to the provider documents and files that are required for the activation of the service.		
DOME blocks B7, B9		

ID RQ-45	**Function(s)** FUNC-3.1	**Source** STA-8
Confirmation of active service While a contract offer has been accepted by the customer, the provider could be able to confirm that the service is ready for use.		
DOME blocks B7, B9		

5.2.4 Management and monitoring

ID RQ-18	**Function(s)** FUNC-4.1	**Source** STA-11
Service monitoring - inventory The customer must be able to view a list of all their active services.		
DOME blocks B7, B9		

ID RQ-35	**Function(s)** FUNC-4.1	**Source** STA-2, STA-7
e-wallet access The authenticated user must be able to access his/her e-wallet, which stores at least a cryptographic key and transactional history. The e-wallet may also contain bank information, linked with a 'customer' or 'provider' profile in which the authenticated user has appropriate access level. Transactional history refers to transactions related to the 'customer' or 'provider' profile in which the authenticated user has appropriate access level.		
DOME blocks B7, B9		

ID RQ-47	**Function(s)** FUNC-4.1	**Source** STA-7
Billing metrics The provider should be able to submit the data metrics used for billing.		

Data metrics are used to bill cloud services and refer to data that is available in the provider's data stores. These metrics may include data transfer volume, storage usage, computing resources used, network bandwidth used, request count, uptime, licence use, connected devices count, data processing volume, or other specialised metrics.
DOME blocks B3, B4, B8, B9

ID RQ-49	**Function(s)** FUNC-4.1	**Source** STA-7
Invoice While the customer has proceeded with a payment, the provider should be able to submit the payment receipt to the customer.		
DOME blocks B7, B8, B9		

ID RQ-50	**Function(s)** FUNC-4.1	**Source** STA-7
Recurring payment The customer should be able to set up banking information along with rules/parameters for authorisation for recurring charges.		
DOME blocks B7, B8, B9		

ID RQ-52	**Function(s)** FUNC-4.1	**Source** STA-7
Billing tracking While the provider has submitted metrics for billing, the system should be able to use the metrics to calculate an estimation of the customer billing and DOME revenue. The billing may be based on alternative pricing models, such as a) fixed price, b) Usage-based pricing, c) Hybrid or average pricing, d) Pay-as-you-go pricing, e) Freemium pricing.		
DOME blocks B7, B8, B9		

ID RQ-19	**Function(s)** FUNC-4.1	**Source** STA-9-NV, STA-11
Service monitoring - review The customer must be able to view an active service page, which includes at least a) The service title, b) The service provider, c) the contract, d) the summary of the service, e) the specific characteristics of the service, f) the configuration applied, g) the resources allocated to the service, and h) the pricing model, i) the billed amount.		
DOME blocks B7, B9		

ID RQ-53	**Function(s)** FUNC-4.1	**Source** STA-7-NV
Billing list The authenticated user should be able to view a list of all the billed charges, including for each billed item at least a) the related service, b) the related active contract, c) the charged amount, d) the date of the charge, e) the dates on which the billed amount corresponds, f) the pricing model, g) the details of how the billed amount was calculated, h) the entity where the amount was deposited, i) the receipt.		
DOME blocks B7, B8, B9		

ID RQ-54	**Function(s)** FUNC-4.1	**Source** STA-7
Billing list - filter The authenticated user should be able to filter the items listed in the billing list, by using criteria for any of the available item fields.		

DOME blocks B7, B9

ID RQ-58	**Function(s)** FUNC-4.1	**Source** STA-2, STA-7
Revoke payment While there is an active recurring payment, the customer must be able to revoke the authorization for the recurring payment.		
DOME blocks B7, B9		

ID RQ-41	**Function(s)** FUNC-4.1	**Source** STA-7
Direct payment The customer should be able to pay their recurring and one time billed payments. The payment methods may include payment gateways, bank transfer, etc.		
DOME blocks B7, B8, B9		

ID RQ-41-01	**Function(s)** FUNC-4.1	**Source** STA-7
Direct payment The customer should be able to store the information of at least one preferred payment method.		
DOME blocks B7, B8, B9		

ID RQ-39	**Function(s)** FUNC-4.1	**Source** STA-7
Billing configuration The provider should be able to set up billing and payment notifications for an active contract.		
DOME blocks B7, B8, B9		

ID RQ-40	**Function(s)** FUNC-4.1	**Source** STA-7
Billing notifications The customer should be able to view billing and payment notifications for their active contracts.		
DOME blocks B7, B8, B9		

ID RQ-56	**Function(s)** FUNC-4.1	**Source** STA-7
Failed payment alert The customer should be able to view a notification if a payment, either recurring or one-time, has failed.		
DOME blocks B7, B8, B9		

ID RQ-57	**Function(s)** FUNC-4.1	**Source** STA-7
Payment method to expire While there is an active recurring payment and the payment method is going to expire in less than 3 months, the customer could be able to view a notification that the payment method is going to expire.		
DOME blocks B7, B8, B9		

ID RQ-19-01	**Function(s)** FUNC-4.1	**Source** STA-9, STA-11
Service management - update configuration While viewing an active service page, the customer should be able to update the configuration applied.		
DOME blocks B7, B9		

ID RQ-51	**Function(s)** FUNC-4.1	**Source** STA-2, STA-9, STA-11
Service management - contract cancellation While at least 1 contract is active, the authenticated user must be able to request a contract for cancellation.		
DOME blocks B7, B8, B9		

ID RQ-51-01	**Function(s)** FUNC-4.1	**Source** STA-2, STA-3, STA-9, STA-11
Service management - contract cancellation - requested While at least 1 contract is active and the other party of the service has requested a contract cancellation, the authenticated user must be able to confirm or flag the contract cancellation.		
DOME blocks B7, B8, B9		

ID RQ-51-02	**Function(s)** FUNC-4.1	**Source** STA-2, STA-3, STA-9, STA-11
Service management - contract cancellation - flagged While a contract cancellation is flagged, the system should launch a conflict resolution process ticket.		
DOME blocks B5, B7, B8, B9		

ID RQ-65	**Function(s)** FUNC-4.1	**Source** CORE
Service management The system won't have comprehensive service management functions, including starting, stopping, extending, updating, automatically configuring, installing and deploying services. These functions are out of the scope of DOME and the provider must be responsible for providing and managing such functions.		
DOME blocks -		

5.2.5 Reporting and analytics

ID RQ-46	**Function(s)** FUNC-5.1	**Source** STA-5
Metrics for service monitoring The provider could be able to submit filled-in forms for data access that correspond to service monitoring metrics. The template may include a) database access information, b) dataset definition, c) metrics titles, d) metrics queries, e) recommended visualisation type		
DOME blocks B4, B9		

ID RQ-48	**Function(s)** FUNC-5.1	**Source** STA-5
Metrics review The authenticated user must be able to view visualisations of the data and metrics that have been defined by the providers, for the service data he/she has access to.		
DOME blocks B4, B7, B9		

ID RQ-36	**Function(s)** FUNC-5.1	**Source** STA-5-NV
Service trends The provider must be able to view data analytics on their listed services, including at least the latest viewed, and the most viewed.		
DOME blocks B1, B2, B4, B7, B9		

ID RQ-37	**Function(s)** FUNC-5.1	**Source** STA-5-NV
Service orders The authenticated user must be able to view data analytics on their ordered services, including at least the number of orders, number of active/completed, and billing.		
DOME blocks B1, B2, B3, B4, B7, B8, B9		

ID RQ-59	**Function(s)** FUNC-5.1	**Source** STA-5-NV
Service orders The provider must be able to view data analytics on data indicators which are specified by the administrator. These indicators may include the number of incidents reported and resolved, time the user spends using a service, provider response time.		
DOME blocks B4, B5, B7, B9		

ID RQ-60	**Function(s)** FUNC-5.2	**Source** STA-5
Dashboard customisation While the authenticated user has access to at least one dataset in the monitoring dashboard, the authenticated user should be able to manage (create, edit, remove) visualisation dashboards with the datasets he/she has access to. Visualisation dashboard may include the definition of metrics, charts and chart types, modification of SQL queries, size and positioning of graphical elements.		
DOME blocks B4, B7, B9		

ID RQ-61	**Function(s)** FUNC-5.2	**Source** STA-5
Dashboard share The authenticated user could be able to specify access (view or edit) for their visualisation dashboards to another authenticated user.		
DOME blocks B4, B7		

ID RQ-61-01	**Function(s)** FUNC-5.2	**Source** STA-3
Dashboard share admin The administrator must be able to specify access (view or edit) for all the visualisation dashboards to an authenticated user.		
DOME blocks B4, B7		

ID RQ-62	**Function(s)** FUNC-5.2	**Source** STA-5
Dataset share The authenticated user could be able to specify access (view or edit) for their datasets to another authenticated user.		
DOME blocks B4, B7		

ID RQ-62-01	**Function(s)** FUNC-5.2	**Source** STA-5
Dataset share admin The administrator must be able to specify access (view or edit) for all the available datasets to an authenticated user.		
DOME blocks B4, B7		

5.2.6 Supporting functions

ID RQ-31	**Function(s)** FUNC-6.1	**Source** STA-2
Provider qualification While the provider has not been qualified, the provider should be able to submit to the administrator at least 1 document (e.g., ID, country-dependent personal documents, billing documents, and company documents if applicable) for passing the qualification process. The actual qualification conditions and process may be defined at a later stage, when the methodological framework has been concretely defined (deliverable D4.2, in M18). The qualification may refer to either the provider or a specific service.		
DOME blocks B7		

ID RQ-31-01	**Function(s)** FUNC-6.1	**Source** STA-2
Provider qualification – admin view The administrator should be able to view the list of providers qualification status and the respective documents submitted in DOME.		
DOME blocks B7		

ID RQ-31-02	**Function(s)** FUNC-6.1	**Source** STA-2
Provider qualification – admin action The administrator could be able to manage the qualification status of the providers, as ‘Qualified’, ‘Not qualified’, ‘Further documentation required’, ‘Waiting for assessment’.		
DOME blocks B7		

ID RQ-31-03	**Function(s)** FUNC-6.1	**Source** STA-2
Provider qualification – admin note The administrator could be able to add notes for the provider in the qualification status list. The notes may be in the format of text.		
DOME blocks B7		

ID RQ-63	**Function(s)** FUNC-6.1	**Source** STA-2
Flag a service or provider The authenticated user must be able to flag a service and a provider to report a breach of terms and conditions or noncompliance.		
DOME blocks B1, B2, B5, B6, B7, B9		

ID RQ-34	**Function(s)** FUNC-6.1	**Source** STA-1, STA-2
Manage certificates The authenticated user must be able to manage (add, delete, update) their certificates. The certificates may include proof of compliance to GDPR, EUCS, ISO standards, etc.		
DOME blocks B6, B7		

ID RQ-42	**Function(s)** FUNC-6.2	**Source** STA-2
Conflict resolution launch The authenticated user must be able to launch a conflict resolution process ticket for an active contract. A conflict may refer to a complaint, an open dispute, a SLA breach, etc., related to a service that has been purchased through DOME.		
DOME blocks B5, B7, B8, B9		

ID RQ-43	**Function(s)** FUNC-6.2	**Source** STA-2, STA-3
Conflict resolution admin The administrator must be able to view and manage (arbitrate, send messages and files, put on-hold, close) all the launched conflict resolution process tickets.		
DOME blocks B5, B7, B8, B9		

ID RQ-44	**Function(s)** FUNC-6.2	**Source** STA-2
Conflict resolution messages While there is at least 1 open linked conflict resolution process, the authenticated user must be able to send messages and files to the administrator.		
DOME blocks B5, B7, B8, B9		

ID RQ-38	**Function(s)** FUNC-6.2	**Source** STA-3
Chatbot Any User should be able to exchange messages with a chatbot, which provides predefined responses to frequently asked questions.		
DOME blocks B5		

ID RQ-38-01	**Function(s)** FUNC-6.2	**Source** STA-3
Chatbot - setup The support personnel should be able to set up the predefined question terms and the text of the responses of the chatbot.		
DOME blocks B5		

ID RQ-28	**Function(s)** FUNC-6.2	**Source** STA-2, STA-3
Ticketing The authenticated user should be able to submit a support ticket. Support tickets are managed by the support personnel.		
DOME blocks B5		

ID RQ-26	**Function(s)** FUNC-6.3	**Source** STA-1
User registration The authenticated user must be able to register at least one customer or provider profile. After creating the relevant profile, authenticated user may use the platform as a ‘Customer’ or as a ‘Provider’. The ‘customer’ or ‘provider’ profile may refer to an organisation, private or public. Specifically for the ‘provider’ the default status is ‘not qualified’ to be visible in the catalogue. See PR-26-01 for qualification. There is not a customer or provider profile for individuals.		
DOME blocks B7, B9		

ID RQ-26-01	**Function(s)** FUNC-6.3	**Source** STA-1, STA-2
eIDAS registration Any User should be able to use eIDAS [15] advanced or qualified signatures and seals to identify themselves.		
DOME blocks B7, B9		

ID RQ-26-07	**Function(s)** FUNC-6.3	**Source** STA-1, STA-2
Legacy registration		

Any User should be able to use legacy methods to identify themselves. 'Legacy methods' may include use of username and password.
DOME blocks B7, B9

ID RQ-27	**Function(s)** FUNC-6.3	**Source** STA-1
Select interaction While at least two customer, provider or marketplace operator profiles are linked with the user, the authenticated user must be able to select the perspective (customer, provider, Marketplace operator) which he/she is currently using the system. Referring to the 'perspective', after the selection the user uses the system as a customer, provider or marketplace operator respectively.		
DOME blocks B7, B9		

ID RQ-29	**Function(s)** FUNC-6.3	**Source** STA-1
Invite user to profile While at least one customer, provider or marketplace operator profile is linked with the user's account, the authenticated user should be able to add Any User or authenticated user to one of the linked profiles by filling the invitee's email address. Access to the function may be further limited by profile-level authorisation levels, i.e. only the 'Administrator' of the profile may access this function.		
DOME blocks B7, B9		

ID RQ-29-01	**Function(s)** FUNC-6.3	**Source** STA-1
Invite user to profile - email While an authenticated user adds an anonymous or authenticated user to one of the linked profiles, the system must be able to send an email to the invitee, which includes at least a) the name of the authenticated user that sends the invite, b) the customer, provider or marketplace operator profile name, c) a link to register. Access to the function may be further limited by profile-level authorisation levels, i.e. only the 'Administrator' of the profile may access this function.		
DOME blocks B7, B9		

ID RQ-30	**Function(s)** FUNC-6.3	**Source** STA-1
Cancel invitation While at least one customer, provider or marketplace operator profile is linked with the user's account and the authenticated user has sent an invitation to add an anonymous or authenticated user to one of the linked profiles, the authenticated user should be able to cancel the invitation. Access to the function may be further limited by profile-level authorisation levels, i.e. only the 'Administrator' of the profile may access this function.		
DOME blocks B7, B9		

ID RQ-32	**Function(s)** FUNC-6.3	**Source** STA-1

Delete profile While at least one customer, provider or marketplace operator profile is linked with the user's account, the authenticated user must be able request the deletion of the respective profile. Access to the function may be further limited by profile-level authorisation levels, i.e. only the 'Administrator' of the profile may access this function.
DOME blocks B7, B9

ID RQ-32-01	**Function(s)** FUNC-6.3	**Source** STA-1
Delete profile – system check While the authenticated user has requested the deletion of a profile, the system should be able to validate the eligibility for deletion, including at least the existence of pending payments, active recurring payments, active conflicts and active contracts. The profile may not be deleted if there is at least one pending payment, active recurring payment, active conflict or active contract. If the profile is not eligible for deletion, the authenticated user must be able to view the respective informative message.		
DOME blocks B5, B7, B8, B9		

ID RQ-32-02	**Function(s)** FUNC-6.3	**Source** STA-1
Delete profile - admin While the authenticated user has requested the deletion of a profile and the profile is eligible for deletion, the administrator must be able to approve the deletion of the respective profile. After the deletion, all the respective data must be archived and retained according to the administrator's data policy and GDPR.		
DOME blocks B7		

ID RQ-33	**Function(s)** FUNC-6.3	**Source** STA-1
Select interaction While at least one customer, provider or marketplace operator profile is linked with the user's account, the authenticated user must be able to delete the respective profile.		
DOME blocks B7		

5.3 Usability requirements

ID UX-29	**Function(s)** -	**Source** RQ-29
Invitation to Any User While the authenticated user has sent an invitation for adding Any User to a linked customer, provider or marketplace operator profile, the system must link the invitee's email to the respective profile.		

ID UX-29-01	**Function(s)** -	**Source** RQ-29
Invite user to profile - email While Any User clicks the link included in the invitation email, the system could be able to pre-fill Any User's email address in the registration page.		

ID UX-NA-01	**Function(s)** -	**Source** STA-1, STA-4
Use from federated marketplace While the authenticated user uses their identity from a federated marketplace, the authenticated user should be able to view the federated marketplace logo and link back.		

ID UX-NA-02	**Function(s)** -	**Source** CORE
Navigation Any User must be able to easily navigate into the DOME platform features. 'Easily' refers to clear and non-deep paths towards accessing each function [5], requiring no more than 3 clicks from the homepage to reach the said function.		

ID UX-NA-03	**Function(s)** -	**Source** CORE
Responsive design Any user must be able to use the system with various devices and screen sizes, including at least desktop computer, table and smartphone. 'Being able to use' refers to the responsiveness of the graphical user interface, which is adapted to the relevant screen size, and is rendered in a readable and usable manner.		

ID UX-NA-04	**Function(s)** -	**Source** CORE
User preferences The authenticated user should be able to manage their preferences of using the system. Preferences may include configurable aspects on the user interface, profile information, security preferences, communication preferences, etc.		

ID UX-NA-05	**Function(s)** -	**Source** CORE
Error messages While an error occurs, Any User must be able to view a clear and prompt notification, which includes concise and jargon-free information on the error description and suggestions on possible solutions to resolve the problem.		

ID UX-NA-06	**Function(s)** -	**Source** CORE
Error impact While an error occurs, Any User should be able to view information on the error impact, including at least how the currently used function may be affected, how data may be affected and any potential follow-up consequences.		

ID UX-NA-07	**Function(s)** -	**Source** CORE
Error impact While an error which is estimated that it cannot be recovered by the user occurs, Any User should be able to directly submit a support ticket, without the need to include all the technical details of the error. The system must attach the technical details of the error to the support ticket.		

ID UX-NA-08	**Function(s)** -	**Source** CORE
Walkthrough Any User could be able to view walkthrough information on using the system features. Walkthrough information may include textual, graphical, or a combination of the two, guidance.		

The specific features on which the walkthrough will be designed may be defined after testing the system and inspecting the locations where the users face the most significant challenges.

ID UX-NA-09	**Function(s)** -	**Source** CORE
Consistent experience Any User must be able to have a consistent user experience across the different sections and features. User experience includes how the actions are activated, branding, graphical elements, response of user actions like clicking on buttons, etc.		

ID UX-NA-10	**Function(s)** -	**Source** CORE
Completed actions While completing more complex actions, Any User must be able to view comprehensive success messages that confirm that the action has been completed successfully. 'Complex actions' may include those that go beyond simply browsing, such as submitting a form or other data, sending a message, submitting a support ticket, changing preferences, purchasing a service, etc.		

ID UX-NA-11	**Function(s)** -	**Source** DOME
Long loading time While a page takes more than 2 seconds to load, Any User could be able to view a notification on the progress of loading and estimated time to complete it. The notification may be in the form of graphical elements, textual, or a combination.		

ID UX-NA-12	**Function(s)** -	**Source** CORE
Error and notification preferences The authenticated user could be able to configure the detail level of the errors and notifications they receive. The 'detail level' may include 'Title', 'Description', 'More details'. The customisation may be configured per type of notification, including 'Error messages', 'Notifications', and 'Confirmation messages'.		

5.4 System interfaces

ID SI-21	**Function(s)** FUNC-1.1	**Source** RQ-21
Federated marketplace listing interface The system must be able to send services for listing to the federated marketplaces, following the TMForum standard APIs. [2] While the marketplace operator has defined a set of acceptance criteria, the system should send only the services that meet these criteria.		

ID SI-NA-01	**Function(s)** FUNC-5.1	**Source** STA-4
Export The authenticated user should be able to export and download their own and accessible data including at least profile data, order history, billing information, generated content and visualisation dashboards.		

The export format must be a widely used one like CSV or JSON.

ID SI-45	**Function(s)** FUNC-3.2	**Source** RQ-45
Activate service While an offer is accepted by the customer, the system must forward the activation request to the federated marketplace. The forward must include all the relevant information, at least potential configuration options, and payment receipt if applicable.		

ID SI-48		**Function(s)** FUNC-5.1	**Source** RQ-48
Metrics review – database access While the provider has defined service metrics, the system could be able to fetch the submitted datasets by connecting to the submitted database.			

ID SI-NA-02	**Function(s)** FUNC-5.1	**Source** STA-4
Dataset import The authenticated user could be able to import a dataset in csv format in their visualisation dashboard.		

ID SI-NA-03	**Function(s)** -	**Source** STA-1, STA-4, STA-8
Provider from federation While a service is listed via a federated marketplace (i.e. the provider does not participate directly in DOME), the provider should be able to use the DOME features by using their federated marketplace identity.		

ID SI-NA-04	**Function(s)** -	**Source** STA-4
Actions from federated marketplaces The system must be able to handle actions (API calls) originated from a federated marketplace following the TMForum standard APIs. [2]		

5.5 Platform security

ID SS-NA-01	**Function(s)** -	**Source** STA-1, STA-2
Legally supported features The system must implement identification and transaction features that allow the legally supported authentication of the user and authentication for performing relevant actions that need such legal supported identification. The identification may use the checks of user and transaction credentials verified by trusted 3rd-parties and credential issuers.		

ID SS-39	**Function(s)** FUNC-4.3	**Source** RQ-39
Billing configuration - secure The system must be able to provide 3D Secure Process for processing payments.		

ID SS-NA-02	**Function(s)** -	**Source** STA-1, STA-2
Authorisation While an external system (including any user) tries to access a protected (data or function), the system must validate that the external system or user has the appropriate access permissions.		

ID SS-NA-03	**Function(s)** -	**Source** STA-2
Encrypted transmission The system must encrypt all data transmitted, including at least user information, transaction data, and communications.		

ID SS-NA-04	**Function(s)** -	**Source** STA-1, STA-2
Authorisation per function The system must verify the authorisation of Any User or Authenticated user in using a function. If the user is not authorised to use a specific function, the system should display a relevant error message.		

ID SS-NA-05	**Function(s)** -	**Source** STA-2
Data integrity The system must implement mechanisms to ensure the integrity and immutability of the data stored and transmitted. The mechanisms may include implementation based on blockchain technologies.		

ID SS-NA-06	**Function(s)** -	**Source** STA-2
Secure infrastructure The system must be deployed on infrastructure that implements security and infrastructure monitoring tools. The infrastructure tools may include at least properly set up firewalls, Intrusion Detection Systems, Security Event Management Systems, etc.		

ID SS-NA-07	**Function(s)** -	**Source** STA-2
GDPR compliance The system must be end-to-end compliant with the GDPR. 'End-to-end' compliance refers to compliance at implementation and operational level, including technical and organisational measures.		

ID SS-NA-08	**Function(s)** -	**Source** STA-2
Secure file upload For any file uploaded to the platform, and by any means or method, the system should implement strict controls on verifying its security, including at least filetype check, size limit check and antivirus scan. Filetype check and size limit may be configured per specific case where the file upload is possible.		

5.6 Information management

ID IM-01-01	**Function(s)** FUNC-1.1	**Source** RQ-01-01
List a service – provider link While a provider adds a service in DOME, the system must link the added service with the provider.		

ID IM-01-02	**Function(s)** FUNC-1.1	**Source** RQ-01
List a service – marketplace operator link While a marketplace operator adds a service in DOME, the system must link the service with the federated marketplace and with the provider.		

ID IM-07	**Function(s)** FUNC-1.2	**Source** RQ-07
Filter The system should be able to extract semantic attributes of the listed services.		

ID IM-29		**Function(s)** -	**Source** RQ-21
Multiple users in profile A customer, provider or marketplace operator profile should be linked with at least one authenticated user. More than one authenticated user may be able to be linked to a customer, provider or marketplace operator profile.			

ID IM-NA-01	**Function(s)** -	**Source** STA-4, STA-11
Data federation The system must not duplicate data that is owned or managed by a federated marketplace. The system may duplicate data for ‘caching’ (short-term storage for quicker web service), but should provide data access with a ‘live’ fetch from the federated marketplace.		

ID IM-NA-02	**Function(s)** -	**Source** CORE
Gaia-X compatibility All the provider and service descriptions data must be compatible with the Gaia-X specifications.		

5.7 Operational policies

ID PR-14	**Function(s)** FUNC-2.2	**Source** RQ-14
Contract template While the provider submits an offer, the contract must be compatible with the DOME template contract.		

ID PR-26-01	**Function(s)** -	**Source** RQ-26
Visibility of added providers		

While the provider has not been qualified, the system must not list (make visible) the provider and the linked services in the relevant system features, including at least the list of providers and list of services. After the provider has been qualified the respective profiles and pages must be made visible. The provider may be qualified either by using trusted identification methods or by submitting relevant documentation.

ID PR-26-02	**Function(s)** -	**Source** RQ-26
Qualification review While the provider has submitted documentation for qualification, the administrator must be able to view the submitted documentation linked with the respective provider. The documentation may include proof of certification (e.g., EUCS) and other proof of the legitimacy of an organisation.		

ID PR-26-03	**Function(s)** -	**Source** RQ-26
Qualification acceptance While the provider has submitted documentation for qualification, the administrator must be able to accept the qualification of the respective provider. After the administrator has accepted, the provider becomes qualified.		

ID PR-26-04	**Function(s)** -	**Source** RQ-26
Qualification resubmit While the provider has submitted documentation for qualification, the administrator should be able to request from the provider the submission of more documents.		

ID PR-26-05	**Function(s)** -	**Source** RQ-26
Qualification acceptance While the provider has submitted documentation for qualification, the administrator must be able to accept the qualification of the respective provider. After the administrator has accepted, the provider becomes qualified.		

ID PR-26-06	**Function(s)** -	**Source** RQ-26
Agree to terms Any User must agree to the DOME terms of use before being able to register. For the Provider, this includes the agreement to the DOME shared revenue model and code of conduct.		

ID PR-26-07	**Function(s)** -	**Source** RQ-26
Legally supported ID While not already authenticated with a legally-supported identification method, the authenticated user should be able to upload at least one document that legally supports their identification.		

ID PR-26-08	**Function(s)** -	**Source** RQ-26
Legally supported ID – 3rd-party The authenticated user should be able to use 3rd-party services that provide legally supported person identification.		

ID PR-26-09	**Function(s)** -	**Source** RQ-26
ID review While the authenticated user has submitted documentation for identification, the administrator must be able to view the submitted documentation linked with the respective user.		

ID PR-26-10	**Function(s)** -	**Source** RQ-26
ID acceptance While the authenticated user has submitted documentation for identification, the administrator must be able to accept the identification of the respective user. After the administrator has accepted, the provider becomes legally identified.		

ID PR-26-11	**Function(s)** -	**Source** RQ-26
ID resubmit While the authenticated user has submitted documentation for identification, the administrator should be able to request from the user the submission of more documents.		

ID PR-44	**Function(s)** FUNC-4.2	**Source** RQ-44
Conflict resolution messages between users While a conflict resolution process ticket is open, the authenticated users must communicate only with the administrator and support personnel and vice-versa.		

ID PR-45	**Function(s)** -	**Source** CORE
Service Execution Policies The system won't manage service execution policies for the services listed. Service Execution Policies must be managed by the respective provider. DOME may monitor but won't manage the execution itself.		

6 Conclusions

6.1 Traceability of desired features to functions

Each of the documented requirements above is traced to its respective stakeholder expectation. There reversed traceability (from stakeholder expectation to platform functions and requirements) table is given below:

STA-1 Unified identity management

Relevant function(s):

- FUNC-6.3 IAM: Advanced Identity and Access Management

Relevant requirements implementing the high-level expectation:

- RQ-26 - The authenticated user must be able to register at least one customer or provider profile.
- RQ-26-01 - Any User should be able to use eIDAS advanced or qualified signatures and seals to identify themselves.
- RQ-27 - While at least two customer, provider or marketplace operator profiles are linked with the user, the authenticated user must be able to select the perspective (customer, provider, Marketplace operator) which he/she is currently using the system.
- RQ-29 - While at least one customer, provider or marketplace operator profile is linked with the user's account, the authenticated user should be able to add an anonymous or authenticated user to one of the linked profiles by filling the invitee's email address.
- RQ-29-01 - While an authenticated user adds an anonymous or authenticated user to one of the linked profiles, the system must be able to send an email to the invitee, which includes at least a) the name of the authenticated user that sends the invite, b) the customer, provider or marketplace operator profile name, c) a link to register.
- RQ-30 - While at least one customer, provider or marketplace operator profile is linked with the user's account and the authenticated user has sent an invitation to add an anonymous or authenticated user to one of the linked profiles, the authenticated user should be able to cancel the invitation.
- RQ-32 - While at least one customer, provider or marketplace operator profile is linked with the user's account, the authenticated user must be able request the deletion of the respective profile.
- RQ-32-01 - While the authenticated user has requested the deletion of a profile, the system should be able to validate the eligibility for deletion, including at least pending payments, active recurring payments, active conflicts and active contracts.
- RQ-32-02 - While the authenticated user has requested the deletion of a profile and the profile is eligible for deletion, the administrator must be able to approve the deletion of the respective profile.
- RQ-33 - While at least one customer, provider or marketplace operator profile is linked with the user's account, the authenticated user must be able to delete the respective profile.
- RQ-43 - The administrator must be able to view and manage (arbitrate, send messages and files, put on-hold, close) all the launched conflict resolution processes.

- UX-29 - While the authenticated user has sent an invitation for adding Any User to a linked customer, provider or marketplace operator profile, the system must link the invitee's email to the respective profile.
- UX-29-01 - While Any User clicks the link included in the invitation email, the system may be able to pre-fill Any User's email address in the registration page.
- UX-NA-01 - While the authenticated user uses their identity from a federated marketplace, the authenticated user should be able to view the federated marketplace logo and link back.
- SI-NA-03 - While a service is listed via a federated marketplace (i.e. the provider does not participate directly in DOME), the provider should be able to use the DOME features by using their federated marketplace identity.
- SS-NA-01 - The system must implement identification and transaction features that allow the legally supported authentication of the user and authentication for performing relevant actions that need such legal supported identification.
- SS-NA-02 - While an external system (including any user) tries to access a protected (data or function), the system must validate that the external system or user has the appropriate access permissions.
- SS-NA-04 - The system must verify the authorisation of Any User or Authenticated user in using a function.
- PR-26-01 - While the provider has not been qualified, the system must not list (make visible) the provider and the linked services in the relevant system features, including at least the list of providers and list of services.
- RQ-26-02 - While the provider has submitted documentation for qualification, the administrator must be able to view the submitted documentation linked with the respective provider.
- RQ-26-03 - While the provider has submitted documentation for qualification, the administrator must be able to accept the qualification of the respective provider.
- RQ-26-04 - While the provider has submitted documentation for qualification, the administrator should be able to request from the provider the submission of more documents.
- RQ-26-05 - While the provider has submitted documentation for qualification, the administrator must be able to accept the qualification of the respective provider.
- RQ-26-06 - Any User must agree to the DOME terms of use before being able to register.
- RQ-26-07 - Any User should be able to use legacy methods to identify themselves.
- PR-26-07 - While not already authenticated with a legally-supported identification method, the authenticated user should be able to upload at least one document that legally supports their identification.
- PR-26-08 - The authenticated user should be able to use 3rd-party services that provide legally supported person identification.
- PR-26-09 - While the authenticated user has submitted documentation for identification, the administrator must be able to view the submitted documentation linked with the respective user.
- PR-26-10 - While the authenticated user has submitted documentation for identification, the administrator must be able to accept the identification of the respective user.
- PR-26-11 - While the authenticated user has submitted documentation for identification, the administrator should be able to request from the user the submission of more documents.

STA-2 Robust security and compliance framework

Relevant function(s):

- FUNC-1.1 Service listing: support listing of services available in the DOME ecosystem
- FUNC-4.1 Payment and order management: Allow customers to view and update service configurations, access control settings, and billing information. Alerting and notification mechanisms to inform customers about critical events or service disruptions
- FUNC-6.1 Certification: Assure that services offered in catalogue are duly certified.
- FUNC-6.2 Customer service: Provide support to the platform users, including conflict resolution
- FUNC-6.3 IAM: Advanced Identity and Access Management

Relevant requirements implementing the high-level expectation:

- RQ-31 - While the provider has not been qualified, the provider should be able to submit to the administrator at least 1 document (e.g., ID, country-dependent personal documents, billing documents, and company documents if applicable) for passing the qualification process.
- RQ-31-01 - The administrator should be able to view the list of providers qualification status and the respective documents submitted in DOME.
- RQ-31-02 - The administrator could be able to manage the qualification status of the providers, as ‘Qualified’, ‘Not qualified’, ‘Further documentation required’, ' Waiting for assessment’.
- RQ-31-03 - The administrator could be able to add notes for the provider in the qualification status list.
- RQ-63 - The authenticated user must be able to flag a service and a provider to report a breach of terms and conditions or noncompliance.
- RQ-35 - The authenticated user must be able to access his/her e-wallet, which stores at least a cryptographic key and transactional history.
- RQ-58 - While there is an active recurring payment, the customer must be able to revoke the authorization for the recurring payment.
- RQ-42 - The authenticated user must be able to launch a conflict resolution process ticket for an active contract.
- RQ-43 - The administrator must be able to view and manage (arbitrate, send messages and files, put on-hold, close) all the launched conflict resolution process tickets.
- RQ-44 - While there is at least 1 open linked conflict resolution process ticket, the authenticated user must be able to send messages and files to the administrator.
- RQ-51 - While at least 1 contract is active, the authenticated user must be able to request a contract for cancellation.
- RQ-51-01 - While at least 1 contract is active and the other party of the service has requested a contract cancellation, the authenticated user must be able to confirm or flag the contract cancellation.
- RQ-51-02 - While a contract cancellation is flagged, the system should launch a conflict resolution process.
- RQ-26-01 - Any User should be able to use eIDAS [15] advanced or qualified signatures and seals to identify themselves.
- RQ-34 - The authenticated user must be able to manage (add, delete, update) their certificates. The certificates may include proof of compliance to GDPR, EUCS, ISO standards, etc.

- RQ-28 - The authenticated user should be able to submit a support ticket. Support tickets are managed by the support personnel.
- SS-NA-01 - The system must implement identification and transaction features that allow the legally supported authentication of the user and authentication for performing relevant actions that need such legal supported identification.
- SS-NA-02 - While an external system (including any user) tries to access a protected (data or function), the system must validate that the external system or user has the appropriate access permissions.
- SS-NA-03 - The system must encrypt all data transmitted, including at least user information, transaction data, and communications.
- SS-NA-04 - The system must verify the authorisation of Any User or Authenticated user in using a function.
- SS-NA-05 - The system must implement mechanisms to ensure the integrity and immutability of the data stored and transmitted.
- SS-NA-06 - The system must be deployed on infrastructure that implements security and infrastructure monitoring tools.
- SS-NA-07 - The system, while on operation, must be end-to-end compliant with the GDPR.
- SS-NA-08 - For any file uploaded to the platform, and by any means or method, the system should implement strict controls on verifying its security, including at least filetype check, size limit check and antivirus scan.
- PR-26-01 - While the provider has not been qualified, the system must not list (make visible) the provider and the linked services in the relevant system features, including at least the list of providers and list of services.
- RQ-26-02 - While the provider has submitted documentation for qualification, the administrator must be able to view the submitted documentation linked with the respective provider.
- RQ-26-03 - While the provider has submitted documentation for qualification, the administrator must be able to accept the qualification of the respective provider.
- RQ-26-04 - While the provider has submitted documentation for qualification, the administrator should be able to request from the provider the submission of more documents.
- RQ-26-05 - While the provider has submitted documentation for qualification, the administrator must be able to accept the qualification of the respective provider.
- RQ-26-06 - Any User must agree to the DOME terms of use before being able to register.
- RQ-26-07 - Any User should be able to use legacy methods to identify themselves.
- PR-26-07 - While not already authenticated with a legally-supported identification method, the authenticated user should be able to upload at least one document that legally supports their identification.
- PR-26-08 - The authenticated user should be able to use 3rd-party services that provide legally supported person identification.
- PR-26-09 - While the authenticated user has submitted documentation for identification, the administrator must be able to view the submitted documentation linked with the respective user.
- PR-26-10 - While the authenticated user has submitted documentation for identification, the administrator must be able to accept the identification of the respective user.
- PR-26-11 - While the authenticated user has submitted documentation for identification, the administrator should be able to request from the user the submission of more documents.

- PR-44 - While a conflict resolution process ticket is open, the authenticated users must communicate only with the administrator and support personnel and vice-versa.

STA-3 Easy platform administration

Relevant function(s):

- FUNC-5.2 Advanced reporting and analytics: Support customisation of analytics dashboard, historical data and personalised visualisations
- FUNC-6.2 Customer service: Provide support to the platform users, including conflict resolution

Relevant requirements implementing the high-level expectation:

- RQ-43 - The administrator must be able to view and manage (arbitrate, send messages and files, put on-hold, close) all the launched conflict resolution process tickets.
- RQ-51-01 - While at least 1 contract is active and the other party of the service has requested a contract cancellation, the authenticated user must be able to confirm or flag the contract cancellation.
- RQ-51-02 - While a contract cancellation is flagged, the system should launch a conflict resolution process ticket.
- RQ-38 - Any User should be able to exchange messages with a chatbot, which provides predefined responses to frequently asked questions.
- RQ-38-01 - The support personnel should be able to set up the predefined question terms and the text of the responses of the chatbot.
- RQ-28 - The authenticated user should be able to submit a support ticket.
- RQ-61-01 - The administrator must be able to specify access (view or edit) for all the visualisation dashboards to an authenticated user.
- RQ-62-01 - The administrator must be able to specify access (view or edit) for all the available datasets to an authenticated user.

STA-4 Smooth integration and communication with federated Marketplaces by using standard APIs

Relevant function(s):

- FUNC-5.1 Reporting and analytics: Provide dashboards and visualisations to enable insights into service consumption and optimise decision-making.

Relevant requirements implementing the high-level expectation:

- UX-NA-01 - While the authenticated user uses their identity from a federated marketplace, the authenticated user should be able to view the federated marketplace logo and link back.
- SI-NA-01 - The authenticated user should be able to export and download their own and accessible data including at least profile data, order history, billing information, generated content and visualisation dashboards.
- SI-NA-02 - The authenticated user could be able to import a dataset in csv format in their visualisation dashboard.
- SI-NA-03 - While a service is listed via a federated marketplace (i.e. the provider does not participate directly in DOME), the provider should be able to use the DOME features by using their federated marketplace identity.

- SI-NA-04 - The system must be able to handle actions originated from a federated marketplace following the TMForum standard APIs.
- IM-NA-01 - The system must not duplicate data that is owned or managed by a federated marketplace.

STA-5 Business metrics and KPIs in centralised dashboard

Relevant function(s):

- FUNC-5.1 Reporting and analytics: Provide dashboards and visualisations to enable insights into service consumption and optimise decision-making.
- FUNC-5.2 Advanced reporting and analytics: Support customisation of analytics dashboard, historical data and personalised visualisations

Relevant requirements implementing the high-level expectation:

- RQ-46 - The provider could be able to submit templates for data access that correspond to service monitoring metrics.
  The template may include a) database access information, b) dataset definition, c) metrics titles, d) metrics queries, e) recommended visualisation type
- RQ-48 - The authenticated user must be able to view visualisations of the data and metrics that have been defined by the providers, for the service data he/she has access to.
- RQ-60 - The authenticated user should be able to manage (create, edit, remove) visualisation dashboards with the datasets he/she has access to.
  Visualisation dashboard may include the definition of metrics, charts and chart types, modification of SQL queries, size and positioning of graphical elements.
- RQ-61 - The authenticated user could be able to specify access (view or edit) for their visualisation dashboards to another authenticated user.
- RQ-62 - The authenticated user could be able to specify access (view or edit) for their datasets to another authenticated user.
- RQ-36 - The provider must be able to view data analytics on their listed services, including at least the latest viewed, and the most viewed.
- RQ-37 - The authenticated user must be able to view data analytics on their ordered services, including at least the number of orders, number of active/completed, and billing.
- RQ-59 - The provider must be able to view data analytics on data indicators which are specified by the administrator.
- SI-48 - While the provider has defined service metrics, the system could be able to fetch the submitted datasets by connecting to the submitted database.

STA-6 Comprehensive service catalogues with detailed descriptions, specifications, pricing information, and user reviews

Relevant function(s):

- FUNC-1.1 Service listing: support listing of services available in the DOME ecosystem
- FUNC-1.2 Search & browsing: enable search of services through structured queries, as well as filtering and sorting of service offerings based on criteria such as price, performance, provider reputation, and compliance standards.

- FUNC-1.3 Advanced search & browsing: Implements advanced searching through natural language processing, ranking and customization of search results based on user preferences, domain relevance, similarities, and other factors.
- FUNC-2.1 Brokerage: manage and track negotiation discussions, including the ability to exchange messages and documents securely.Capture and store the agreed-upon terms and conditions in a transparent and auditable manner.

Relevant requirements implementing the high-level expectation:

- RQ-01 - Any User must be able to view the list of services that are available for provisioning in DOME.
- RQ-01-01 - The provider must be able to add a service for provisioning in DOME.
  The service addition may be done either by using the DOME Web User Interface, or by using an API.
- RQ-01-02 - The marketplace operator must be able to add in DOME a service for provisioning, by utilising an API.
  The API must follow the TMForum APIs standard.
- RQ-01-03 - The administrator must be able to remove (delete) a service from the list of services.
- RQ-02 - While viewing the list of services, Any User must be able to view at least a) service image, b) the service summary, c) the name of the service provider, d) the service domain, e) the overall rating and f) the indicative price, for each service, g) related services (e.g., migration, substitution, dependencies), h) lifecycle status (‘in study’, ‘retired’ or ‘obsolete’), i) product catalogue title, in the respective list entry.
- RQ-02-01 - The provider must be able to enter for a service at least a) an illustrative image, b) the service summary, c) the service domain, d) the price, e) detailed description, f) use cases/success stories, g) related services (e.g., migration, substitution, dependencies), and h) criteria for publishing the service in different marketplaces (at least geographical, domain, time-based, legal, compliance, specific marketplaces), i) Lifecycle status (‘in study’, ‘in design’, ‘in test’, ‘active’, ‘rejected’, ‘launched’, ‘retired’ or ‘obsolete’), k) visibility criteria (based on customer profile), l) product catalogue title.
- RQ-02-02 - The marketplace operator must be able to provide for each service at least a) service image, b) the service summary, c) the service domain, d) the indicative price, e) detailed description, f) use cases/success stories and, g) the name of the service provider, h) related services (e.g., migration, substitution, dependencies), and i) service page on the federated marketplace, j) criteria for publishing the service in different marketplaces (at least geographical, domain, time-based, legal, compliance, specific marketplaces), k) Lifecycle status (‘in study’, ‘retired’ or ‘obsolete’), l) visibility criteria (based on customer profile), m) product catalogue title.
- RQ-03 - Any User must be able to view a page with more information, in respect to the list of services, about each service.
- RQ-04 - While viewing the service page, Any User must be able to view at least: a) service image, b) the service summary, c) the name of the service provider, d) the service domain, e) the overall rating, f) the indicative price, g) detailed description, h) details of the ratings/reviews, i) source of the service (name of federated marketplace or DOME), j) use cases/success stories, and k) related services (e.g., migration, substitution, dependencies), l) Lifecycle status (‘in study’, ‘retired’ or ‘obsolete’), m) product catalogue title
- RQ-21 - The marketplace operator should be able to define the acceptance criteria (at least geographical, domain, time-based, legal, compliance, specific marketplaces) for publishing a service listed in DOME to their federated marketplace.

- RQ-21-01 - The provider should be able to define the acceptance criteria (at least geographical, domain, time-based, legal, compliance, specific marketplaces) for (re)publishing a service listed in DOME to the federated marketplaces that participate in the DOME federation.
- RQ-23 - Any User must be able to view the list of providers that have at least one service listed.
- RQ-24 - While viewing the list of providers, Any User should be able to view the profile of each listed provider, including at least a) name, b) summary, c) domains, d) overall rating (aggregated from listed service), e) detailed description, f) list of offered services (links to service pages), g) use cases/success stories (aggregated from listed services), h) linked federated marketplace (if applicable)
- RQ-64 While there is a service contract between a Customer and a Provider, the Customer should be able to leave one rating for the linked service listed in DOME.
- RQ-05 - Any User must be able to filter the services shown in the 'Service list' by using a key text (word or phrase).
  The phrase is searched in all the available fields of the services, and those that contain it are shown.
- RQ-06 - Any User should be able to filter the services shown by each available service field.
- RQ-07 - Any User should be able to filter the services shown by using natural language queries, i.e., search by text semantics and not exact text.
- RQ-20 - Any User could be able to filter the services shown by using categories organised in tree structure.
- RQ-20-01 - The administrator could be able to define the titles and structure of the categories of the listed services.
- RQ-08 - While viewing the list of services, Any User should be able to sort the services listed at least by a) title, b) name of the provider, c) overall rating, and d) indicative price.
- RQ-09 - While viewing the list of services, the authenticated user could be able to sort the services listed by relevance to their profile.
  The relevance may be calculated based on the user's previous activity, purchased services, industry, domain, etc.
- RQ-10 - While viewing the list of services and services are filtered by using natural language queries, Any User could be able to sort the services listed by relevance to their query.
- RQ-11 - While viewing the list of services, the authenticated user could be able to hide a service from the list of services.
- RQ-22 - While viewing the service page, the customer could be able to view other suggested services that are available in the service list.
  The suggestion of services may be based on the similarity of different service fields and on customer profile.
- RQ-25 - The customer could be able to define private lists that consist of listed services.
- RQ-13 - While viewing (a service page or a message exchange linked with a service) and the service is listed on a federated marketplace, the customer should be able to access the service page on the federated marketplace.
- SI-21 - The system must be able to send services for listing to the federated marketplaces, following the TMForum standard APIs. [2]
- While the marketplace operator has defined a set of acceptance criteria, the system should send only the services that meet these criteria.

- IM-01-01 - While a provider adds a service in DOME, the system must link the added service with the provider.
- IM-01-02 - While a marketplace operator adds a service in DOME, the system must link the service with the federated marketplace and with the provider.
- IM-07 - The system should be able to extract semantic attributes of services available for provision in DOME.
- IM-29 - A customer, provider or marketplace operator profile should be linked with at least one authenticated user.

STA-7 Transparent billing and accounting

Relevant function(s):

- FUNC-1.3 Advanced search & browsing: Implements advanced searching through natural language processing, ranking and customization of search results based on user preferences, domain relevance, similarities, and other factors.
- FUNC-4.1 Payment and order management: Allow customers to view and update service configurations, access control settings, and billing information. Alerting and notification mechanisms to inform customers about critical events or service disruptions.

Relevant requirements implementing the high-level expectation:

- RQ-55 - While the provider has provided metrics for billing, the customer could be able to simulate the total cost of a service based on defining values for these metrics.
- RQ-35 - The authenticated user must be able to access his/her e-wallet, which stores at least a cryptographic key and transactional history.
  The e-wallet may also contain bank information.
- RQ-47 - The provider should be able to submit the data metrics used for billing.
- RQ-49 - While the customer has proceeded with a payment, the provider should be able to submit the receipt to the customer.
- RQ-50 - The customer should be able to set up banking information along with rules/parameters for authorisation for recurring charge.
- RQ-52 - While the provider has submitted metrics for billing, the system should be able to use the metrics to calculate the customer billing and DOME revenue.
  The billing may be based on alternative pricing models, such as a) fixed price, b) Usage-based pricing, c) Hybrid or average pricing, d) Pay-as-you-go pricing, e) Freemium pricing.
- RQ-53 - The authenticated user should be able to view a list of all the billed charges, including for each billed item at least a) the related service, b) the related active contract, c) the charged amount, d) the date of the charge, e) the dates on which the billed amount corresponds, f) the pricing model, g) the details of how the billed amount was calculated, h) the entity where the amount was deposited, i) the receipt.
- RQ-54 - The authenticated user should be able to filter the items listed in the billing list, by using criteria for any of the available item fields.
- RQ-58 - While there is an active recurring payment, the customer must be able to revoke the authorization for the recurring payment.
- RQ-41 - The customer should be able to pay their recurring and one time billed payments.
  The payment methods may include payment gateways, bank transfer, etc.
- RQ-41-01 - The customer should be able to store the information of at least one preferred payment method.

- RQ-39 - The provider should be able to set up billing and payment notifications for an active contract.
- RQ-40 - The customer should be able to view billing and payment notifications for their active contracts.
- RQ-56 - The customer should be able to view a notification if a payment, either recurring or one-time, has failed.
- RQ-57 - While there is an active recurring payment and the payment method is going to expire in less than 3 months, the customer could be able to view a notification that the payment method is going to expire.
- SS-39 - The system must be able to provide 3D Secure Process for processing payments.

STA-8 Simplification of purchasing and contracting

Relevant function(s):

- FUNC-1.1 Service listing: support listing of services available in the DOME ecosystem
- FUNC-2.1 Brokerage: manage and track negotiation discussions, including the ability to exchange messages and documents securely.Capture and store the agreed-upon terms and conditions in a transparent and auditable manner
- FUNC-3.1 Service activation: Coordinate the communication and integration with service providers' systems to initiate service provisioning. Facilitate the activation process by providing necessary configurations, access credentials, and instructions to customers

Relevant requirements implementing the high-level expectation:

- RQ-21 - The marketplace operator should be able to define the acceptance criteria (at least geographical, domain, time-based, legal, compliance, specific marketplaces) for publishing a service listed in DOME to their federated marketplace.
- RQ-21-01 - The provider should be able to define the acceptance criteria (at least geographical, domain, time-based, legal, compliance, specific marketplaces) for (re)publishing a service listed in DOME to the federated marketplaces that participate in the DOME federation.
- RQ-13 - While viewing (a service page or a message exchange linked with a service) and the service is listed on a federated marketplace, the customer should be able to visit the service page on the federated marketplace.
- RQ-15 - The customer and the provider should be able to view a list of their active offers and contracts.
- RQ-16 - While a contract offer has been accepted by the customer, the provider and the customer should be able to exchange messages, linked to the contract.
- RQ-45 - While a contract offer has been accepted by the customer, the provider could be able to confirm that the service is ready for use.
- SI-21 - The system must be able to send services for listing to the federated marketplaces, following the TMForum standard APIs. [2]
  While the marketplace operator has defined a set of acceptance criteria, the system should send only the services that meet these criteria.
- SI-45 - While an offer is accepted by the customer, the system must forward the activation request to the federated marketplace.
- SI-NA-03 - While a service is listed via a federated marketplace (i.e. the provider does not participate directly in DOME), the provider should be able to use the DOME features by using their federated marketplace identity.

- IM-29 - A customer, provider or marketplace operator profile should be linked with at least one authenticated user.
  More than one authenticated user may be able to be linked to a customer, provider or marketplace operator profile.

STA-9 On-demand scaling, elastic resource allocation and different pricing models (depending on the provider)

Relevant function(s):

- FUNC-2.1 Brokerage: manage and track negotiation discussions, including the ability to exchange messages and documents securely.Capture and store the agreed-upon terms and conditions in a transparent and auditable manner
- FUNC-3.1 Service activation: Coordinate the communication and integration with service providers' systems to initiate service provisioning. Facilitate the activation process by providing necessary configurations, access credentials, and instructions to customers
- FUNC-4.1 Payment and order management: Allow customers to view and update service configurations, access control settings, and billing information. Alerting and notification mechanisms to inform customers about critical events or service disruptions

Relevant requirements implementing the high-level expectation:

- RQ-15 - The customer and the provider should be able to view a list of their active offers and contracts.
- RQ-17 - While a contract offer has been accepted by the customer, the customer could be able to send to the provider documents and files that are required for the activation of the service.
- RQ-19 - The customer must be able to view an active service page, which includes at least a) The service title, b) The service provider, c) the contract, d) the summary of the service, e) the specific characteristics of the service, f) the configuration applied, g) the resources allocated to the service, and h) the pricing model, i) the billed amount.
- RQ-19-01 - While viewing an active service page, the customer should be able to update the configuration applied.
- RQ-51 - While at least 1 contract is active, the authenticated user must be able to request a contract for cancellation.
- RQ-51-01 - While at least 1 contract is active and the other party of the service has requested a contract cancellation, the authenticated user must be able to confirm or flag the contract cancellation.
- RQ-51-02 - While a contract cancellation is flagged, the system should launch a conflict resolution process.

STA-10 Procurement and tendering

Relevant function(s):

- FUNC-2.1 Brokerage: manage and track negotiation discussions, including the ability to exchange messages and documents securely.Capture and store the agreed-upon terms and conditions in a transparent and auditable manner

Relevant requirements implementing the high-level expectation:

- RQ-12 - While the customer is viewing a service, the customer should be able to initiate a message exchange with the respective service provider.
  The message exchange may be linked to the specific service from which it was initiated.
- RQ-12-01 - While a customer has initiated a message exchange linked with a service, the provider should be able to participate in the message exchange.
  Participates include viewing and replying to the messages sent.
- RQ-12-02 - While a customer has initiated a message exchange linked with a service, the provider and the customer could be able to send and receive files within the messaging.
- RQ-66 - The customer should be able to create, configure and manage procurement processes.
- RQ-66-01 - The customer could be able to invite specific providers to participate with proposals in a procurement process.
- RQ-66-02 - The customer could be able to compare side-by-side, and per specified need in a procurement, the proposals that providers have submitted.
- RQ-66-03 - The customer should be able to accept at least one submitted proposal in a procurement process.

STA-11 Service orchestration to enable seamless interoperability for the acquisition of different cloud services, service provisioning, deployment, monitoring, scaling, and termination

Relevant function(s):

- FUNC-1.1 Service listing: support listing of services available in the DOME ecosystem
- FUNC-2.1 Brokerage: manage and track negotiation discussions, including the ability to exchange messages and documents securely.Capture and store the agreed-upon terms and conditions in a transparent and auditable manner
- FUNC-3.1 Service activation: Coordinate the communication and integration with service providers' systems to initiate service provisioning. Facilitate the activation process by providing necessary configurations, access credentials, and instructions to customers
- FUNC-4.1 Payment and order management: Allow customers to view and update service configurations, access control settings, and billing information. Alerting and notification mechanisms to inform customers about critical events or service disruptions

Relevant requirements implementing the high-level expectation:

- RQ-21 - The marketplace operator should be able to define the acceptance criteria (at least geographical, domain, time-based, legal, compliance, specific marketplaces) for publishing a service listed in DOME to their federated marketplace.
- RQ-21-01 - The provider should be able to define the acceptance criteria (at least geographical, domain, time-based, legal, compliance, specific marketplaces) for (re)publishing a service listed in DOME to the federated marketplaces that participate in the DOME federation.
- RQ-13 - While viewing (a service page or a message exchange linked with a service) and the service is listed on a federated marketplace, the customer should be able to access the service page on the federated marketplace.
- RQ-14 - While viewing a message exchange linked with a service and a customer, the provider could be able to upload an offer for the service, in the form of a contract.

- RQ-14-01 - While viewing a message exchange linked with a service and the provider has uploaded an offer (contract), the customer should be able to accept the contract. The actual contract template will be defined later during the DOME project.
- RQ-14-02 - While the customer has accepted an offer (contract), the provider should be able to view that the customer has accepted the offer.
- RQ-14-03 - While a service supports it, the customer must be able to instantly buy a service.
- RQ-14-04 - The customer should be able to select more than one service and combine them in one order.
- RQ-16 - While a contract offer has been accepted by the customer, the provider and the customer should be able to exchange messages, linked to the contract.
- RQ-17 - While a contract offer has been accepted by the customer, the customer could be able to send to the provider documents and files that are required for the activation of the service.
- RQ-18 - The customer must be able to view a list of all their active services.
- RQ-19 - The customer must be able to view an active service page, which includes at least a) The service title, b) The service provider, c) the contract, d) the summary of the service, e) the specific characteristics of the service, f) the configuration applied, g) the resources allocated to the service, and h) the pricing model, i) the billed amount.
- RQ-19-01 - While viewing an active service page, the customer should be able to update the configuration applied.
- RQ-51 - While at least 1 contract is active, the authenticated user must be able to request a contract for cancellation.
- RQ-51-01 - While at least 1 contract is active and the other party of the service has requested a contract cancellation, the authenticated user must be able to confirm or flag the contract cancellation.
- RQ-51-02 - While a contract cancellation is flagged, the system should launch a conflict resolution process ticket.
- SI-21 - The system must be able to send services for listing to the federated marketplaces, following the TMForum standard APIs.
- While the marketplace operator has defined a set of acceptance criteria, the system should send only the services that meet these criteria.
- IM-29 - A customer, provider or marketplace operator profile should be linked with at least one authenticated user.
  More than one authenticated user may be able to be linked to a customer, provider or marketplace operator profile.
- IM-NA-01 - The system must not duplicate data that is owned or managed by a federated marketplace.
  The system may duplicate data for ‘caching’ (short-term storage for quicker web service), but should provide data access with a ‘live’ fetch from the federated marketplace.
- PR-14 - While the provider submits an offer, the contract must be compatible with the DOME template contract.

6.2 Follow-up validation of requirements

On the follow-up iterations (D2.4 DOME requirements (v2) and D2.8 DOME requirements (v3)), surveys to validate and extend the expectations with external stakeholders will be

conducted, by utilising the consortium networks, as well as structured interviews. Through these networks, partners can access all different classes of stakeholders, either from the provisioning or from the consuming side. Based on the initial uncertainties and needs for clarifications and prioritisation, an initial guideline which can be used by the partners for interviews has already been prepared and briefed below. The guide interview structure may be extended or modified on the follow up, according to the elicitation results.

In addition, while many of the above-mentioned requirements are core features that the DOME needs to implement, priorities as well as details need to be validated with external stakeholders in the follow-up of this requirements document (i.e., D2.4 DOME requirements (v2), as planned). This includes at least the following items:

Requirement to validate	Purpose of validation
RQ-02 While viewing the list of services, Any User should be able to view at least […]	Items to show and their importance.
RQ-04 While viewing the service page, Any User should be able to view at least […]	Items to show and their importance.
RQ-24 While viewing the list of providers,Any User should be able to view the profile of each listed provider, including at least […]	Items to show and their importance.
RQ-07 Any User should be able to filter the services shown by using natural language queries, i.e., search by text semantics and not exact text.	Validation of need, importance and expected use.
RQ-20 Any User could be able to filter the services shown by using categories organised in tree structure.	Validation of need and importance.
RQ-09 While viewing the list of services, the authenticated user should be able to sort the services listed by relevance to their profile.	Validation of need and importance. Criteria for assessing relevance.
RQ-11 While viewing the list of services, the authenticated user should be able to hide a service from the list of services.	Validation of need and importance.
RQ-22 While viewing the service page, the customer should be able to view other suggested services that are available in the service list.	Validation of need and importance. Criteria for suggestions.
RQ-25 The customer should be able to define private lists that consist of listed services.	Validation of need and importance.
RQ-55 While the provider has provided metrics for billing, the customer should be able to simulate the total cost of a service based on defining values for these metrics.	Validation of need and importance.
RQ-19 The customer must be able to view an active service page, which includes at least […]	Items to show and their importance.
RQ-53 The authenticated user should be able to view a list of all the billed charges, including for each billed item at least […]	Items to show and their importance.

RQ-36 The provider must be able to view data analytics on their listed services, including at least the latest viewed, and the most viewed.	Items to show and their importance.
RQ-37 The authenticated user must be able to view data analytics on their ordered services, including at least the number of orders, number of active/completed, and billing.	Items to show and their importance.
RQ-59 The provider must be able to view data analytics on data indicators which are specified by the administrator.	Items to show and their importance.

On the follow-up activities of the requirements analysis, external stakeholders will be engaged in order to validate the above-mentioned requirements, but also to gain insight on potential new features that could be added in the DOME Marketplace. This engagement will take place mostly in the form of structured surveys that stakeholders can participate in, but also through structured interviews.

The consortium partners have committed on engaging a large number of stakeholders, with a total of more than 180 organisations, of which:

- >90 of the 'Customer' category
- >40 of the 'Provider' category
- ~20 of the 'Federable Marketplace' category
- ~30 of other related third-parties, such as public bodies, regulatory and certification organisations, etc.

A detailed guideline has been prepared (see Annex A), along with the preparatory activities of dissemination and partner preparation for using the survey, supporting responders and conducting follow-up interviews. The partners will conduct the surveys and interviews after an internal training and Q&A webinar on the 2th of November and up to the end of November. The survey questions have been prepared so as to validate the above-mentioned requirements and to address the uncertainties summed up in the table above.

Additionally, another survey was early distributed among member states representatives, however the feedback number was not sufficient to be included in the initial analysis. The responses are targeted to be collected for analysis in the next version of the requirements, D2.4.

Apart from the large-scale survey, requirements elicitation and management will be iterated once more towards the second version of the requirements. This includes the updated input from partners, following on the implementation progress, as well as potential difficulties, new risks and new opportunities identified. Additionally, the business and governance aspects will be reviewed, in order to identify new or requirements that need to be revised. In summary, the following activities will take place towards the second version of the requirements, D2.4 DOME requirements (v2):

- October 2023: Preparation of large-scale survey
- November 2023:
  - Large-scale survey and interviews with external stakeholders.
  - Identification of new risks, opportunities and needed revisions coming from technical implementation.
  - Alignment with business planning.
- December 2023:
  - Gathering and analysis of survey results.

    - Alignment of new information where needed with technical implementation.
- January 2024:
    - Consolidation of all new feedback.
    - Identification of revisions and extensions.
    - Feasibility check with technical implementation.
- February 2024: Consolidation of all feedback, revisions and extensions and final drafting of D2.4 report.

References

[1] European Commission Directorate-General of Communications Networks, Content & Technology by Capgemini Invent, "Building a European Cloud Marketplace - Conceptualisation Study," European Commission, Brussels, 2021.

[2] TM Forum, "TM Forum Ecosystem API Portal".

[3] J. L. Hopkins and D. F. Kehoe, “The theory and development of a relationship matrix-based approach to evaluating e-marketplaces,” Electronic Markets, vol. 16, no. 3, pp. 245-260, 2006

[4] S. Verhulst and A. Young, "Open Data Impact: When demand and supply meet," The GOVLAB, 2016.

[5] K. Whitenton, “Flat vs. Deep Website Hierarchies”, Nielsen Norman Group, November 2013, Available: https://www.nngroup.com/articles/flat-vs-deep-hierarchy/#:~:text=But%20the%20deeper%20a%20hierarchy,and%20understand%20the%20site%20structure.

[6] G. Muller, “Requirements Elicitation and Selection”, in Systems Architecting: A Business Perspective, CRC Press, 2011

[7] J. L. Hopkins and D. F. Kehoe, “Testing an interrelationship matrix-based method designed for assisting in e-marketplace selection,” Electronic Markets, vol. 17, no. 3, pp. 210-230, 2007

[8] Directive 2014/24/EU of the European Parliament and of the Council of 26 February 2014 on public procurement and repealing Directive 2004/18/EC Text with EEA relevance, *OJ L 94, 28.3.2014,* p. 65–242

[9] P. Bouklis, “D1.1 DIH² Marketplace specification”, DIH² project, Grant Agreement No. 824964, 2019

[10] A. Garbi, “D2.1 L4MS Marketplace Specification”, L4MS project, Grant Agreement No. 767642, 2018

[11] S. Rowland, “Tendering Cloud Services and Supplier Selection Selection”, Gov.uk Digital Marketplace, Available: https://www.applytosupply.digitalmarketplace.service.gov.uk/g-cloud/services/807279783189683

[12] M. Hanak, “A complete guide to custom cloud computing”, Future Processing, 12 July 2022, Available: https://www.future-processing.com/blog/a-complete-guide-to-custom-cloud-computing/

[13] Computers in the City, “Bespoke vs Off-the-shelf Cloud Solutions”, Available: https://www.computersinthecity.co.uk/bespoke-vs-off-the-shelf-cloud-solutions/

[14] DOME Grant Agreement, Contract No. 101084071

[15] Regulation (EU) No 910/2014 of the European Parliament and of the Council , "Electronic identification and trust services for electronic transactions in the internal market," *OJ L 257,* pp. 73-114, 2014.

[16] P. Laubheimer, "Cards: UI-Component Definition," Nielsen Norman Group, November 2016. [Online]. Available: https://www.nngroup.com/articles/cards-component/. [Accessed June 2023].

[17] D. Clegg and R. Barker, Case Method Fast-Track: A Rad Approach, Addison-Wesley Longman Publishing Co., Inc., 1994.

[18] The Open Group, "Cloud Computing Portability and Interoperability," [Online]. Available: http://www.opengroup.org/cloud/cloud_iop/. [Accessed May 2023].

[19] C. Klein, "Cloud atlas," European Round Table for Industry, [Online]. Available: https://ert.eu/single-market/stories/cloud-atlas/. [Accessed May 2023].

[20] A. Qumer Gill and S. Hevary, "Cloud Monitoring Data Challenges: A Systematic Review," in *ICONIP 2016*, 2016.

[21] Y. Frolova and A. Minonne, "European Cloud Spending Will Reach $148 billion this year, Despite Tug of War Effect Caused by Economic Pressures," IDC, 9 February 2023. [Online]. Available: https://www.idc.com/getdoc.jsp?containerId=prEUR250293723. [Accessed May 2023].

[22] The Art of Service, Cloud Access Security Broker A Complete Guide, Cloud Access Security Broker Publishing, 2020.

[23] J. Atenas and L. Havemann, "Open Data as Open Educational Resources: Case studies of emerging practice," Open Knowledge, London, 2015.

[24] Jamcracker, Inc., "Cloud Broker - Essentials for a Cloud Service Brokerage Platform," [Online]. Available: https://www.jamcracker.com/cloud-broker/cloud-service-brokerage-essentials. [Accessed May 2023].

[25] M. S. Mayernik, "Open data: Accountability and transparency," *Big Data & Society,* vol. 4, no. 2, 4 July 2017.

[26] E. Gasiorowski-Denis, "Trust and confidence in cloud privacy," International Organization for Standardization, 6 January 2015. [Online]. Available: https://www.iso.org/news/2015/01/Ref1921.html. [Accessed May 2023].

[27] B. Lheureux, D. Plummer, I. Beazley, J. Buckner, N. Wynne and B. Caffery, "A CIO Primer on Cloud Services Brokerage," Gartner, Inc, 17 October 2012. [Online]. Available: https://www.gartner.com/en/documents/2201415.

[28] J. Byrne, "Will ISO certification give you a competitive edge?," Cognidox Ltd, [Online]. Available: https://www.cognidox.com/blog/will-iso-certification-give-you-a-competitive-edge. [Accessed May 2023]

[29] European co-operation for Accreditation, "Accreditation in Europe: Facilitating regulatory compliance and international trade," 13 September 2022. [Online]. Available: https://european-accreditation.org/accreditation-in-europe-facilitating-regulatory-compliance-and-international-trade.

[30] IT Governance Ltd, "The Benefits of Implementing an ISMS (Information Security Management System)," [Online]. Available: https://www.itgovernance.eu/en-ie/isms-benefits-ie.

[31] ISO/IEC/IEEE 29148:2011, “Systems and software engineering - Lifecycle processes - Requirements engineering”

[32] ISO/IEC/IEEE 15288:2015, “Systems and software engineering - System life cycle processes”

Annex A. Guidelines for a) Quick touch base with potential interviewees, b) interview (with the support of a survey online form)

1 Introduction

1.1 Executive Summary

The first relevant technical step of the project roadmap is the collection of the requirements. This is a complex process flowing through different steps, starting from the original indication of the European commission study on the marketplace functionalities, flowing through the public documents and best practices, reviewed through the direct experience of the various project partners and last but not least the collection of the opinion of the relevant stakeholders through a survey process. This guideline defines the scope of the survey, the methodological approach to be used in the interviews and the contents that the survey should provide once carried out.

1.2 Intended audience

The reference audience of this document are the DOME consortium members participating in task 2.4 of the global project planning titled “requirements gathering”. Being addressing informed people this document doesn’t spend too many rows in describing the reference context assuming that the reader, who will later become the interviewer, has enough knowledge of the platform to be able to explain it to the final audience. The core part of the document is presented in a questionnaire form in order to be used also in front of the interviewed person as a storyboard.

2 Survey approach

2.1 Preliminary contact

Approaching **participants** for a survey is always complicated because we're consuming their time. To engage with them, we first need to raise interest, encouraging potential interviewees to invest time in the discussion. This happens through a preliminary contact where the **interviewer** (DOME partner) describes what the DOME project is, the business scope and the benefits of joining the DOME federated marketplace ecosystem.

This **first contact** with potential participants can be done through a phone call, an in-person meeting, or a mailing campaign and can be expressly focused on DOME or can touch the DOME argument while talking about something else.

The intention is to **engage the counterpart in a second meeting** where the interviewer can go more in depth on the argument.

Being a very quick preliminary touchbase, there is no need for specific support / documents, but in any case the consortium makes available communication material that can be used to prepare the conversation or to support the mailing campaign.

2.2 Interview meeting

There is no restriction on the ways you can meet the target people. You can do it in person, with a video call, through a phone call or anything else, you can do it in an office or in a public bar or a restaurant, it doesn't matter. What is relevant is the commitment of the target person that should be available in sustaining a discussion that can take up to 1-1.30 hours.

The meeting is conducted with several sequential steps:

1- the onboarding. The first step is to revive the DOME interest. The preliminary meeting may happen several days before the meeting and the counterpart may have already forgotten most of the contents you addressed, so it's better to start with a refresh of the key business advantages of the DOME platform. The suggestion is to reduce the amount of time dedicated to this stage using high level business descriptions only because you will have the opportunity to address the details during the survey.

2 - the profiling. The first set of questions aims to profile the target company, qualifying his position on the market. This is a small set of questions about the company business with predefined set of answers to have the capability later on to use the answers as statistical baseline for the database analysis.

3 - the requirements gathering. This is the core part of the survey. In this stage we aim to collect the desired functionalities of the interviewed in order to confirm or integrate the specifications that we already defined inside the task 2.4 preliminary steps. Due to the need to touch several aspects of the marketplace design, we need to use an information collection method that is light enough to non be exhausting for the interviewed person. To achieve this the questionnaire form has been designed through a set of open questions allowing the

interviewed person to feel free in the answers and avoiding to propose hundreds of questions that will scare the target person. The questions are strictly focused on functionalities and are organised by functional scope. No strictly technical content is addressed avoiding the feeling of a too complex questionnaire.

That information will be later compared with the predefined list of functionalities created by the consortium through the first 3 steps of the requirement gathering process. Through this operation we will get visibility about:

- The validation that the functionalities we identified are interesting for the market.
- The possible indication that some functionality is not interesting or of low priority to the market
- Some functionality that we excluded in our reference list that is requested by a set of potential customers.
- The priority we should address in the implementation (more requested functionalities will have the priority)

4 - The data normalisation. The usage of open text descriptions leaves the target person the capability to use different descriptions to refer to something that has been originally defined with a different name. Once the interview has been finished and the data has been reversed in a centralised repository, the interviewer should map such answers to the defined set of functionalities, mapping the answer to standard definitions. This allows the capability once finished to collect statistics about the use and the re-use of specific categories as defined in step 3.

5 - The reporting. This is an optional task. Once the survey has been completed the results may be published as an attachment of the official deliverable D2.4 (Requirements ver. 2.0).

2.3 Tools supporting the interview

In the introduction we already stated the availability of marketing documentation supporting the description of the DOME mission and the DOME business value. In parallel we're providing this guideline that can be useful to train interviewers, and an online form exactly mapped on the survey questions, allowing the centralised collection of all the answers, speeding up the information collection and centralization process.

The online form can be used in different ways:

- By the interviewer to transcribe the answer provide vocally by the target person
- By the interviewed person to autonomously record his own answers (self service audit)
- As a step by step guide through the list of argument the survey will flow

3 Reference questionnaire

Following the list of topics we're going to address during the interview.

3.1 Profiling

Company identification

Company name

Contact person

Email address

Country

Preliminary questions

Type of Organisation

- ○ Public Sector
- ○ Small-Medium Enterprise (1-250 employees)
- ○ Large Corporation (+250 employees)
- ○ Other...

Market sector addressed by your Organisation

- [ ] AEROSPACE
- [ ] AGRICULTURE
- [ ] CONSULTING
- [ ] ENERGY
- [ ] FINANCE
- [ ] INFORMATION-TECHNOLOGY
- [ ] MANUFACTURING
- [ ] MEDIA
- [ ] PUBLISHING
- [ ] UTILITIES
- [ ] Other...

What is the business model of your Organisation?

- [ ] B2C
- [ ] B2B
- [ ] B2G
- [ ] Other...

Main purpose of your Organisation

Please select the option that better defines the perspective of your Organisation in relation to the provision or acquisition of Cloud & Edge Services, or if it is operating a marketplace in this domain. Depending on your answer you will be redirected to a different set of questions.

If your organisation is interested in more than one of the options below, you will be able to select them later.

(select one)

- My organisation is principally buying cloud/products services (or will do so in the future)
- My organisation is principally selling cloud/products services (or will do so in the future)
- My organisations acts as a marketplace where thirds parties buy and sell cloud services/products

3.2 Functionalities

Functionalities questions are **organised by stakeholder profile** to avoid bothering the participant with out of context requests. However, it's important to consider that a single organisation can cover different stakeholder categories. A typical sample: a company that wants to sell its own products/services on the cloud (Provider) which buys office365 functionalities on the cloud (Customer) and aims to sell the services through its own marketplace instance (Marketplace). It’s up to the interviewer, with the agreement of the interviewed person to decide which question block/s to address as a priority.

3.2.1 Customer

As a Customer you would be accessing the marketplace **to navigate the catalogue and buy cloud & edge related products/services.**

Identity management.

Do you agree / disagree?

1. Any user (customers and services providers persons) in DOME should be identified through highly trustful method (agree disagree)
2. I would like to have a 'company' profile, in which I can add other users from my Organisation, with different access levels to the DOME functionalities.

Catalogue: quality and provenance of cloud related services

Do you agree / disagree?

1. Cloud services listed on DOME catalogue should pass a pre-qualification first (e.g. compliance with EU regulations such as GDPR, security, etc.)
2. I would like to be able to buy cloud services coming from different providers.

Catalogue: browsing and searching

Multiple choice

3. What kind of cloud services are you interested in ?
    a. Online software solutions
    b. Infrastructure services
    c. Platform services
    d. Edge computing service
    e. Other: (type your own)
4. What kind of search and filtering functionalities would you like to have ?
    a. By keywords
    b. By service domain (IaaS, PaaS, etc.)
    c. By compliance level
    d. By rating
    e. By price
    f. Using natural language and expressions
    g. Hiding the services I'm not interested in
    h. Defining my own lists of services
    i. Other: (type your own)

Agree / Disagree

5. For each listed cloud service, I would like to view the following information:
    a. A summarised description of the service
    b. The name of the service provider
    c. The service domain (SaaS, PaaS, etc.)
    d. The overall rating by other service customers
    e. An indicative price
    f. Other related services

g. Indication that a service is DOME-validated or is under qualification
h. Indication that it is a service directly listed on DOME or coming from another marketplace
i. Other: (type your own)

6. For each listed provider, I want to view the following information:
    a. A summary description of the provider
    b. An overall rating derived from the provider's service ratings
    c. A list of the provider's services
    d. Information if this is a provider directly listed on DOME or coming from another marketplace
    e. Other: (type your own)

Ordering

Multiple choice

1. I would like to buy cloud services in the following way(s):
    a. Directly purchasing ready-to-use services by selecting a service in the catalogue
    b. Accepting specific offline offers tailored to my specific needs
    c. Completing a form with what I need and have providers sending me offers
    d. Formal tendering procedures
    e. Other: (type your own)

Payment

Multiple choice

2. What kind of payment system is your Organisation using?
    a. Credit card
    b. Bank transfer
    c. Online payment facilities are not allowed
    d. Other: (type your own)

Billing/Invoicing

Agree / disagree

1. I would like to have different billing for each of my Organisation's departments.
2. I would like to view consolidated billing information from all my purchased cloud services
3. I would like to simulate the cost of a possible subscription before to order it
4. I would like to set an overall budget cap across my purchased services, which will notify me when it is reached
5. I agree to receive an invoice from DOME on behalf of the original provider

Reporting and Analytics

Multiple choice

- What kind of **reporting** are you aiming for?
    - Regular billing report
    - Forecast of expenses
    - Budget cap
    - Number of orders in the last period
    - Expenses trend in period
    - Subscription duration by typology
    - Other: (type your own)

Customer service using the DOME platform

Multiple choice

- What kind of functionality are you expecting from the customer service?
    - I want to quickly resolve common problems by interacting with a chatbot
    - I want to submit support tickets which I can follow-up and interact with the support team
    - I want to directly phone the support team and get help
    - When I face problems with services purchased through DOME, I want DOME to try and mediate between me and the provider in finding a common solution, before I proceed to further actions.
    - Other kinds of support: (type your own)

3.2.2 Provider

As a Provider you would like to publish your products/services through the DOME ecosystem improving the visibility of your catalogue and the business opportunities.

To what degree do you agree with the following statements? Answer from 1 (completely disagree) to 5 (completely agree)

Identity management.

Do you agree / disagree?

1. Any user (customers and services providers persons) in DOME should be identified through highly trustful method (agree disagree)
2. I want to have a ‘company’ profile, in which I can add other users from my Organisation, with different access levels to the DOME functionalities.

Catalogue publishing

Agree / disagree

1. A pre-qualification check (e.g. compliance with EU regulations, such as GDPR, security, etc.) will be required for every service your Organisation wishes to publish in the DOME catalogue.

Catalogue offering

7. What kind of cloud services is your Organisation offering?
    a. Online software solutions
    b. Infrastructure services
    c. Platform services
    d. Edge computing service
    e. Consultancy services
    f. Hardware / Software licensing
    g. Other: (type your own)

Catalogue pricing

Multiple Choice

Your Organisation is interested in selling services based on the following model(s):

a. Ready-to-use, standard price
b. Customised offers to specific customers
c. Requesting a service via an online form
d. Offers in formal tendering procedures

Marketing and advertising

Multiple choice

Are you looking for embedded marketing and advertising services

a. for free
b. paid
c. other

Ordering

Agree / disagree

1. DOME will act as payment gateway service
2. My Organisation is ready for a pure online process (not needing any formal offline procedure)
3. I would like to interact with my customers through **web interfaces** in DOME, to negotiate tailored offers and configure the cloud services

Payment

Multiple choice

Your Organisation is using the following payment methods (multiple choice):

a. Credit card
b. Bank transfer

c. Other: (type your own)

Billing/Invoicing

1. DOME will send invoices to my customer on behalf of my Organisation

Reporting and Analytics I

2. My Organisation is willing to share with DOME a part of statistical data related to the usage and billing of the services, which will be presented to customers through the central DOME analytics dashboard.

Reporting and Analytics II

To allow the sharing of usage and billing data, the following conditions should be fulfilled:

- Encryption of data
- Non Disclosure Agreement (NDA)
- Neutrality
- Other

Reporting and Analytics II)

- The central analytics dashboard should allow to see:
  - Customers buying my products
  - Revenue trend in real time
  - Number of visits on my products
  - Customer base trend
  - Other: (type your own)

Contractual agreement

Agree / Disagree

1. My Organisation is willing to pay a recurrent fee which would allow the certification of my services and products compliance.
2. My Organisation is willing to list my services on DOME, even if this means I will have to pay a sales fee for purchases made through it.
3. My Organisation is willing to share revenue for the sales done by DOME or federated marketplaces.

(obtaining new business without investment)

Customer service

Multiple choice

- What kind of functionality are you expecting from the customer service?
  - I want to quickly resolve common problems by interacting with a chatbot
  - I want to submit support tickets which I can follow-up and interact with the support team

- I want to directly phone the support team and get help
- When I face problems with services purchased through DOME, I want DOME to try and mediate between me and the provider in finding a common solution, before I proceed to further actions.
- I want to have dedicated expert support on integrating my services catalogue within the DOME ecosystem
- Other kinds of support: (type your own)

3.2.3 Marketplace operator

As a marketplace owner (doesn't mind if you're conducting a private marketplace publishing your products only or if you're a multi brand marketplace) you have the opportunity to join the DOME ecosystem having the possibility to replicate your products on the dome catalogue enlarging their visibility and to enrich your catalogue picking services from the DOME catalogue that you can expose on your marketplace.

Identity management.

Agree / disagree

1. My Organisation is willing to spend resources in integrating its identity systems with DOME to be federated within the DOME ecosystem.

Catalogue publishing and pricing

Which categories do you have in your marketplace, how are items grouped, categorised etc.

Open question:

Multiple Choice

1. What kind of product / services would your Organisation like to publish on the DOME catalogue ?
    a. Online software solutions
    b. Infrastructure services
    c. Platform services
    d. Edge computing service
    e. Other: (type your own)

2. My Organisation is interested in selling services based on the following model(s):
    a. Ready-to-use, standard price
    b. Customised offers to specific customers
    c. Requesting a service via an online form
    d. Offers in formal tendering procedures

Integration

My Organisation is willing to invest in integrating its marketplace with the DOME ecosystem to enable catalogue sharing, order processing and cross-visibility.

Ordering

Agree / Disagree

1. DOME will act as payment gateway service
2. My Organisation is ready for a pure online process (not needing any formal offline procedure)

Payment

Multiple choice

3. What kind of payment system is your Organisation using?
    a. Credit card
    b. Bank transfer
    c. Online payment facilities are not allowed
    d. Other: (type your own)

Billing/Invoicing

1. DOME sends invoice to my customer on behalf of my Organisation

Reporting and Analytics I

3. My Organisation is willing to join the DOME ecosystem, even if this means that part of the data related to services and billing will be shared with DOME.

Reporting and Analytics II

To allow the sharing of usage and billing data, the following conditions should be fulfilled:

- Encryption of data
- Non Disclosure Agreement (NDA)
- Neutrality
- Other

Reporting and Analytics III

1. I want to have a central analytics dashboard where I can view metrics based on the following stats:
    a. Total number of services and providers
    b. Number and value of marketplace's services sold through DOME
    c. Number of visitors in DOME
    d. Success rate of listed services
    e. Other: (type your own)

Customer service

Multiple choice

- What kind of functionality are you expecting from the customer service?
  - I want to quickly resolve common problems by interacting with a chatbot
  - I want to submit support tickets which I can follow-up and interact with the support team
  - I want to directly phone the support team and get help
  - When I face problems with services purchased through DOME, I want DOME to try and mediate between me and the provider in finding a common solution, before I proceed to further actions.
  - I want to have dedicated expert support on integrating my marketplace within the DOME ecosystem
  - Other kinds of support: (type your own)

Contractual agreement

Agree / Disagree

1. To enable the revenue sharing model for the products that my Organisation is publishing on the DOME catalogue a contractual agreement between DOME and the Service Provider will be established.

3.2.4 Final Considerations

If possible, we would like to have an open discussion with the survey participant about what they would expect from DOME, based on their current understanding.

- “In general, what would you expect from DOME to be valuable for your Organisation’s business”
- “What would make you hesitant in using DOME”
- Finally, would it be possible for you to give a rough estimation of your Organisation’s yearly revenues from cloud services provisioning?
  - Small (under 100k€)
  - Medium (between 100k€ and 500k€)
  - Large (over 500k€)
  - Not willing to answer

Annex B. Partners initial feedback collection form

Here is a list of some of the identified stakeholders:

- Cloud/edge service/data providers
- Data/app service providers
- Platform & IaaS providers
- Service Customers
- SMEs Customers
- SMEs Providers
- Public bodies/administration
- Citizens
- Purchasing/procurement managers
- Policy makers
- Software development companies
- Government/Public authorities, as a customer
- Data owners
- Integrators
- Startups
- Other Marketplace operators
- AI Software vendors
- IT Providers

On the following table pick 3 (or add more) and explain, according to your knowledge & expertise, their profile and what their expectations would be for DOME:

Stakeholder title	**Profile** • **Who are they?** • **What is their main job?** • **What is their familiarity with such solutions?** • **What is their objective from using DOME?**	**Expectations from DOME.** • **What is their main objective when using DOME?** • **How do they currently achieve this objective without DOME?** • **What additional value from the current situation would they expect from DOME?**
Your input here	Your input here	Your input here
Your input here	Your input here	Your input here

Your input here	Your input here	Your input here

For the above stakeholders, write some features that they would need in DOME, in order to achieve their objectives and get the promised added value.

Stakeholder title	**Features and functionalities to achieve above-mentioned objectives and added value**
Your input here	Your input here
Your input here	Your input here
Your input here	Your input here

What is the added value for YOUR organisation, and what are the features that you expect in order to achieve this value? (referring to the DOME platform, NOT THE PROJECT!)

Your input here

Annex C. Summary of requirements per priority

MUST

- RQ-01 Any User must be able to view the list of services that are available for provisioning in DOME.
- RQ-01-01 The provider must be able to add a service for provisioning in DOME.
- RQ-01-02 The marketplace operator must be able to add in DOME a service for listing, by utilising an API.
- RQ-01-03 The administrator must be able to remove (delete) a service from the list of services.
- RQ-03 Any User must be able to view a page with more information, in respect to the list of services, about each service.
- RQ-23 Any User must be able to view the list of providers that have at least one service listed.
- RQ-05 Any User must be able to filter the services shown in the 'Service list' by using a key text (word or phrase).
- RQ-14-03 While a service supports it, the customer must be able to instantly buy a service.
- RQ-18 The customer must be able to view a list of all their active services.
- RQ-35 The authenticated user must be able to access his/her e-wallet, which stores at least a cryptographic key and transactional history.
- RQ-19 The customer must be able to view an active service page, which includes at least a) The service title, b) The service provider, c) the contract, d) the summary of the service, e) the specific characteristics of the service, f) the configuration applied, g) the resources allocated to the service, and h) the pricing model, i) the billed amount.
- RQ-58 While there is an active recurring payment, the customer must be able to revoke the authorization for the recurring payment.
- RQ-51 While at least 1 contract is active, the authenticated user must be able to request a contract for cancellation.
- RQ-51-01 While at least 1 contract is active and the other party of the service has requested a contract cancellation, the authenticated user must be able to confirm or flag the contract cancellation.
- RQ-48 The authenticated user must be able to view visualisations of the data and metrics that have been defined by the providers, for the service data he/she has access to.
- RQ-36 The provider must be able to view data analytics on their listed services, including at least the latest viewed, and the most viewed.
- RQ-37 The authenticated user must be able to view data analytics on their ordered services, including at least the number of orders, number of active/completed, and billing.
- RQ-59 The provider must be able to view data analytics on data indicators which are specified by the administrator.
- RQ-61-01 The administrator must be able to specify access (view or edit) for all the visualisation dashboards to an authenticated user.
- RQ-62-01 The administrator must be able to specify access (view or edit) for all the available datasets to an authenticated user.

- RQ-63 The authenticated user must be able to flag a service and a provider to report a breach of terms and conditions or in compliance.
- RQ-34 The authenticated user must be able to manage (add, delete, update) their certificates.
- RQ-42 The authenticated user must be able to launch a conflict resolution process ticket for an active contract.
- RQ-43 The administrator must be able to view and manage (arbitrate, send messages and files, put on-hold, close) all the launched conflict resolution process tickets.
- RQ-44 While there is at least 1 open linked conflict resolution process, the authenticated user must be able to send messages and files to the administrator.
- RQ-26 The authenticated user must be able to register at least one customer or provider profile.
- RQ-27 While at least one customer, provider or marketplace operator profile is linked with the user's account, the authenticated user must be able to select the perspective from which he/she is currently using the system.
- RQ-29-01 While an authenticated user adds an anonymous or authenticated user to one of the linked profiles, the system must be able to send an email to the invitee, which includes at least a) the name of the authenticated user that sends the invite, b) the customer, provider or marketplace operator profile name, c) a link to register.
- RQ-32 While at least one customer, provider or marketplace operator profile is linked with the user's account, the authenticated user must be able request the deletion of the respective profile.
- RQ-32-02 While the authenticated user has requested the deletion of a profile and the profile is eligible for deletion, the administrator must be able to approve the deletion of the respective profile.
- RQ-33 While at least one customer, provider or marketplace operator profile is linked with the user's account, the authenticated user must be able to delete the respective profile.
- UX-29 While the authenticated user has sent an invitation for adding Any User to a linked customer, provider or marketplace operator profile, the system must link the invitee's email to the respective profile.
- UX-NA-02 Any User must be able to easily navigate into the DOME platform features.
- UX-NA-03 Any user must be able to use the system with various devices and screen sizes, including at least desktop computer, table and smartphone.
- UX-NA-05 While an error occurs, Any User must be able to view a clear and prompt notification, which includes concise and jargon-free information on the error description and suggestions on possible solutions to resolve the problem.
- UX-NA-10 While completing more complex actions, Any User must be able to view comprehensive success messages that confirm that the action has been completed successfully.
- SI-21 The system must be able to send services for listing to the federated marketplaces, following the TMForum standard APIs.
- SI-45 While an offer is accepted by the customer, the system must forward the activation request to the federated marketplace.
- SI-NA-04 The system must be able to handle actions (API calls) originated from a federated marketplace following the TMForum standard APIs.
- SS-NA-01 The system must implement identification and transaction features that allow the legally supported authentication of the user and authentication for performing relevant actions that need such legal supported identification
- SS-39 The system must be able to provide 3D Secure Process for processing payments.

- SS-NA-02 While an external system (including any user) tries to access a protected (data or function), the system must validate that the external system or user has the appropriate access permissions.
- SS-NA-03 The system must encrypt all data transmitted, including at least user information, transaction data, and communications.
- SS-NA-04 The system must verify the authorisation of Any User or Authenticated user in using a function.
- SS-NA-05 The system must implement mechanisms to ensure the integrity and immutability of the data stored and transmitted.
- SS-NA-06 The system must be deployed on infrastructure that implements security and infrastructure monitoring tools.
- SS-NA-07 The system must be end-to-end compliant with the GDPR.
- IM-01-01 While a provider adds a service in DOME, the system must link the added service with the provider.
- IM-01-02 While a marketplace operator adds a service in DOME, the system must link the service with the federated marketplace and with the provider.
- IM-NA-01 The system must not duplicate data that is owned or managed by a federated marketplace.
- IM-NA-02 All the provider and service description data must be compatible with the Gaia-X specifications.
- PR-14 While the provider submits an offer, the contract must be compatible with the DOME template contract.
- PR-26-01 While the provider has not been qualified, the system must not list (make visible) the provider and the linked services in the relevant system features, including at least the list of providers and list of services.
- PR-26-02 While the provider has submitted documentation for qualification, the administrator must be able to view the submitted documentation linked with the respective provider.
- PR-26-03 While the provider has submitted documentation for qualification, the administrator must be able to accept the qualification of the respective provider.
- PR-26-05 While the provider has submitted documentation for qualification, the administrator must be able to accept the qualification of the respective provider.
- PR-26-06 Any User must agree to the DOME terms of use before being able to register.
- PR-26-09 While the authenticated user has submitted documentation for identification, the administrator must be able to view the submitted documentation linked with the respective user.
- PR-26-10 While the authenticated user has submitted documentation for identification, the administrator must be able to accept the identification of the respective user.
- PR-44 While a conflict resolution process ticket is open, the authenticated users must communicate only with the administrator and support personnel and vice-versa.

SHOULD

- RQ-02 While viewing the list of services, Any User should be able to view at least a) service image, b) the service summary, c) the name of the service provider, d) the service domain, e) the overall rating and f) the indicative price, for each service, g) related services (e.g., migration, substitution, dependencies), h) lifecycle status (‘in study’, ‘in design’, ‘in test’, ‘active’, ‘rejected’, ‘launched’, ‘retired’ or ‘obsolete’), i) product catalogue title, in the respective list entry.

- RQ-02-01 The provider should be able to enter for a service at least a) an illustrative image, b) the service summary, c) the service domain, d) the price, e) detailed description, f) use cases/success stories, g) related services (e.g., migration, substitution, dependencies), and h) criteria for publishing the service in different marketplaces (at least geographical, domain, time-based, legal, compliance, specific marketplaces), i) Lifecycle status ('in study', 'in design', 'in test', 'active', 'rejected', 'launched', 'retired' or 'obsolete'), k) visibility criteria (based on customer profile), l) product catalogue title.
- RQ-02-02 The marketplace operator should be able to provide for each service at least a) service image, b) the service summary, c) the service domain, d) the indicative price, e) detailed description, f) use cases/success stories and, g) the name of the service provider, h) related services (e.g., migration, substitution, dependencies), and i) service page on the federated marketplace, j) criteria for publishing the service in different marketplaces (at least geographical, domain, time-based, legal, compliance, specific marketplaces), k) Lifecycle status ('in study', 'in design', 'in test', 'active', 'rejected', 'launched', 'retired' or 'obsolete'), l) visibility criteria (based on customer profile), m) product catalogue title.
- RQ-04 While viewing the service page, Any User should be able to view at least: a) service image, b) the service summary, c) the name of the service provider, d) the service domain, e) the overall rating, f) the indicative price, g) detailed description, h) details of the ratings/reviews, i) source of the service (name of federated marketplace or DOME), j) use cases/success stories, and k) related services (e.g., migration, substitution, dependencies), l) Lifecycle status ('in study', 'in design', 'in test', 'active', 'rejected', 'launched', 'retired' or 'obsolete'), m) product catalogue title
- RQ-21 The marketplace operator should be able to define the acceptance criteria (at least geographical, domain, time-based, legal, compliance, specific marketplaces) for publishing a service listed in DOME to their federated marketplace.
- RQ-21-01 The provider should be able to define the acceptance criteria (at least geographical, domain, time-based, legal, compliance, specific marketplaces) for (re)publishing a service listed in DOME to the federated marketplaces that participate in the DOME federation.
- RQ-24 While viewing the list of providers, Any User should be able to view the profile of each listed provider, including at least a) name, b) summary, c) domains, d) overall rating (aggregated from listed service), e) detailed description, f) list of offered services (links to service pages), g) use cases/success stories (aggregated from listed services), h) linked federated marketplace (if applicable)
- RQ-64 While there is a service contract between a Customer and a Provider, the Customer should be able to leave one rating for the linked service listed in DOME.
- RQ-06 Any User should be able to filter the services shown by each available service field.
- RQ-07 Any User should be able to filter the services shown by using natural language queries, i.e., search by text semantics and not exact text.
- RQ-08 While viewing the list of services, Any User should be able to sort the services listed at least by a) title, b) name of the provider, c) overall rating, and d) indicative price.
- RQ-12 While the customer is viewing a service, the customer should be able to initiate a message exchange with the respective service provider.
- RQ-12-01 While a customer has initiated a message exchange linked with a service, the provider should be able to participate in the message exchange.

- RQ-13 While viewing (a service page or a message exchange linked with a service) and the service is listed on a federated marketplace, the customer should be able to visit the service page on the federated marketplace.
- RQ-14-01 While viewing a message exchange linked with a service and the provider has uploaded an offer (contract), the customer should be able to accept the contract.
- RQ-14-02 While the customer has accepted an offer (contract), the provider should be able to view a confirmation that the customer has accepted the offer.
- RQ-14-04 The customer should be able to select more than one service and combine them in one order.
- RQ-15 The customer and the provider should be able to view a list of their active offers and contracts.
- RQ-16 While a contract offer has been accepted by the customer, the provider and the customer should be able to exchange messages, linked to the contract.
- RQ-66 The customer should be able to create, configure and manage procurement processes.
- RQ-66-03 The customer should be able to accept at least one submitted proposal in a procurement process.
- RQ-47 The provider should be able to submit the data metrics used for billing.
- RQ-49 While the customer has proceeded with a payment, the provider should be able to submit the payment receipt to the customer.
- RQ-50 The customer should be able to set up banking information along with rules/parameters for authorisation for recurring charge.
- RQ-52 While the provider has submitted metrics for billing, the system should be able to use the metrics to calculate an estimation of the customer billing and DOME revenue.
- RQ-53 The authenticated user should be able to view a list of all the billed charges, including for each billed item at least a) the related service, b) the related active contract, c) the charged amount, d) the date of the charge, e) the dates on which the billed amount corresponds, f) the pricing model, g) the details of how the billed amount was calculated, h) the entity where the amount was deposited, i) the receipt.
- RQ-54 The authenticated user should be able to filter the items listed in the billing list, by using criteria for any of the available item fields.
- RQ-41 The customer should be able to pay their recurring and one time billed payments.
- RQ-41-01 The customer should be able to store the information of at least one preferred payment method.
- RQ-39 The provider should be able to set up billing and payment notifications for an active contract.
- RQ-40 The customer should be able to view billing and payment notifications for their active contracts.
- RQ-56 The customer should be able to view a notification if a payment, either recurring or one-time, has failed.
- RQ-19-01 While viewing an active service page, the customer should be able to update the configuration applied.
- RQ-51-02 While a contract cancellation is flagged, the system should launch a conflict resolution process ticket.
- RQ-60 While the authenticated user has access to at least one dataset in the monitoring dashboard, the authenticated user should be able to manage (create, edit, remove) visualisation dashboards with the datasets he/she has access to.
- RQ-31 While the provider has not been qualified, the provider should be able to submit to the administrator at least 1 document (e.g., ID, country-dependent personal

documents, billing documents, and company documents if applicable) for passing the qualification process.

- RQ-31-01 The administrator should be able to view the list of providers qualification status and the respective documents submitted in DOME.
- RQ-38 Any User should be able to exchange messages with a chatbot, which provides predefined responses to frequently asked questions.
- RQ-38-01 The support personnel should be able to set up the predefined question terms and the text of the responses of the chatbot.
- RQ-28 The authenticated user should be able to submit a support ticket.
- RQ-26-01 Any User should be able to use eIDAS [15] advanced or qualified signatures and seals to identify themselves.
- RQ-26-07 Any User should be able to use legacy methods to identify themselves.
- RQ-29 While at least one customer, provider or marketplace operator profile is linked with the user's account, the authenticated user should be able to add Any User or authenticated user to one of the linked profiles by filling the invitee's email address.
- RQ-30 While at least one customer, provider or marketplace operator profile is linked with the user's account and the authenticated user has sent an invitation to add an anonymous or authenticated user to one of the linked profiles, the authenticated user should be able to cancel the invitation.
- RQ-32-01 While the authenticated user has requested the deletion of a profile, the system should be able to validate the eligibility for deletion, including at least the existence of pending payments, active recurring payments, active conflicts and active contracts.
- UX-NA-01 While the authenticated user uses their identity from a federated marketplace, the authenticated user should be able to view the federated marketplace logo and link back.
- UX-NA-04 The authenticated user should be able to manage their preferences of using the system.
- UX-NA-06 While an error occurs, Any User should be able to view information on the error impact, including at least how the currently used function may be affected, how data may be affected and any potential follow-up consequences.
- UX-NA-07 While an error which is estimated that it cannot be recovered by the user occurs, Any User should be able to directly submit a support ticket, without the need to include all the technical details of the error.
- SI-NA-01 The authenticated user should be able to export and download their own and accessible data including at least profile data, order history, billing information, generated content and visualisation dashboards.
- SI-NA-03 While a service is listed via a federated marketplace (i.e. the provider does not participate directly in DOME), the provider should be able to use the DOME features by using their federated marketplace identity.
- SS-NA-08 For any file uploaded to the platform, and by any means or method, the system should implement strict controls on verifying its security, including at least filetype check, size limit check and antivirus scan.
- IM-07 The system should be able to extract semantic attributes of the listed services.
- IM-29 A customer, provider or marketplace operator profile should be linked with at least one authenticated user.
- PR-26-04 While the provider has submitted documentation for qualification, the administrator should be able to request from the provider the submission of more documents.

- PR-26-07 While not already authenticated with a legally-supported identification method, the authenticated user should be able to upload at least one document that legally supports their identification.
- PR-26-08 The authenticated user should be able to use 3rd-party services that provide legally supported person identification.
- PR-26-11 While the authenticated user has submitted documentation for identification, the administrator should be able to request from the user the submission of more documents.

COULD

- RQ-20 Any User could be able to filter the services shown by using categories organised in tree structure.
- RQ-20-01 The administrator could be able to define the titles and structure of the categories of the listed services.
- RQ-09 While viewing the list of services, the authenticated user could be able to sort the services listed by relevance to their profile.
- RQ-10 While viewing the list of services and services are filtered by using natural language queries, Any User could be able to sort the services listed by relevance to their query.
- RQ-11 While viewing the list of services, the authenticated user could be able to hide a service from the list of services.
- RQ-22 While viewing the service page, the customer could be able to view other suggested services that are available in the service list.
- RQ-25 The customer could be able to define private lists that consist of listed services.
- RQ-55 While the provider has provided metrics for billing, the customer could be able to simulate the total cost of a service based on defining values for these metrics.
- RQ-12-02 While a customer has initiated a message exchange linked with a service, the provider and the customer could be able to send and receive files within the messaging user interface.
- RQ-14 While viewing a message exchange linked with a service and a customer, the provider could be able to upload an offer for the service, in the form of a contract.
- RQ-17 While a contract offer has been accepted by the customer, the customer could be able to send to the provider documents and files that are required for the activation of the service.
- RQ-45 While a contract offer has been accepted by the customer, the provider could be able to confirm that the service is ready for use.
- RQ-66-01 The customer could be able to invite specific providers to participate with proposals in a procurement process.
- RQ-66-02 The customer could be able to compare side-by-side, and per specified need in a procurement, the proposals that providers have submitted.
- RQ-57 While there is an active recurring payment and the payment method is going to expire in less than 3 months, the customer could be able to view a notification that the payment method is going to expire.
- RQ-46 The provider could be able to submit filled-in forms for data access that correspond to service monitoring metrics.
- RQ-61 The authenticated user could be able to specify access (view or edit) for their visualisation dashboards to another authenticated user.
- RQ-62 The authenticated user could be able to specify access (view or edit) for their datasets to another authenticated user.

- RQ-31-02 The administrator could be able to manage the qualification status of the providers, as ‘Qualified’, ‘Not qualified’, ‘Further documentation required’, ‘Waiting for assessment’.
- RQ-31-03 The administrator could be able to add notes for the provider in the qualification status list.
- UX-29-01 While Any User clicks the link included in the invitation email, the system could be able to pre-fill Any User’s email address in the registration page.
- UX-NA-08 Any User could be able to view walkthrough information on using the system features.
- UX-NA-11 While a page takes more than 2 seconds to load, Any User could be able to view a notification on the progress of loading and estimated time to complete it.
- UX-NA-12 The authenticated user could be able to configure the detail level of the errors and notifications they receive.
- SI-48 While the provider has defined service metrics, the system could be able to fetch the submitted datasets by connecting to the submitted database.
- SI-NA-02 The authenticated user could be able to import a dataset in csv format in their visualisation dashboard.

WON’T

- RQ-65 The system won’t have comprehensive service management functions, including starting, stopping, extending, updating, automatically configuring, installing and deploying services.
- PR-45 The system won’t manage service execution policies for the services listed.

Annex D. Table of simplified features, incl. traceability to requirements and stakeholders

Functionality from [1]	Functionality in DOME	Short description	relevant D2.1 requirements	Explanation	Customers	Providers	Dome operator and broker	Supervisory and governance bodies (Influencers)	Federate Marketplace (Business Partners)
Service listing function (mandatory) At the heart of the marketplace lies the service. It takes the form of a standardised, ordered and detailed list of services made available by providers to customers. Via a dedicated portal, providers can create and manage their service listings and describe them using predefined description fields. This detailed information is accessed by	**FUNC-1-1. Service listing** Support listing of services available in the DOME ecosystem	List of services: Service onboarding (contents publishing).	RQ-01-01, RQ-01-02, RQ-01-03, RQ-02, RQ-02-01, RQ-02-02, RQ-04, RQ-21, RQ-23, RQ-24	Any provider should have an interface to describe his own product/service. This form is binding a standard data model addressing all the characteristics that the description must contain. This improves both the quality of the description and the capability to compare products of the same category. The description will have a set of mandatory attributes to be defined in order to make the product visible on the catalogue. The functionality will consider a "staging" area where the provider can create the product description, while waiting for the final DOME authorization coming from the certification process. Only after the Certification has been successfully passed and		x			

customers via their own dedicated portal or a standardised landing page. A sector-specific user interface might be envisaged to improve the user experience and adoption.				all the mandatory attributes will be satisfied, the product will be published in the shared catalogue.					
		List a service-provider data entry: Price list definition	RQ-02-01	A specific interface allows the provider to define a price list for any defined product. This is mainly related to the off-the -shelf products. An advanced functionality can be the capability to define different price lists for different customers or customers categories. This will support the tailored offering as well.		x			
		Selling chain management		To support the revenue sharing model, a specific "selling chain management" function allowing the definition of the role of the different participants and the economic agreement signed by the parties should be provided.		x	x		
		Product SLA/KPI (if applicable)	PR-14	With the single exception of potential "raw" products, all the service offering must (by dome contract) be associated with a reference SLA with predefined KPIs. A specific area describing such SLAs must be provided by the portale interface.		x			
		List a service-provider data entry:	RQ-02-01	Any product should be classified according to a predefined set of attributes that can later on be considered to grouping them in homogeneous		x	x		

		Product category definition		classes, for product searching, product comparison and product filtering					
		Provisioning management layer	RQ-45, SI-45	All the providers publishing services on the DOME catalogue need to develop an integration process to automate the provisioning of the procured services in a user transparent way. While any service will have its own specific need DOME should provide a standard interface addressing the provisioning workflow in order to simplify this integration process.	x	x	x		x
		Provider contract activation	PR-26-06	The provider onboarding process starts with the agreement on the standard contract model including obligations and and compensations to enter the DOME ecosystem. The contract signed by the parties will address both the direct relationship between the Provider and The Dome operator, but also the set of obligations the Provider must accept to be part of the ecosystem (es. the availability of a customer support service, the need to expose a service level agreement, etcetera).		x	x		

Search & browsing function: (mandatory) This feature lets customers find the specific service they are looking for. In its most basic format, the marketplace and its service catalogue should allow customers to launch product searches on the marketplace portal, leveraging category filters and easily accessible product pages.	**FUNC-1.2. Search & browsing** Enable search of services through structured queries, as well as filtering and sorting of service offerings based on criteria such as price, performance, provider reputation, and compliance standards.	List of services: Catalogue browsing	RQ-01	The user (including GUEST users) should have the capability to navigate the catalogue sorting and filtering the contents with different criteria. The interface must allow the list of many products providing just baseline information like name of the product, the provider, and the price. The products list may be filtered upon the user that is browsing the catalogue to address specific needs of the different providers. (ex. a provider may decide to not publish some product in specific countries or to distinguish the SME offering from the enterprise offering and so on).	x	x	x	x	x
		Services page: Product detailed description	RQ-03	Once a product is selected the user can browse its detailed description with a clear understanding of the functionalities and the related options. The relevant feature here is the definition of a standard data model enabling the possible comparison of different products of the same category.	x	x	x	x	x

		Service page: Product pricing	RQ-03	Any product description should have a specific area where the user can find the description of the pricing model, the visibility of the available pricing plans, and the cost related to the described options if any. This section must clarify if the product is sold through the off-the-shelf model (in this case the pricing is explicit) or in a tailored mode (in this case a simple "contact" option will be shown to create a direct link from the user to the provider).	x	x	x		
		Pricing simulator	RQ-55	For off-the-shelf products a specific functionality to allow the customer to have a simulation of the service pricing in time should be provided	x	x			
		Filter by field: Catalogue filter by criteria	RQ-06	The user should have the possibility to filter the catalogue contents based on reference criteria (category, price, brand, and so on)	x	x	x	x	x
		Filter by tree	RQ-20, RQ-20-01	Any User could be able to filter the services shown by using categories organised in tree structure.	x	x	x	x	x

Advanced search/browsing algorithms: (optional) building upon the basic search functions illustrated previously, it is possible to design and implement more advanced features with the goal of connecting shoppers with relevant products as quickly as possible. Notably, it is possible to implement a search algorithm which would match customer search queries with keywords from relevant product listings. Even more advanced search functions may leverage additional information (such as product ratings or click-through rates) to prioritise/rank the results of search queries and improve the customer experience. Finally, search algorithms could also be specific to the customer's sector to provide results that take into account the customer's particularities. This feature could	**FUNC-1.3. Advanced search & browsing:** Implements advanced searching through natural language processing, ranking and customization of search results based on user preferences, domain relevance, similarities, and other factors.	Natural language search	RQ-07	A natural language query function should be provided. This query didn't work on the categories addressed by the default filtering capability but searches the catalogue contents considering the product description (including pricing model and SLA) provided by the different providers.	x	x	x	x	x
		Sorting - relevant to me	RQ-09	While viewing the list of services, the authenticated user could be able to sort the services listed by relevance to their profile. The relevance may be calculated based on the user's previous activity, purchased services, industry, domain, etc.	x	x	x	x	x
		List of service - hide	RQ-11	While viewing the list of services, the authenticated user could be able to hide a service from the list of services.	x	x	x	x	x
		Suggestions	RQ-22	While viewing the service page, the customer could be able to view other suggested services that are available in the service list. The suggestion of services may be based on the similarity of different service fields and on customer profile.	x				

be developed in conjunction with a sector-wise user interface.		Private list	RQ-25	The user has the capability to tag the catalogue products defining a "preferred/private list" in order to immediately focus on the services he is focused on during the browsing sessions.	x				
Certification system: (mandatory) A key demand from public and private customers of cloud services in Europe is the need to access a reliable source of information on the sovereignty and trust of potential cloud services. As a result, a basic service certification system must be included even in the most basic EU Cloud Marketplace scenarios. A basic certification system could for example involve formal verification by the marketplace operator of a select list of official certifications (e.g. official cloud security	**FUNC-6.1. Certification** Assure that services offered in catalogue are duly certified.	Provider qualification: Provider compliance self declaration	RQ-31, RQ-31-01, RQ-31-02, RQ-31-03	A provider should be able to fill a self assessment form qualifying himself as compliant with the DOME rules. This includes the upload of the required documents to prove the compliance.		*			
		Provider qualification: Product compliance self declaration	RQ-31, RQ-31-01, RQ-31-02, RQ-31-03	Any provider must fill a self assessment form about the compliance of the single service/product the DOME rules. This includes the capability to upload the needed documents to prove the compliance.					

certifications like SecNumCloud or BSI C5) but rely on a declarative approach for private-sector led labels, which would be verified only once the first transaction takes place for the given service to minimise the administrative burden. The involvement of external audit & certification agencies to carry out these tasks is explored in section 5.2 of this document.		Provider profile editing	UX-NA-04	The DOME operator should be able to edit/modify the provider profile. Note: the loss of the baseline qualification must automatically take off the visibility of all the Provider products from the catalogue and must start a notification to all the subscribers about the change of the condition.			x		
		Provider profile visualisation	RQ-23, RQ-24, PR-26-01	The user must be able to visualise the Provider qualification panel providing visibility of the validated credentials	*	x	*		
		Provider suspension	PR-26-01	DOME may allow a "grace period" for the provider to fix his own positioning. During this time the provider is "suspended", this means he cannot receive additional orders for his products. To be defined if this startts a notification to the existing subscribers or not.	x	x	x	x	x
		Product profile editing	RQ-02-01	The DOME operator should be able to edit/modify the product profile. The loss of the product baseline qualification must automatically remove the visibility of the product from the catalogue and start a notification to all the			x		

				existing subscribers about the change of the condition.					
		Service page: Product/service profile visualisation	RQ-03	The user must be able to visualise the product qualification profile describing the difference compliances validated by DOME.	*	*	x		
		List a service-administrator delete: Product suspension	RQ-01-03	DOME may allow a "grace period" to fix the product positioning. During this time the product is "suspended" it means it's still visible but cannot receive orders. To be clarified if it starts a notification to the existing subscribers or not.	x	x	x	x	x

Automated certification system: (optional) beyond a basic manual and declarative certification system (relying on information provided by the service providers themselves), more advanced certification features can be envisioned. For instance, an automated and trusted digital certification system could be developed, and access granted to public, and possibly private, certification and audit agencies. While the development of this digital certification platform would come at a higher upfront cost, it would distribute the verification responsibility and accelerate verification of certifications through digital authentications. The repository (or part of it) could be made readable to all, providing all firms and citizens with direct access to verify certifications and further strengthening trust in the European ecosystem. The repository could therefore be	**(partly) FUNC-6.1. Certification** Assure that services offered in catalogue are duly certified.	Provider qualification: Certification validation	RQ-31, RQ-31-01, RQ-31-02, RQ-31-03	Where applicable the validation about the validity of the official certificate proving the compliance is done through an automated process. This process belongs to the availability of an open data interface from the different certification authorities, not yet warrantied.		x			
		Provider localization validation		One of the requirements of the EU rules is the localization of the service platform inside the European Community boundaries. The capability to automate this kind of control should be evaluated.			x		
		Provider financial status		One of the possible parameters to ensure the provider's reliability is to check his financial positioning. To be investigated if this task can be done automatically.					
		Flag a service or provider	RQ-63	The authenticated user must be able to flag a service and a provider to report a breach of terms and conditions or noncompliance.	x	x	x	x	x

used for other applications of the forthcoming EU Cloud Rulebook.									
IAM system: (mandatory) A robust identity and access management system will be required to ensure trust in the information listed on the platform by providers, as well as to enable customers to order services, manage their profile and benefit from a tailored experience. A basic IAM could be implemented by integrating a third party IAM solution. The marketplace could then build or connect to a federated IAM such as the service due to be provided by GAIA-X.	**FUNC-6.3. IAM:** Advanced Identity and Access Management	User registration: Portal login	RQ-26	While the catalogue can be browsed by guest users, the access to actionable services must be protected by an authentication layer supported by a centralised federated authentication system relying on trusted authentication sources.	x	x	x	x	x
		User registration	RQ-26	The portal should allow the self registration of single users functionality. Due to the need to collect personal information this feature should address all the GDPR requirements.	x	x	x	x	x
		User registration: Company registration	RQ-26, IM-29	To enable B2B business the portal should address the "company" environment and later to allow the registration of individuals under that context.					
		Invite user to profile: User profile	RQ-29, RQ-29-01, IM-29	A "company administrator" should be able to assign different roles with different visibility on the portal functionalities to the different users registered in the company domain. Tha same					

		management		admin can revoke the user affiliation to the company.					
		GDPR oblivion request	RQ-32, RQ-32-01, RQ-32-02, SS-NA-07	In order to be fully compliant with the GDPR the portal should provide a "Oblivium management" functionality removing any track of a personal identity from the database.					
		eIDAS registration	RQ-26-01	Any User should be able to use eIDAS [15] advanced or qualified signatures and seals to identify themselves.	x	x	x	x	x
		Select interaction	RQ-27	While at least two customer, provider or marketplace operator profiles are linked with the user, the authenticated user must be able to select the perspective (customer, provider, Marketplace operator) which he/she is currently using the system.	x	x	x	x	x

		Invite user to profile	RQ-29, RQ-29-01, IM-29, RQ-30	While at least one customer, provider or marketplace operator profile is linked with the user's account, the authenticated user should be able to add Any User or authenticated user to one of the linked profiles by filling the invitee's email address. Access to the function may be further limited by profile-level authorisation levels, i.e. only the 'Administrator' of the profile may access this function	x	x	x	x	x
Reporting and analytics system: (mandatory) customers, providers, and the operator will require metrics to monitor activity and adoption, identify sources of improvement and detect and correct issues. This function should first be developed to meet the needs of providers and the operator, and then evolve to meet needs of customers (particularly to	**FUNC-5.1. Reporting and analytics:** Provide dashboards and visualisations to enable insights into service consumption and optimise decision-making.	Service monitoring-inventory: Subscriptions dashboard	RQ-18	The user should have the possibility to view all the active subscriptions and their description. An option to enable Historical report, showing also the closed ones should be provided. The module allows users to select the single subscription on the list to open the detailed description page.	x	x	x		
		Invoicing dashboard	RQ-53	A report showing the upcoming invoicing should be provided. The dashboard should allow the user to select a line from the list to see the detailed invoice description.	x	x	x		

support the first and last stages of their journey).	customers, providers, and the operator will require metrics to monitor activity and adoption, identify sources of improvement and detect and correct issues. This function should first be developed to meet the needs of providers and the operator, and then evolve to meet needs of customers (particularly to support the first and last stages of their journey).	List of offers and contracts: Pending offering report	RQ-15	Tailored offering may require time to be processed. This report lists the pending offering not yet transformed into subscription. The module allows the capability to select a specific offer to access a detailed description of the trade.	x	x			
		Metrics for service monitoring: Service usage reporting	RQ-46, RQ-48	A report providing visibility of the metering of the different services usage.	x	x			
		Service orders: Statistical user registrations	RQ-59	A report about the portal users showing the trend of the registrations (with detail about the number of companies and so on) should be provided to allow the DOME operator to understand the success of the marketing activities.		x	x		x
		Service orders:	RQ-59	A report about the registered providers should be published to allow the DOME operator to			x		x

		Statistical Providers registration		understand the trends and the success of the on boarding process.					
		Service orders: Financial report	RQ-59	A Financial report summarising the value of the business moved on the portal should be provided. Upon specific filtering capabilities the same report can be shared with providers and marketplace operators.	x	x	x		x
		Service orders: Visit to Registration to Ordering report	RQ-59	A Report comparing the number of guest visit with the number of new registrations and the number of entities that placed an order on the portal gives a picture of the success of the portal			x		x
Advanced reporting and analytics: (optional) reporting and analytics features can also be developed into more advanced (freemium) versions. Notably, the marketplace can provide users the option to	**FUNC-5.2. Advanced reporting and analytics:** Support customisation of analytics	Report download capability	SI-NA-01	All the reporting functionalities will provide a data export capability. Report data will be exported in CSV, XML, or PDF for user convenience.	x	x	x		x
		Data export interface	SI-21	Report data can be collected through an API interface allowing integration with external	x	x	x		x

personalise their reports or to export data to outside platforms via connectors and APIs. For instance, with the help of the brokering services data, the marketplace could provide personalised consumption monitoring for each customer.	dashboard, historical data and personalised visualisations.			systems. This functionality should ensure proper data protection.					
		Dashboard customisation	RQ-60, RQ-61	While the authenticated user has access to at least one dataset in the monitoring dashboard, the authenticated user should be able to manage (create, edit, remove) visualisation dashboards with the datasets he/she has access to. Visualisation dashboard may include the definition of metrics, charts and chart types, modification of SQL queries, size and positioning of graphical elements.	x	x	x	x	x
		Dataset share	RQ-62	The authenticated user could be able to specify access (view or edit) for their datasets to another authenticated user.	x	x	x	x	x
		Report scheduling capability		A report can be automatically generated on a scheduled basis. The generated report may be then sent by email to a predefined mail address.	x	x	x		x
Financial simulation: (optional) To favour user adoption and competition within the several	**integrated in FUNC-1.3.**	Expenses forecast	RQ-55	A report that, upon the analysis of the historical billing trends, tries to forecast the expenses in the next x months.	x	x	x		x

CSPs, the marketplace should include a financial simulation feature. Customers would then be able to forecast and compare the costs of the options that fit their needs	**Advanced search & browsing:** Implements advanced searching through natural language processing, ranking and customization of search results based on user preferences, domain relevance, similarities, and other factors.	Cost scenario simulation	RQ-55	A panel enabling the simulation of a scenario including multiple subscriptions with specific options and pricing to have visibility of the possible TCO. As an option, upon customer decision, the simulation can be transformed into real subscriptions.	x				
Customer service: (mandatory) Customer service is an essential component of improved customer experience within the context of (online) cloud marketplaces. Even a basic format of customer service can	**FUNC-6.2. Customer service:** Provide support to the platform users, including	Online help functionality (KB)	UX-NA-08	An online contextual help functionality should be provided since the early beginning of the operations to support the user in the portal usage. The knowledge base contents will be browsable through a web interface and will include both FaQ indications and other useful documents.	x	x	x	x	x

drive customer loyalty and adoption. Under its most basic format, customer service may take the form of a 'Help' search function, FAQ page and contact forms when customers encounter an issue.	conflict resolution.	Email contact availability		Customer service will provide a direct email address the customer can use to ask for specific support. The customer service operators will monitor that email and will provide feedback according to a predefined service level agreement.	x	x	x		x
Advanced customer service: (optional) beyond the most basic forms of customer service, more advanced features can be designed and implemented (or acquired), such as, but not limited to: - AI-powered customer service (chatbots to improve the user experience for instance) - Knowledgebase, forums, or even training services - Self-care functions (via notice boards or universal search features) - Service Level Agreement (SLA) management can be used to provide the desired transparency	**FUNC-6.2. Customer service:** Provide support to the platform users, including conflict resolution.	Ticketing: Online support portal	RQ-28	An online portal allowing direct interaction with the customer service should be supported. This online portal should allow the opening of support cases, the traceability of all the requests, the monitoring of the applied SLA, and the monitoring of the ticket status.	x	x	x	x	x
		Chatbot: Natural language assistant	RQ-38	A natural language virtual assistant able to directly interact with the user providing information about the portal usage or to collect the user requests should be provided.	x	x	x		x
		Conflict resolution	RQ-51, RQ-51-01, RQ-51-02	While not directly involved in the service provisioning, DOME will provide some contract warranties to the buyer and will support the conflict resolution, where feasible to facilitate the relationship.	x	x	x		

and guarantees, including data privacy and protection - Customer/contact tracing									
Brokerage features: (optional) within the context of a European Cloud Marketplace addressing public and private customers (probably, with limited maturity in terms of the adoption of cloud services), different brokerage services could improve the customer experience significantly. Notably, automated or procedural services could be implemented to facilitate transactions between customers and providers. For example, a broker could help customers find the most relevant service provider for their needs or facilitate the contractual formalities between customers and providers, if necessary, via	**FUNC-2.1. Brokerage:** Manage and track negotiation discussions, including the ability to exchange messages and documents securely (referring to interaction between a Customer and a Provider).Capture and store/record the agreed-upon terms and conditions in a transparent and	Centralised messaging system	RQ-12, RQ-12-01, RQ-12-02, RQ-16	DOME portal will provide a mechanism to create a direct communication link between Customer and Provider.	x	x	x		x
		Providers selection engine	RQ-22	A specific search engine that, working on the different providers profile will provide a list of the providers matching the selection criteria. Note: this function requires that different kinds of information should be included in the Providers profile.	x		x		x
		Tailored offering support	RQ-14, RQ-14-01, RQ-14-02	DOME will support the tailored offering support, allowing the customer to ask for a custom (not off the shelf) offering from a specific provider. The process will include the management of the entire process up to the formalisation of the agreement. This process will end with a standard order and a standard subscription that will later appear in the billing of the customer.	x	x	x		

pre-defined framework contracts.	auditable manner.	Tendering process support	RQ-66, RQ-66-01, RQ-66-02, RQ-66-03	DOME will support the tendering process, allowing the customer to request a specific offer from a preselected list of providers which can provide their best offer in a format allowing the comparison. This process will lead in the decision of the Customer of the tended winner that will receive a standard order.	x	x	x		
		Product ranking system	RQ-04, RQ-64	Customers may provide feedback about the satisfaction obtained in the usage of specific products. This will create a ranking system that may be helpful for the Customer that needs to select a new product from the platform.	x	x	x		x
		Provider ranking system	RQ-24	The sum of the providers product ranking will be used to create a provider ranking that will be later shown in the provider profile.	x	x	x		x
		Access services at federated marketplace	RQ-13	While viewing (a service page or a message exchange linked with a service) and the service is listed on a federated marketplace, the customer should be able to visit the service page on the federated marketplace. The visited page may be accessible or not, according to the specified marketplace policies.	x				

Advanced payment and order management: (optional) (applicable to the platforming scenario only): under certain advanced scenarios, the European Cloud Marketplace may offer payment functionalities to process the purchase of services made via the marketplace. In addition to payment gateways, multiple sub-features can be envisioned/considered such as (but not limited to): - Escrow and commission fees (in the case of brokerage services), - Standardised framework contracts, - Billing and invoice operations, - Multiple payment options.	**FUNC-4.1. Payment and order management:** Allow customers to view and update service configurations, access control settings, and billing information. Alerting and notification mechanisms to inform customers about critical events or service disruptions	Centralised billing management	RQ-40, RQ-47, RQ-52	DOME may keep the governance of the billing process ensuring the correctness of the computation and the bind with the contractual agreement.	x	x	x		x
		Centralised metering management	RQ-46	DOME will centrally collect visibility of the metering information about the service usage from all the involved providers. Such information will be used for the centralised billing and will be visible in the user reporting page.	x	x	x		x
		Centralised invoicing management	RQ-49	DOME will handle a white label invoicing service on behalf of the provider. Invoicing will be managed in line with the contractual agreement and the information coming from the billing engine. This engine should address all the legal requirements in the different member states.	x	x	x		x
		Centralised payment engine	RQ-41, RQ-41-01, RQ-56, RQ-57, RQ-58	A payment gateway enabling online and offline payment intermediating the relationship with payment gateway and banking systems must be provided. As an additional feature the payment engine must allow the capability to select a preferred payment method .	x	x	x		x

		Standardisation of contractual framework / template	PR-14	In order to ensure the compliance with the DOME rules, the contractual template used by the DOME providers will have some standard components ensuring the correct description of specific commitments. The contract between the providers and DOME will ensure the commitment of the providers in respect of those agreements.	x	x	x		
		Product ordering (off-the-shelf)	RQ-14-03	The platform should allow users to select a product, perform a cost simulation defining all the purchasing configuration, and to place an order. This function asks for a payment, sends an order to the reference provider, and starts the provisioning process. Once completed the customer will see the provisioned service in his/her dashboard.					
		Order configuration change (off-the-shelf)	RQ-14-03	Upon the product configuration and the selected selling plan, the Customer may have the possibility to change the subscription configuration upgrading or downsizing the service. The change will create a new provisioning process to align the service to the new configuration and a new order to align the economics to the new profile. This change will reflect in a revision of the billing process starting in the next billing cycle.	x				

		e-wallet access	RQ-35	The authenticated user must be able to access his/her e-wallet, which stores at least a cryptographic key and transactional history. The e-wallet may also contain bank information, linked with a 'customer' or 'provider' profile in which the authenticated user has appropriate access level. Transactional history refers to transactions related to the 'customer' or 'provider' profile in which the authenticated user has appropriate access level.	x	x	x	x	x
		Billing configuration	RQ-39	The provider should be able to set up billing and payment notifications for an active contract.		x			
		Recurring payment	RQ-50	The customer should be able to set up banking information along with rules/parameters for authorisation for recurring charges.	x				
		Service management:	RQ-51, RQ-51-01, RQ-51-02	Where allowed the Customer should have the possibility to terminate a subscription. (fixed price multi year subscriptions cannot be terminated before the end)	x	x	x	x	x

		Subscription termination							
Federation functionalities: (mandatory) To support the interaction of the different federated marketplace the DOME platform should implement a set of functionalities. Part of them are related to the interaction with the shared catalogue, others are related to the order/billing management, and some of them may be related to the reporting functionalities. All those functionalities are based on API interface.	**As extended by non-functional requirements: FUNC-1-1. Service listing** Support listing of services available in the Dome ecosystem	Catalogue products listing (API)	SI-NA-04	The federated marketplace has the capability to query the shared catalogue and get the list of the catalogue product. The query may include some filtering capability to immediately identify the set of products of interest.			x		x
		Catalogue product reading (API)	RQ-01-01, RQ-01-02, SI-21	The federated marketplace has the capability to import the detailed description of a catalogue item with all the different attributes. The commitment for all the federated marketplaces is to adapt their data model to ensure the visualisation of the full product profile.			x		x
		Price list reading (API)	SI-NA-04	The federated marketplace should read the specific price list associated with the specific product and in some cases associated with the user category or the specific user that is browsing the product page.			x		x

		Catalogue product registration (API)	RQ-01-01, RQ-01-02, SI-21	The federated marketplace may register a product in the shared catalogue staging area. If both the provider and the product passed the certification process and the product description is matching all the required definitions and attributes the product will be moved in the shared catalogue.			x		x
		Price list registration (API)	RQ-01-01, RQ-01-02, SI-21	The federated marketplace may register the price lists associated with the published product.			x		x
		Notification management (API)	SI-NA-04	The DOME platform and the federated marketplaces will communicate through a notification system advising the actors about relevant events. A sample of those events may be the availability of a new product in the catalogue, the update of a price list, or an order notification.			x		x