DOME

(Distributed Open Marketplace for Europe)

D2.3 DOME Ecosystem V1

Project full title

A Distributed Open Marketplace for Europe Cloud and Edge Services

Contract No.

101084071

Strategic Objective

DIGITAL-2021-CLOUD-AI-01-DS-MARKETPLACE-CLOUD

Project Document Number

DOME-D.2.3

Project Document Date

29.12.2023

Deliverable Type and Security

R - PU

Main editor

Engineering Ingegneria Informatica (ENG)

Contributors

ENG, IONOS, PONS IP, FF, iSHARE, TOP IX

This project has received funding from the European Union's Digital Europe Programme under grant agreement No 101084071

Log Table

Version	Date	Change	Author/partner
V01	20.10.2023	ToC & Initial Contents	Giovanni Frattini(ENG)
V02	6/12/2023	First version of the document	Lydia Montandon (FF), Giovanni Frattini (ENG), Leonardo Camiciotti (TOP IX), Giuseppe Cafiso (DHUB)
V03	19/12/2023	Final version	Giovanni Frattini (ENG)
V04	22/12/2023	Internal review	Lydia Montandon (FF)
VFinal	29/12/2023	Final check and preparation submission	Laura Pucci (ENG)

Table of Contents

Acronyms & Definitions

Acronym	Description
ADE	European Alliance on industrial data and cloud
AIoD	AI on Demand
CSP	Cloud Service Provider
DSBA	Data Space Business Application
DSSC	Data Space Support Center
EC	European Commission
ECI	European Cloud Initiative
IaaS	Infrastructure as a Service
ISV	Independent Software Vendors
KPI	Key Performance Indicator
PaaS	Platform as a Service
SaaS	Software as a Service
SIMPL	Standard Integration Management Platform Layer
TMF	TeleManagement Forum

1 Introduction

1.1 Executive Summary

DOME will provide the single point for enabling customers and service providers to meet each other in a trustful manner. The DOME marketplace will offer a federated collection of marketplaces connected to a shared digital catalogue of cloud and edge services.

Each of the federated marketplaces will be independent or connected to the offering of a given cloud provider which, in turn, can be classified as cloud IaaS providers or cloud platform providers (each of which provides a platform targeted to solve the integration of vertical data/application services from a given vertical domain, like smart cities or smart farming, or the integration of certain type of data/application services, e.g., AI services).

DOME will rely on adopting common open standards for the description of cloud and edge services and service offerings as well as their access through a shared catalogue.

This document presents the DOME project liaison strategy and the activities aimed to promote and create the background for the project following the policies established by our major sponsor, the EC.

Note for the reader, in the document by DOME Portal we will mean DOME Marketplace, a virtual place where to sell and buy bundles of digital cloud/edge services.

1.2 Intended audience

The intended audience is twofold—first the project partners. The consortium is constituted of 40 partners of different natures and with different roles along the cloud & edge value chain. Several partners have significant effort planned to dedicate to marketing activities and almost all partners are expected to promote the project in one way or the other. Second, the stakeholders of the DOME ecosystem will be important players in the establishment and success of the marketplace.

1.3 Structure of the document

This document is divided into 5 chapters:

Chapter 1: Introduction,

Chapter 2: Overview of the cloud and edge computing landscape in Europe

Chapter 3: Activities aimed to create liaison with relevant projects and initiatives

Chapter 4: Results and achievements

Chapter 5: Conclusions and recommendations

2 Overview of the cloud and edge computing landscape in Europe

2.1 Key trends and developments

The cloud and edge marketplaces are rapidly evolving, driven by technological advancements, increasing demand for cloud and edge computing solutions, and shifting business models. Here's a comprehensive overview of the latest trends in cloud and edge marketplaces from different perspectives:

Technical Trends

- Consolidation and Specialisation: Cloud marketplaces are consolidating, with larger players acquiring smaller, specialised marketplaces to expand their offerings and cater to diverse customer needs.
- Multi-Cloud and Hybrid Cloud Support: Marketplaces are increasingly supporting multi-cloud and hybrid cloud scenarios, allowing customers to manage and deploy applications across multiple cloud providers.
- Edge Computing Integration: Edge computing is becoming integrated into cloud marketplaces, enabling customers to discover, manage, and deploy edge-based applications and services.
- Containerisation: Containerization (and Kubernetes) is gaining traction in cloud marketplaces, simplifying application packaging, deployment, and management.
- AI and Machine Learning Integration: AI and machine learning capabilities are being integrated into marketplaces, enabling customers to automate tasks, optimise resource utilisation, and gain insights from data.

Operational Trends

- Self-Service and Automation: Marketplaces are moving towards self-service provisioning, automation, and self-healing capabilities, reducing manual intervention and improving operational efficiency.
- Usage Analytics and Reporting: Marketplaces are providing enhanced usage analytics and reporting tools, enabling customers to track resource consumption, optimise costs, and gain insights into application performance.
- Security and Compliance: Marketplaces are strengthening security measures and compliance frameworks to address escalating cybersecurity threats and regulatory requirements.
- Vendor Ecosystem Management: Marketplaces are expanding their vendor ecosystems to offer a wider range of solutions, catering to diverse customer needs and use cases.
- Global Reach and Localization: Marketplaces are expanding their global reach and localising their offerings to address the needs of customers in different regions and regulatory environments.

Business Trends

- Monetization and Partner Programs: Marketplaces are exploring diverse monetization models, including subscription fees, usage-based pricing, and value-added services. They are also establishing partner programs to expand their reach and expertise.
- Vertical and Industry-Specific Solutions: Marketplaces are tailoring their offerings to specific industries and verticals, providing industry-specific solutions and addressing unique requirements.
- Data Marketplace Integration: Data marketplaces are being integrated into cloud and edge marketplaces, enabling customers to access and utilise valuable data resources.
- AI-Powered Recommendations and Insights: Marketplaces are leveraging AI to provide personalised recommendations, insights, and predictive analytics to help customers make informed decisions.
- Ecosystem Collaboration and Open Standards: Marketplaces are promoting collaboration within the ecosystem and advocating for open standards to foster interoperability and innovation.

DOME is considering these trends and, in parallel, is trying to combine them with EC policies documents and inputs from many other stakeholders. We will provide a short overview of them and their relative importance in the next section.

2.2 Existing Cloud and edge initiatives in Europe

2.2.1 European Cloud Initiative

The European Cloud Initiative (ECI) is a European Commission initiative that aims to promote the development of a competitive and secure cloud computing ecosystem in Europe. The ECI has four main objectives:

- Boost the availability and uptake of cloud services in Europe
- Strengthen the European cloud supply chain
- Foster cloud interoperability and open standards
- Enhance the security and resilience of cloud computing in Europe

The ECI is supporting several initiatives to defragment the cloud provider market in Europe, including:

- The development of a European cloud marketplace
- The promotion of open-source cloud software
- The funding of research and development in cloud computing
- The creation of a network of European cloud competence centres

2.2.2 Gaia-X

Gaia-X is an initiative that develops, based on European values, digital governance that can be applied to any existing cloud/ edge technology stack to obtain transparency, controllability, portability and interoperability across data and services.

Gaia-X is supporting several initiatives to defragment the cloud provider market in Europe, including:

- The development of a Gaia-X reference architecture
- The creation of a Gaia-X certification program
- The promotion of Gaia-X adoption by European organisations

DOME aligns with Gaia-X and the overall trends in developing cloud marketplaces in several key aspects:

1. Openness and Standards-Based Approach:

Gaia-X emphasises openness and promotes the adoption of open standards to ensure interoperability, avoid vendor lock-in, and foster a competitive cloud ecosystem.

2. Security and Trustworthiness:

Gaia-X prioritises security and trustworthiness, emphasising data sovereignty, privacy protection, and compliance with European data protection regulations. This aligns with the growing focus on cybersecurity, data privacy, and compliance in cloud marketplaces worldwide, not only in Europe.

3. Multi-Cloud and Hybrid Cloud Support:

Gaia-X aims to facilitate multi-cloud and hybrid cloud environments, allowing customers to manage and deploy applications across multiple cloud providers. This aligns with the increasing demand for multi-cloud solutions and the need for seamless interoperability between different cloud platforms.

4. Industry-Specific Solutions and Verticalization:

Gaia-X recognizes the need for industry-specific solutions and is tailoring its offerings to address the unique requirements of different verticals. This aligns with the trend towards verticalization in cloud marketplaces, catering to the specific needs of industries like healthcare, finance, and manufacturing.

5. Data Marketplace Integration:

Gaia-X has at the core of its mission integrating data marketplaces to provide access to valuable data resources. Even though not necessarily in the scope of the DOME marketplace at this moment, a strategy toward the integration of the data marketplace into DOME will be beneficial.

6. Ecosystem Collaboration and Open Governance:

Gaia-X promotes collaboration within the European cloud ecosystem and advocates for open governance models. This aligns with the global trend towards open cloud initiatives and the need for collaborative governance to foster innovation and address shared challenges.

In summary, the European cloud marketplace, Gaia-X, is well-positioned to address the evolving trends in developing cloud marketplaces, emphasising openness, security, multi-cloud support, industry-specific solutions, data integration, and collaborative governance.

2.2.3 Alliance on Data, cloud and Edge (ADE)

The European Alliance for Industrial Data, Edge and Cloud, also known as the "Alliance on Data, Cloud and Edge" or "ADE," plays a crucial role in the European Commission's strategy for developing a competitive and resilient cloud ecosystem in Europe. It serves as a key collaborative platform for bringing together leading European stakeholders from industry, academia, and research institutions to address the challenges and opportunities surrounding data, cloud, and edge computing.

Key Objectives of the Alliance:

- Strengthen European Industrial Competitiveness: The alliance aims to strengthen the competitiveness of European industries by enabling them to leverage the full potential of data, cloud, and edge technologies. This includes fostering innovation, enhancing productivity, and unlocking new business models.
- Promote European Cloud and Edge Leadership: The alliance seeks to position Europe as a global leader in cloud and edge technologies by driving the development of next-generation cloud and edge solutions, promoting open standards, and fostering a vibrant cloud and edge ecosystem.
- Address Data Sovereignty and Security: The alliance emphasises the importance of data sovereignty and security in the cloud and edge computing landscape. It aims to develop solutions and frameworks that ensure the secure and responsible management of data while respecting privacy regulations.
- Facilitate Knowledge Sharing and Collaboration: The alliance acts as a knowledge-sharing hub, facilitating collaboration among its members and fostering the exchange of expertise and best practices in data, cloud, and edge computing.
- Shape European Policies and Initiatives: The alliance provides valuable input and recommendations to the EC on policy initiatives related to data, cloud, and edge technologies, ensuring that European policies are aligned with the needs of the industry and the broader cloud ecosystem.

Impact on the European Cloud Landscape:

The Alliance's activities are expected to have a significant impact on the development of the European cloud landscape in several ways:

- Accelerated Cloud Adoption: By addressing common challenges and promoting interoperability, the alliance is expected to accelerate the adoption of cloud and edge technologies among European organisations.
- Enhanced Innovation: The alliance's focus on innovation and collaboration is likely to foster the development of new cloud-based and edge-enabled solutions, driving innovation across various industries.
- Strengthened European Cloud Ecosystem: The alliance's efforts to promote European cloud providers and foster partnerships are expected to strengthen the overall European cloud ecosystem, leading to a more competitive and resilient cloud market.
- Data Sovereignty and Security Assurance: The alliance's focus on data sovereignty and security is expected to build trust and confidence among European organisations, encouraging them to embrace cloud and edge technologies without compromising data privacy and security.
- Informed Policymaking: The alliance's input and recommendations are expected to inform the EC's policymaking process, ensuring that European cloud policies are well-aligned with industry needs and technological advancements.

Overall, the European Alliance for Industrial Data, Cloud and Edge plays a pivotal role in shaping the future of the European cloud landscape. By addressing key challenges, fostering innovation, and promoting collaboration, the alliance is helping to position Europe as a global leader in the data, cloud, and edge computing domains.

2.2.4 SIMPL

SIMPL, an acronym for "Standard Integration Management Platform Layer," is a standard integration layer promoted by the European Commission (EC) to facilitate the exchange of data and services between different cloud platforms in Europe. It aims to address the fragmentation of the cloud market in Europe by providing a common set of APIs and protocols that can be used by different cloud providers to interoperate with each other.

Key Features of SIMPL:

- Modular and extensible architecture: SIMPL is designed to be modular and extensible, allowing new functionalities to be added easily. This flexibility makes it well-suited to the ever-evolving cloud landscape.
- Open standards: SIMPL is based on open standards, ensuring interoperability and preventing vendor lock-in. This aligns with the EC's goal of promoting a competitive and open cloud ecosystem in Europe.
- Focus on cloud-native technologies: SIMPL is designed to support cloud-native technologies, such as microservices and containers, making it relevant for modern cloud applications.

Benefits of SIMPL:

- Reduced integration costs: SIMPL can significantly reduce integration costs by providing a standardised way to connect different cloud platforms.
- Improved interoperability: SIMPL enhances interoperability between cloud platforms, enabling seamless data exchange and service orchestration across different cloud environments.
- Accelerated cloud adoption: By simplifying cloud integration, SIMPL can accelerate

cloud adoption among European organisations, fostering innovation and economic growth.

Current Status of SIMPL:

SIMPL is still under development, but it has gained significant traction within the European cloud community. Several major cloud providers have expressed their support for SIMPL, and there are ongoing efforts to refine the standard and promote its adoption.

The EC's support for SIMPL is a strong indication of its commitment to addressing cloud fragmentation and promoting a more unified cloud ecosystem in Europe. As SIMPL matures, it has the potential to play a crucial role in shaping the future of cloud computing in Europe.

From the DOME perspective, SIMPL is a critical project. Some of the partners are involved in the tendering process, we know the status of it. We are now waiting for the first allotment to be assigned to have a clear interface to speak with.

2.2.5 Data Space Business Association

The Data Spaces Business Alliance (DSBA) is a non-profit organisation that aims to promote the development and adoption of data spaces across Europe. Data spaces are secure, interoperable environments where data can be shared and exchanged in a controlled and trustworthy manner. They are seen as key enabler for the digital transformation of European industries and economies.

Key Objectives of the DSBA:

- Advance Data Space Standards and Interoperability: The DSBA works to develop and promote open standards and interoperability frameworks for data spaces, ensuring that different data spaces can communicate and exchange data seamlessly.
- Promote Data Space Adoption: The DSBA advocates for the adoption of data spaces across various industries and sectors, demonstrating their value proposition and addressing potential barriers to adoption.
- Facilitate Knowledge Sharing and Collaboration: The DSBA serves as a knowledge-sharing platform, providing resources, training, and support to organisations interested in developing and implementing data spaces.
- Engage with Policymakers: The DSBA engages with policymakers at the national and European levels to inform policy decisions and ensure that regulatory frameworks support the development and adoption of data spaces.
- Foster European Leadership in Data Spaces: The DSBA strives to position Europe as a global leader in data spaces, promoting European expertise and solutions in this domain.

Impact of the DSBA on the European Data Landscape:

- DSBA's activities are expected to have a significant impact on the European data landscape in several ways:

- Accelerated Data Space Adoption: By promoting data space standards, interoperability, and use cases, the DSBA is expected to accelerate the adoption of data spaces across European organisations.
- Enhanced Data Sharing and Innovation: Data spaces are expected to facilitate secure and controlled data sharing among organisations, enabling new forms of collaboration, innovation, and value creation.
- Strengthened European Data Ecosystem: DSBA's focus on promoting European data space solutions and fostering partnerships is expected to strengthen the overall European data ecosystem, leading to a more competitive and resilient data market.
- Data Sovereignty and Trust in Data Sharing: DSBA's emphasis on data sovereignty and data governance principles is expected to build trust and confidence among organisations, encouraging them to participate in data spaces without compromising data privacy and security.
- Informed Policymaking and Regulatory Frameworks: The DSBA's engagement with policymakers is expected to inform the development of data space-related policies and regulations, ensuring that they are supportive of data space adoption and aligned with industry needs.
- Overall, the Data Spaces Business Alliance plays a crucial role in shaping the future of the European data landscape. By addressing key challenges, promoting data space adoption, and fostering collaboration, the DSBA is helping to position Europe as a leader in the development and utilisation of data spaces for the benefit of its industries, economies, and citizens.

2.2.6 Data Space Support Centre

The Dataspace Business Support Center (DSSC) is one of the initiatives promoted by EC for fostering Data:

Objective 1: Promote the adoption of dataspaces

- Raising awareness of dataspaces and their benefits.
- Providing resources and support to organisations interested in implementing dataspaces. DSSC will develop and promote best practices for dataspace implementation and operation.

Objective 2: Facilitate collaboration and knowledge sharing within the dataspace community

- Creating a forum for dataspace experts to share knowledge and experiences.
- Supporting the development of open standards and interoperability frameworks for dataspaces Promoting the development of cross-border dataspace projects.

Objective 3: Support the development of a vibrant dataspace ecosystem

- Identifying and supporting promising dataspace startups.
- Connecting data space providers with potential customers.
- Encouraging the development of new data space applications and services.

Objective 4: Inform policymaking on dataspaces

- Providing policymakers with insights into the needs and challenges of the dataspace

community.
- Developing policy recommendations that promote the growth and adoption of dataspaces.
- Representing the interests of the data space community in international policy forums.

Objective 5: Position Europe as a global leader in dataspace technologies

- Promoting European data space solutions on the global stage.
- Facilitating collaboration between European dataspace stakeholders and their counterparts in other regions.
- Contributing to the development of international dataspace standards and frameworks.

The DSSC is playing a vital role in helping to realise the full potential of data spaces for European businesses, industries, and society. By pursuing these objectives, the DSSC is helping to create a more data-driven and innovative Europe.

2.2.7 TM Forum

The TM Forum Open API Ecosystem provides a set of APIs that enable businesses to create, manage, and monetize their products and services. The APIs cover a wide range of functionality, including:

- Catalogue management: APIs for managing product and service catalogues, including creating, modifying, and deleting products and services.
- Ordering management: APIs for placing orders, managing order status, and handling order fulfilment.
- Inventory management: APIs for managing inventory levels, reserving inventory for orders, and tracking inventory movements.
- Usage management: APIs for tracking usage of products and services, generating usage reports, and charging for usage.
- Billing: APIs for generating bills, managing payment plans, and handling customer payments.
- Customer management: APIs for managing customer information, creating and managing customer accounts, and handling customer interactions.
- Party management: APIs for managing business partners, including creating, modifying, and deleting business partners.

These APIs can be used to create a variety of business ecosystems, including:

- Partner ecosystems: APIs can be used to create partner ecosystems where businesses partner with each other to offer products and services.
- Customer ecosystems: APIs can be used to create customer ecosystems where businesses interact with their customers in a more personalised and engaging way.
- Supplier ecosystems: APIs can be used to create supplier ecosystems where businesses manage their relationships with their suppliers more efficiently.

The TM Forum Open API Ecosystem is a powerful tool for businesses that want to create, manage, and monetize their products and services. The APIs are based on open standards, which makes them interoperable with other systems. They are also well-documented and easy to use.

DOME has adopted these APIs. Such a choice comes from a technical evaluation, including the fact that they are at the basis of different experiments and concrete realisations

2.3 Other Ecosystems

2.3.1 AI on Demand

AI on Demand is a European initiative that aims to democratise access to artificial intelligence (AI) and make it easier for businesses, especially small and medium-sized enterprises (SMEs), to adopt AI technologies. The initiative is funded by the European Union's Horizon 2020 research and innovation program.

AI on Demand provides a marketplace where businesses can find and access AI services from a variety of providers. The marketplace also provides tools and resources to help businesses understand and use AI.

The goals of AI on Demand are to:

- Increase the adoption of AI by businesses of all sizes;
- Make AI more accessible and affordable;
- Help businesses understand and use AI effectively;
- Promote the development of new AI solutions.

AI on Demand is expected to have a significant impact on the European economy by:

- Boosting productivity and innovation;
- Creating new jobs;
- Enhancing competitiveness.

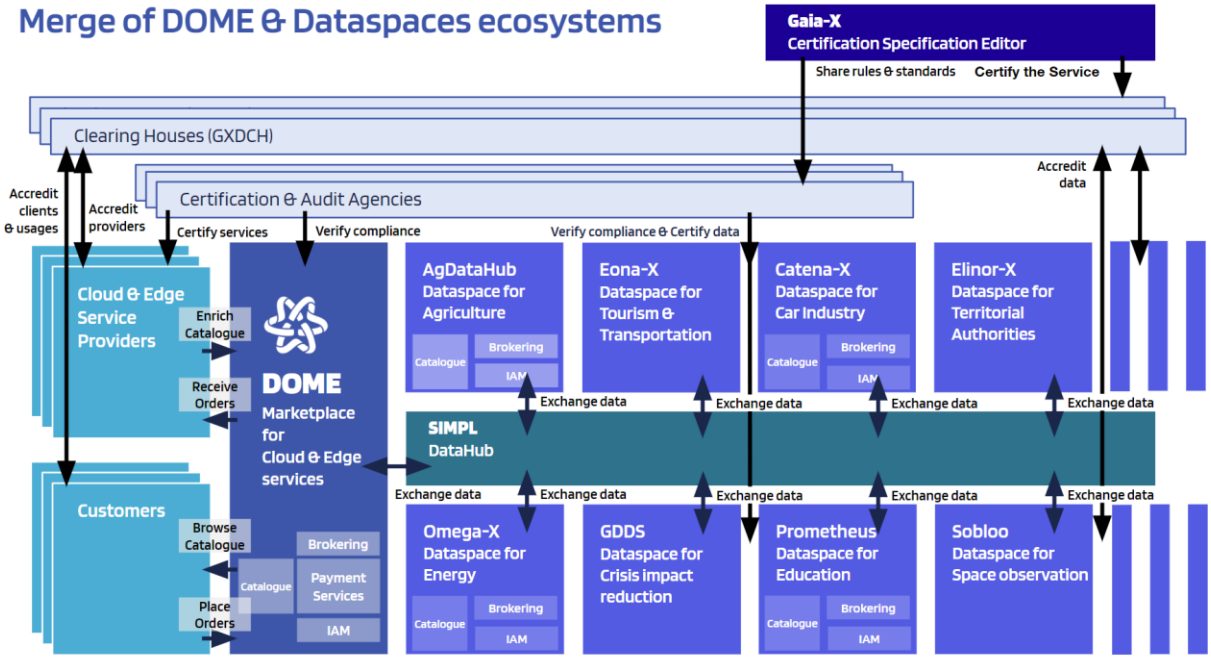
The initiative is also expected to promote the development of a more ethical and responsible AI ecosystem in Europe.

Here are some of the key benefits of AI on Demand for businesses:

- Access to a wide range of AI services: The marketplace provides access to a wide range of AI services, from data preparation and modelling to deployment and maintenance.
- Easy discovery and procurement: Businesses can easily search for and procure AI services that meet their specific needs.
- Expert support: Businesses can access expert support from AI providers and consultants to help them understand and use AI effectively.
- Reduced costs: The marketplace can help businesses find AI services at competitive prices.

2.3.2 Data Spaces ecosystem

The volume of data processed, in all sectors, is exploding and given the value that can be extracted from it, the economic interests of many players converge. Therefore, Data Spaces projects and initiatives are multiplying. As a federated marketplace, DOME can enrich this ecosystem. The figure below represents the analysis of the ecosystem of projects and how they would relate to DOME.



Interestingly, GAIA-x and SIMPL are also mentioned in other parts of this document as they are clearly important European actors that DOME needs to connect and align with.

2.4 Challenges and opportunities for the adoption of a federated marketplace

The EU Marketplace and SIMPL are expected to cooperate in several ways to promote a unified and interoperable cloud ecosystem in Europe. Here are some potential areas of collaboration:

- Defining standardised cloud services: The EU Marketplace can leverage SIMPL's standardised interfaces to define and publish standardised cloud services. This will make it easier for cloud providers to offer and for organisations to consume standardised cloud services across different cloud platforms.
- Enhancing service discovery and matchmaking: SIMPL's discovery and matchmaking capabilities can be integrated into the EU Marketplace to facilitate the discovery and selection of cloud services that meet specific requirements. This will streamline the process of finding the right cloud services for different use cases.
- Enabling seamless service orchestration: SIMPL's orchestration capabilities can be utilised by the EU Marketplace to orchestrate the deployment and management of cloud services across different cloud platforms. This will enable organisations to manage their cloud resources more efficiently and effectively.
- Promoting interoperability testing and certification: The EU Marketplace and SIMPL can collaborate to promote interoperability testing and certification programs for cloud providers and services. This will help ensure that cloud providers adhere to SIMPL standards and that their services can interoperate seamlessly.
- Fostering open source cloud initiatives: The EU Marketplace and SIMPL can jointly support and promote open source cloud initiatives, such as OpenStack and Cloud

Foundry, which align with the goals of a unified and open cloud ecosystem.

- Encouraging community participation: The EU Marketplace and SIMPL can collaborate to engage with the European cloud community, gathering feedback, identifying potential issues, and promoting the adoption of both initiatives.

By working together, the EU Marketplace and SIMPL can significantly contribute to the development of a more integrated and interoperable cloud ecosystem in Europe, benefiting European organisations, cloud providers, and the overall digital economy.

3 Activities aimed to create liaison with relevant projects and initiatives

3.1 Identification of relevant projects and initiatives

Identifying critical projects for realising the EC strategy involves a comprehensive evaluation process that considers various factors, including alignment with strategic objectives, potential impact, feasibility, and resource availability. We have tried to think out of the box looking beyond the pure evaluation of the institutional role of associations or projects.

The structured approach to identifying relevant projects:

Align with Strategic Objectives:

- Thoroughly understand the EC's strategic objectives and priorities.
- Assess potential projects against these objectives, identifying those that contribute directly and significantly to achieving the desired outcomes.

Evaluate Potential Impact:

- Analyse the potential impact of each project in terms of economic, social, and environmental benefits.
- Consider the project's potential to address critical challenges, enhance competitiveness, and contribute to sustainable development.

Assess Feasibility:

- Evaluate the technical feasibility of each project, considering the available technology, expertise, and resources.
- Assess the regulatory and legal framework, identifying potential barriers and the need for adjustments.

Conduct Stakeholder Engagement:

- Engage with relevant stakeholders, including industry experts, government officials, and civil society representatives.
- Seek feedback on the identified critical projects and incorporate their perspectives into the decision-making process.

Develop Implementation Plans:

- For each critical project, develop a detailed implementation plan that outlines the project scope, timelines, budget, deliverables, and risk management strategies.
- Assign clear responsibilities and ensure effective coordination among stakeholders.

Monitor and Evaluate Progress:

- Establish a monitoring and evaluation framework to track project progress against milestones, objectives, and impact indicators.

3.2 Establishment of communication channels and collaboration agreements

3.2.1 Liaison with main stakeholders

The table below summarises the activities carried out to connect DOME with different organisations. Details are provided on the actions taken and what will be the next steps.

LIAISON	ACTION	STATUS
ECI/EC	We are participating in all the MSCCG events, in the context of the meeting of the alliance that are organised every 6 months. We are presenting DOME in its evolution. The same applies to similar events to the industrial community.	Presentations given. On December 14th we gave a DEMO of the marketplace to both industrial representatives and member states representatives
ECI/Support to MS and requirement collection activities	We have prepared a survey for MS representatives. It has been circulated thanks to the EC representative, Mr. Tomas Petru, to MSSCG members.	Currently, we have received 6 answers from Italy, Finland, Poland, Czech republic, Spain and Portugal. The results, even if partial, show that small countries could benefit from DOME even if the lack of a single process leading to the adoption of cloud services (including the selection, certification, comparison and final pricing, ordering and payment) does not exist. Such a lack of uniformity is still one major blocking factor. It is then necessary to deep dive into PA requirements. One of the major results we have obtained is to start discussions with the Catalonian Regional Administration which is going to develop its cloud marketplace. The joint undertaking with Catalonia could open different perspectives to DOME adoption, opening the door to many other regional agencies that could follow the example (and reuse software).
ECI/Support to MS and requirement collection activities	We have held dedicated sessions with Italian representatives (National Cybersecurity Agency and Central purchasing agency) and with German Trusted cloud responsible. We are going to have a meeting with Romanian representatives. A meeting is planned with the French organisation operating UGAP (together with Cap Gemini). Invitation for further discussions have been sent to Latvian representatives whose plan is to consider DOME	Italian representatives (Mr. Avenia) who have provided documentation and have proposed features of interest for the Italian government. The selection of Services is in charge of the ACN while the price negotiation is in charge of the central procurement office (whose platform offers tendering services). During the meeting with the German Trusted Cloud, a completely new scenario emerged. Trusted cloud is intended for industries. It lists “certified” services according to a process in which service providers have to demonstrate adherence to a set of requirements. With German Trusted cloud there are many possibilities for collaborations considering the possibility of

LIAISON	ACTION	STATUS
	as a marketplace (or at least, they mention it in their presentation given to the MSSCG). More connections have been attempted with Romanian, Greek, Latvian and Portuguese cloud committees.	having the German catalogue federated with DOME as well as using DOME software for evolving their portal.
Gaia-X	Considering the fact that some of the participants are also members of the Gaia-X board we have direct contact with the Gaia-X management. We have asked them to circulate the DOME survey. Some of the partners have been appointed as ambassadors in their respective countries (Outscale for France for example). The collaboration could go further than an advertisement. The DOME IAM is based on the Gaia-X trust framework, which has been adopted by large cloud providers in Europe (e.g. Aruba)	DOME was born from the Gaia-X community. Since we are now at the stage of having software up and running we will give demos to Gaia-X communities. Recently it has been appointed the new CEO, formerly CEO of the FIWARE foundation whose software is at the core of the DOME project. We will leverage the reciprocal knowledge to strengthen the relationship with them.
European Alliance on industrial Data and cloud	The project is following the Alliance as strictly as possible. Some of the partners are members of it (e.g. IONOS) and we have been invited to the events (held every 6 months).	The contacts with the Alliance are direct, whenever the meetings of the association are held and indirect, via the intermediation of the Project Officer. These contacts are aimed at this stage to collect requirements from stakeholders (both public and private). At the moment we have collected 6 answers to a questionnaire prepared by the DOME consortium trying to collect feedback from public admin. The results, even if partial at the time of writing, have shown differences among MS. The main differences have to be attributed to the mechanisms for selecting services and purchasing them. Some of the countries are buying for all the PA entities, some others are pre-qualifying services and then negotiating among the qualified services the pricing and the terms and conditions for buying those services. The negotiations are held through national tenders and not at the European level. The qualification is not yet done using uniform criteria (but possibly soon it will be). Member states could share the catalogue of services among them.

LIAISON	ACTION	STATUS
		Considering the purchasing procedures at the time being a public entity from a MS could not buy the services belonging to a catalogue shared by another MS because the purchasing procedures are different. The industrial community has been addressed with specific marketing activities aimed at the same time to create leads and get feedback. We have not limited ourselves to the members of the alliance, but more in general to the industrial community. The first reaction is still “observation”. Most of the companies are still in doubt whether this initiative will create benefits. The idea of an EU federated marketplace is not clear as well as the rationale behind it. In conclusion, the situation as it is has shown some difficulties in matching the requirements from MS, while for industrial entities we are progressing trying to clarify our objectives.
SIMPL	With the SIMPL consortium we have direct contacts. On December the 14th 2023 the first allotment of the project was assigned to the consortia comprising Engineering. We have then established direct contact with SIMPL. With this consortium, we have naturally a commonality of views on the implementation and integration.	At the time of writing, we have had a first internal discussion with the core SIMPL team members: Evidian, Aruba and CapGemini representatives.
Data Space Business Association (DSBA)	The DOME consortium comprises Engineering and FIWARE. They are both active in this context. More specifically Engineering and FIWARE are contributing to the definition of the technical blueprint of the future of industrial data spaces.	The first technical blueprint refers to the same API we are using for DOME. The TMF APIs are assuming relevance in Europe as a tool for integrating marketplaces and, if we succeed in pushing on such a uniform approach, all data marketplaces could be federated via DOME, saving money and adding incredible value. We will push in this direction in the next months
Data Space Support Center (DSSC)	As per the DSBA, the FIWARE foundation is a member of the DSSC consortium. The strategy is always to push on integration and federation of data marketplaces.	We have held a workshop with some of the members of the consortium to share common objectives and we have planned another one for 2024. We plan to converge for the first release in June trying to find more collaborations.
TeleManagement	We have discovered that many other studies have been	We have established a connection with the catalyst project within TMF.

LIAISON	ACTION	STATUS
Forum	carried out by companies such as Orange, a member of the consortium. Some of these experiences have been collected and taken as reference.	Through the editor and the main contributor to the result of study [1] whose objective was to use the same APIs we use in DOME. It has also validated the approach adopted by DOME. The applies to the many other experiences that have been developed within this community[2].

[1] Federated_CSPs_Marketplace_Whitepaper_C20.0.34.pdf (tmforum.org)
[2] DLT based marketplace phase 2 https://www.tmforum.org/vertical-industry-telcos-federated-dlt-based-marketplace/

DLT based marketplace https://www.tmforum.org/blockchain-based-telecom-infrastructure-marketplace/

Due to the work done by one of the partners, namely Alastria, the DOME consortium has established a tight relationship with the Catalan regional government whose intention is to use DOME and extend it for implementing its marketplace.

We will discuss other initiatives that we consider relevant but not necessarily critical for the success of our project. Within the marketing activities, we have contacted industrial communities such as Digital Europe and business Europe. We have tried to reach them out to ensure the maximum visibility of the existence of DOME.

3.2.2 Liaisons with other projects

All the partners have contributed to creating connections with projects and with partners within these projects. The objective is to spread the knowledge on DOME. In some relevant cases the connection has been established, not only because of the presence of a partner, but because of the importance of the project for DOME. This is the case of AioD, a project that will deliver a marketplace dedicated to AI services. We have established a connection with them, presented DOME and established a solid connection.

The same applies to projects born within TMForum. The catalyst project has been an example. They have not delivered a federated marketplace but they have delivered documentation and reports that have been collected as inputs for the technical team.

ACRONYM	PROJECT TITLE	RELEVANCE FOR DOME	COMMENT	CONTACT PARTNER IN DOME
AIoD	AI on Demand	Ecosystem of partners that develop products that could be promoted on the marketplace	DOME tech presentation to the AIoD tech committee 22/09/2023	FF
WELLBASED	Exiting energy poverty and related health problems: European pilots take action.	Service of public interest for reducing energy poverty, its effects on the citizens health and wellbeing,	Edge services for well-being in 6 European cities.	GOLEM
AURORAL	Architecture for Unified Regional and Open digital ecosystems for Smart Communities and Rural Areas Large scale application.	A marketplace of services to support the digitalisation of rural areas is being developed. In addition, the AURORAL Service Store is already accessible: https://auroral.elliotcloud.com/service-store	Services to be offered through DOME once matured	ELL
RAMP.eu	Multiple projects: L4MS (ended), DIH2 (ended), Better Factory, SHOP4CF, KITT4SME, CIRCULOOS	RAMP (Robotics and Automation MarketPlace) itself is already part of DOME (to be federated)	RAMP project will deliver services dedicated to industries covering the need of SMEs	ED
MERLOT	Gaia-X marketplace for educational data and services	Marketplace (Dataspace) whose offerings might also be offered via the DOME marketplace	One of the German Gaia-X lighthouse projects	IONOS

ACRONYM	PROJECT TITLE	RELEVANCE FOR DOME	COMMENT	CONTACT PARTNER IN DOME
POSSIBLE	Gaia-X marketplace for data and services in the educational, public and SME sectors	Marketplace (Dataspace) whose offerings might also be offered via the DOME marketplace	One of the German Gaia-X lighthouse projects	IONOS
MARISPACE-X	Gaia-X marketplace for data/services related to the maritime domain	Marketplace (Dataspace) whose offerings might also be offered via the DOME marketplace	One of the German Gaia-X lighthouse projects	IONOS
GATEKEEPER	Smart Data driven Solutions for personalized early risk detection and intervention	Marketplace for AI solutions in the health care domain	Flagship large scale project in the area of Ai for chornic disease prevention	AOA
TEMS	Trusted European Media Space	Building of the EU media data space; platform could be linked to the DOME Portal	Dawex is a key member of TEMS and will oversee the building of the TEMS platform	DWX
TRUSTCHAIN	Fostering a Human-Centred, Trustworthy and Sustainable Internet	Potential customers and providers		ALASTRIA
TRUBLO	Trusted and reliable content on future blockchains	Potential customers and providers		ALASTRIA
CIRCULOOS	Circular and Dynamic Manufacturing Supply Chain Orchestration and OptimiSation	Marketplace (Dataspace) for supply chain	Like RAMP this is a project whose deliverables could be offered on DOME or federated with it	ALASTRIA
DSSC	Data Space support centre	Broad range of opportunities by federating marketplaces	The relationship is important since the same architecture could enable federation of data marketplaces with DOME	FF

ACRONYM	PROJECT TITLE	RELEVANCE FOR DOME	COMMENT	CONTACT PARTNER IN DOME
5GaaS	5G as a Service	Decentralised digital marketplace for the TELECOM ecosystem	5GaaS is another possible federated marketplace	UW
Catalyst Project	Vertical Industry Telcos - Federated DLT-based Marketplace	Ecosystem driven approach opening up new business opportunities that accelerate the ability of CSPs to engage with new sectors and markets. TMForum	Catalyst project has provided useful support demonstrating interest of communities such as TMF	ENG

It is important to underline the relative importance of the connection with other EU projects. We are still trying to identify the projects that will deliver marketplaces and/or production grade services.

3.2.3 Participation in workshops, conferences, and other events

Of importance for these reports it is important to underline the presence of the DOME team to all the events organised by EC every 6 months (meeting of the European Alliance on data, cloud and edge).

During these meetings, we have presented DOME. On December 14th 2023 we presented a demo of the DOME portal to the industrial community and MS. More such events will be organised.

It is worth noticing that we have held meetings, facilitated by the EC, with member states aimed to define the largest set of requirements to be satisfied for providing a good service.

A list of the other events and marketing activities is given in D2.2.

3.2.4 List of Identified Marketplaces

The following table is a summary of the existing marketplaces operating in Europe.

Marketplace	DESCRIPTION	Status	CATEGORY
OVH	OVH is the largest cloud provider in Europe. offering a range of cloud solutions including virtual private servers, storage, and network services.	Contacted. We will return to them when the product matures enough	European Industrial Player
Scaleway	cloud products, providing access to a variety of services including compute instances, storage, and databases.	Contacted	European Industrial Player
T-Systems	cloud services, providing access to a variety of solutions including cloud infrastructure, platforms, and software applications.	Contacted	European Industrial Player
Orange Business Services	cloud solutions, providing access to a range of services including infrastructure, data analytics, and collaboration tools.	In the Consortium	European Industrial Player
Cloudwatt	cloud services, providing access to solutions such as compute instances, storage, and databases.		European Industrial Player
Aruba	cloud services, featuring a range of offerings including virtual servers, storage, and domains.	Contacted	European Industrial Player
Google	cloud products and services, providing access to a variety of solutions including virtual machines, APIs, and data analytics tools.	AmCham has involved this company and asked them to answer to the survey	Global Player

Marketplace	DESCRIPTION	Status	CATEGORY
IBM	cloud services, featuring offerings such as AI, blockchain, IoT, and infrastructure solutions.	AmCham has involved this company and asked them to answer to the survey	Global Player
AWS	cloud solutions, offering a wide array of products including software, machine learning models, and infrastructure services.	AmCham has involved this company and asked them to answer to the survey	Global Player
Alibaba	cloud services, offering a wide range of products and solutions including compute, storage, networking, and artificial intelligence.	No contact	Global Player
CloudBlue	platform that enables service providers to connect with multiple cloud marketplaces and manage their offerings.	Contacted, Italian representatives	US based/Player in Europe
CloudSigma	cloud services, offering a range of infrastructure-as-a-service (IaaS) solutions including virtual machines, storage, and networking.	Contacted via phone.	Beyond Europe
Cofinity-X	Marketplace for everything related to the automotive value chain	Contacted	Beyond Europe
McFadyen Digital	company specialised in building all types of marketplaces (including data spaces)	Contacted. Not productive	Beyond Europe
ALSO Cloud Marketplace	Germa marketplace. Based on ALSO a reseller of different technological products/solutions	Contacted via web page	European
21Vianet Cloud Market	This is a cloud provided supported by alibaba (chinese)	Not contacted	Beyond Europe
Cloud24 Marketplace	Small provider of technological services based in the Netherlands	contacted	European
SUSE Marketplace	on hyperscalers/mostly basic software running on AWS and GCP	contacted	European

Marketplace	DESCRIPTION	Status	CATEGORY
Talend Open Studio Exchange	free resources offered to the community	contacted	European
drooms	Specialised marketplace	contacted	European
bitnami	Spanish marketplace	To be contacted. They have contracts with Spanish partners and with FIWARE foundation. We count on establishing a contact with them	European
SAP	Largest ICT provider in Europe	To be contacted. Considering their importance we want to get in touch when the marketplace will be more mature	European
1&1 IONOS Cloud (1&1 IONOS):	IONOS is one of the biggest cloud providers in Europe. Its 1&1 offering is known all over Europe	In the consortium	European
Leaseweb Cloud (Leaseweb):	Leaseweb cloud is a well known brand in the European cloud scenarios.	contacted	European
City Network (Today Cleura)	Cleura is the European cloud, offering fully automated digital infrastructure services for companies that want to innovate without sacrificing data privacy.	contacted	European
EOSC	European Open Science Cloud is a pan-European project designed to create a virtual environment for sharing and accessing research	contacted	European

Marketplace	DESCRIPTION	Status	CATEGORY
	data across borders and scientific disciplines		
OCRE	Open Clouds for Research Environments project, aims to accelerate cloud adoption in the European research community	ACK	European
OUTSCALE MARKETPLACE	Paas, Saas, Iaas products and services.	In the consortium	European
TMForum - Federated DLT-based Marketplace	The connection has created many connections with the telco world which is at the very root of “federated” experiences	Info collected on the activities. The leadership of the activities where on Orange that has developed many R&D activities on the topic	European
Nivola	CSI Piemonte cloud services marketplace: IaaS, PaaS, SaaS and network services	In the consortium	European

In conclusion, we have identified many marketplaces. The rise of regional cloud marketplaces, such as the Catalonian one or Nivola, from the Piedmont region in Italy, could create more leads to contact and more connections to create. At the time being, the contacts are mainly aimed at creating a channel and getting feedback from potential partners. Our main concern is to correctly identify the features to be implemented and to define an appropriate business model. Once the product is mature enough, we will try to engage them commercially.

4 Results and achievements

4.1 understanding of the technical and non-technical challenges

The main result of these months of activities can be summarised as follows:

- There is a lack of uniformity in the way public administrations (PAs) select, certify, compare, and purchase cloud services. This is hindering the adoption of cloud marketplaces, such as DOME. The survey of PA representatives revealed that small countries could benefit from DOME, but they need support to adopt it. Dedicated sessions with Italian and German representatives have helped to identify their specific needs. and opportunities
- PAs are interested in DOME, but they need to be convinced that it can address their specific requirements.
- In this context we have found that there is an opportunity to collaborate with other cloud marketplaces, such as the German Trusted Cloud, to provide a more comprehensive offering to PAs.
- DOME could be federated with other data marketplaces to create a single, pan-European marketplace.
- The project has established connections with other cloud marketplaces and data communities, such as the Gaia-X Alliance and the SIMPL consortium.
- DOME is already aligned with the TMF API, which could be used to integrate it with other marketplaces.

Overall, the liaison activities have helped to improve the project's understanding of the requirements of PAs and other stakeholders. This will help to ensure that DOME is developed in a way that meets their needs and that it can be successfully adopted.

More activities have been started to reach out to industrial communities such as Digital Europe and Business Europe.

4.2 Potential collaborations for the implementation of the federated marketplace

Has reported in the previous chapters we have established tight connections with:

1) **Gaia-X**. Both the communities will benefit from realisations such as the trust framework, based on Virtual credentials. DOME will be one of the projects adopting it being prepared for automatic verification of certifications, going beyond the pure authentication and authentication features that are normally associated with Identity management systems. The same applies for other specifications which are at the basis

of other experiences (e.g. the CISPE Catalogue as well as the German Trusted cloud). Adherence to service specifications are essential for inter-catalogue compatibility. This is an important collaboration topic since the collaboration.

2) **SIMPL**. The initiative will provide a single interface to an EU cloud. Then services could be provisioned once no matter where but respecting EU rules. The integration with the EU cloud will provide an integrated solution to service providers that will gest a substantial benefit from defining their environment once and forever over a large cloud
3) With **data-oriented initiatives** it is essential to pave the way to the integration of data marketplaces and computing service marketplaces. By adding these two ingredients we will create additional, evident value, for customers.
4) Enforce connection with AI communities. It is indeed foreseeable that AI, Data and computing will grow together in the next following years. It is then essential to go hand in hand with data initiatives.
5) The **Catalonian regional government** is going to develop its full-fledged solution. It will comprise modules developed for the management of their specific requirements. They have to decide whether to release these modules as open source. DOME will provide them with the software modules for federating with DOME, the trust framework and the open-source marketplace.
6) Even though most are still immature, we are looking to establish contacts with t**elco world**, whose advancement in the direction of creating federated marketplaces and service ecosystem.

5 Conclusions and recommendations

Even though the DOME project is gathering more and more interest from industrial communities and public entities, there is still work to do. While industrial entities are sceptical that such a marketplace could add value, considering the harsh competition with US giants, public entities seem not to be willing to modify their processes. It is then a matter of trying to convince them that DOME adds value and, thus, to identify the values that the community could deem important for their business. It is in essence an existential issue: where is the value?

The consortium deems that at the moment all the possible actions have been performed. A deeper involvement of all the other partners will boost the activities both in terms of liaison and in terms of commercial activities. In the next months, the marketing and liaison activities should be intertwined more and more.