SHIFT-HUB

Deliverable 4.3

SHIFT-HUB Smart Health marketplace

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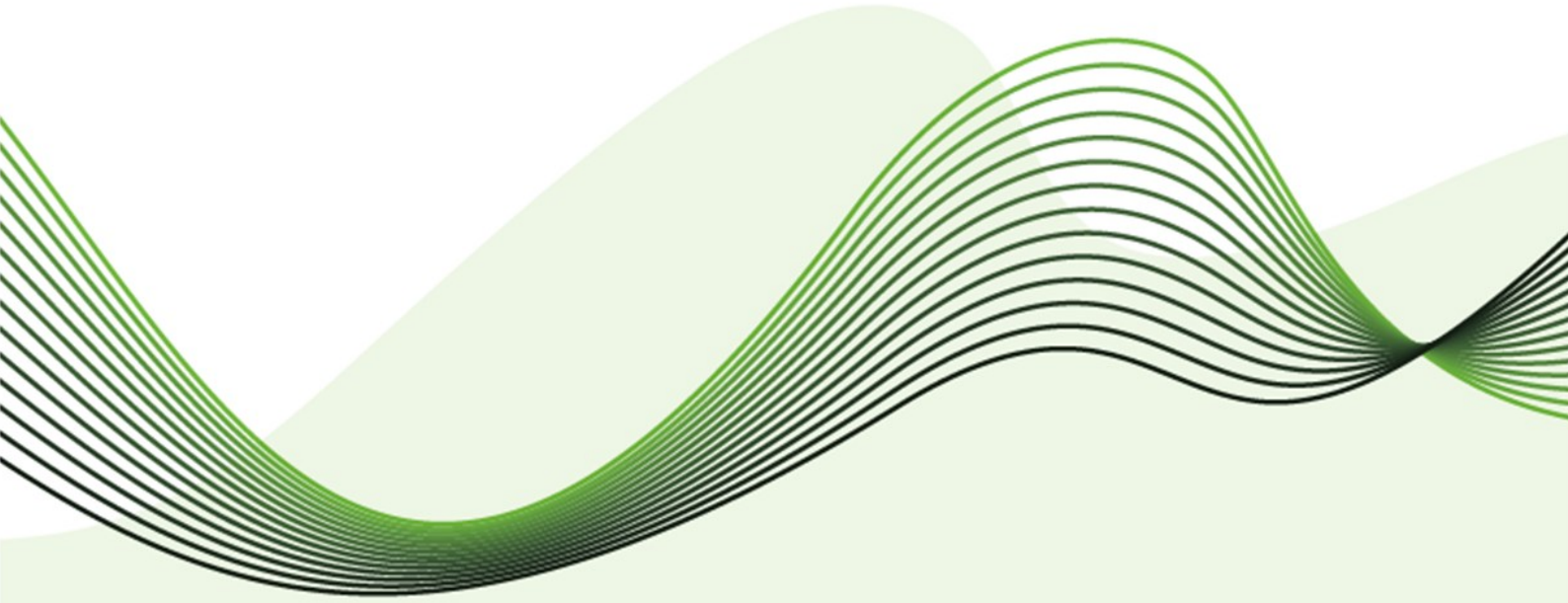

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Project SHIFT-HUB: D4.3 SHIFT-HUB Smart Health marketplace

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Abstract

This deliverable presents the architecture, functionalities, and implementation of the SHIFT-HUB Smart Health Marketplace, a key output of the SHIFT-HUB project. The Marketplace has been designed as a two-layered platform to support and accelerate innovation in Europe's digital health ecosystem. Its first layer, the SHIFT-HUB Community Marketplace, offers an open, user-friendly environment where stakeholders can share digital health solutions, collaboration opportunities, and innovation needs. The second layer, the Smart Health Data Space, provides a secure technical environment for data sharing, processing, and service integration. Together, the two layers foster visibility, networking, and technical collaboration while ensuring compliance with interoperability and data governance standards. The Marketplace offers long-term sustainability through its integration into the broader SHIFT-HUB Community Platform and the Cleyrop-managed Smart Health Data Space.

Keywords

SHIFT-HUB, Marketplace, SHIFT-HUB Community Marketplace, Smart Health Data Space pilot, Digital Health apps, HealthTech, dataset, collaboration, data sharing

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Abbreviations and Acronyms

Abbreviation/ Acronym	Description
API	Application Programming Interface
app	Application
COP	Cleyrop
EDSA	European DIGITAL SME Alliance
R&D	Research & Development
SME	Small and medium-sized enterprises
SSH	Secure Shell Protocol
SQL	Structured Query Language
REST	Representational State Transfer
SHIFT-HUB	Smart Health Innovation & Future Technologies Hub
VPN	Virtual Private Network

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1. Introduction

The SHIFT-HUB Smart Health Marketplace is a core component of the project's mission to foster innovation and collaboration within the European smart health sector. Designed to meet the needs of a wide range of stakeholders—including small and medium-sized enterprises (SMEs), start-ups, researchers, healthcare organizations, and public authorities—the Marketplace enables collaboration, knowledge exchange and technical service integration.

To achieve these goals, the Marketplace was conceived as a two-layered platform. The first layer, the SHIFT-HUB Community Marketplace, is embedded in the well-established SHIFT-HUB Community Platform managed by European DIGITAL SME Alliance (EDSA). This public-facing environment allows for the promotion of solutions, identification of partners, and participation in thematic events. It was intentionally designed to be accessible and attractive to a broad audience, fostering cross-sector collaboration without requiring advanced technical skills.

The second layer, the Smart Health Data Space, was developed on a secure technical platform provided by Cleyrop (COP). It enables the sharing, processing, and integration of health-related data and applications, supporting more advanced forms of collaboration and data-driven innovation. Through this secure, modular environment, actors working on data-intensive services—such as digital health applications (apps), AI-based applications, or clinical decision support tools—can test, validate, and deploy solutions in compliance with European standards for privacy and interoperability.

This deliverable outlines the architecture, functionalities, and use cases of both layers of the Marketplace, and explains how they are linked to offer a cohesive and future-proof infrastructure for the European Smart Health ecosystem.

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2. The first layer of the Smart Health Marketplace - the SHIFT-HUB Community Marketplace

The SHIFT-HUB Community Marketplace is a core feature of the SHIFT-HUB Community Platform, developed to facilitate collaboration, visibility, and engagement among diverse stakeholders in the European digital health ecosystem. Integrated into a broader, lasting infrastructure managed by EDSA, the Marketplace enables users to publicly share solutions, services, needs, and partnership opportunities. With tailored categories, advanced filtering, and direct messaging functionalities, it supports matchmaking and cross-sectoral cooperation.

Designed to remain active beyond the project's duration, with the potential for integration with other initiatives, the Marketplace not only enhances interaction within SHIFT-HUB events but also provides value by fostering sustained community engagement.

2.1 The SHIFT-HUB Community Platform

The SHIFT-HUB Community has become a foundational element of the project, serving as a key enabler for several project's activities. It functions as a central space, particularly in connection with public events, thereby contributing to increased engagement and broader outreach. Since its introduction in the early stages of the project, the community and its associated tools and functionalities have continued to evolve alongside the steady growth in membership. In the context of ongoing digital transformation in healthcare, new opportunities are emerging in the fields of Smart Health and digital technologies. These developments are reshaping the provision of healthcare services across Europe, creating potential for innovation, business development, and collaborative research.

The e-Health Community Platform, developed under SHIFT-HUB, has been designed to facilitate collaboration and engagement among stakeholders within the European health innovation ecosystem. It aims to support the uptake and diffusion of Smart Health technologies and services, while enabling access to a growing network of professionals, organizations, and market opportunities.

It provides functionalities that enable participation in thematic events, particularly those focused on funding and B2B matchmaking, access to cooperation opportunities across borders, and enhanced interaction through direct messaging and structured one-to-one meetings. Organizations and individuals have also the possibility to present their expertise, digital solutions, or innovation needs within a dedicated Marketplace, thus increasing visibility and facilitating targeted exchanges.

In addition, the platform provides a range of integrated functionalities that support interaction, visibility, and collaboration within the e-Health Community. Through advanced search and filtering tools, stakeholders are able to identify and connect with relevant peers based on shared interests, sectoral focus, or organizational profiles. This facilitates the creation of new synergies and fosters knowledge exchange across the Smart Health ecosystem.

Participation in dedicated events is further enhanced by the possibility of use of matchmaking functionalities, which allow for the automatic scheduling of one-to-one meetings between participants. These features have been particularly valuable in the context of international

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events focused on funding opportunities, cross-border cooperation, and innovation partnerships, enabling more structured and outcome-oriented engagement.

Within the technical platform, the interactive **marketplace** offers a dedicated space where organizations can present their digital solutions, service offerings, research activities, or specific collaboration needs. By increasing the visibility of these contributions, the marketplace supports networking, partner identification, and potential uptake of innovative technologies or services. It also contributes to the broader objectives of the SHIFT-HUB project by facilitating the development of sustainable partnerships and promoting alignment with emerging market trends or open calls.

Collectively, these features contribute to building a dynamic, interoperable, and future-oriented digital environment in support of the European Smart Health landscape.

2.2 Navigating the SHIFT-HUB Online Marketplace

The SHIFT-HUB Community Marketplace has been developed by EDSA as an additional component of the SHIFT-HUB Community Platform, where it operates as a dedicated, interactive environment to support visibility, collaboration, and value creation among stakeholders. Strategically embedded within the broader platform, the Marketplace complements and extends the platform's existing functionalities by offering a publicly accessible space where both registered and non-registered users can view posted content. As one of the main sections, it is easily reachable from all parts of the community space, ensuring practical access and navigation. At the moment of drafting this deliverable (June 2025), the marketplace hosts 28 unique opportunities.

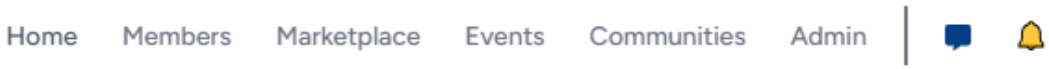

Figure 1. SHIFT-HUB Community Platform main sections

While the Marketplace content is openly accessible to all visitors of the SHIFT-HUB e-Health Community, contributions—such as the publication of digital solutions, collaboration opportunities, or service offerings—require users to be logged into the platform. The same account used for accessing other platform features (including event registration and member interaction) is required for Marketplace publishing, thereby ensuring consistency and avoiding additional complexities across functionalities.

The Marketplace's value proposition lies in its function as a central, public hub for promoting innovation and facilitating stakeholder interaction. It provides organizations with a visible and accessible space to present products, service portfolios, research outputs, ideas, or collaboration needs. In doing so, it enables the discovery of potential partners, supports matchmaking, and contributes to the uptake of new technologies and services across the e-Health ecosystem. Moreover, the Marketplace directly aligns with SHIFT-HUB's overarching objectives by fostering strategic cooperation, supporting business development, and helping align digital health innovations with market demands.

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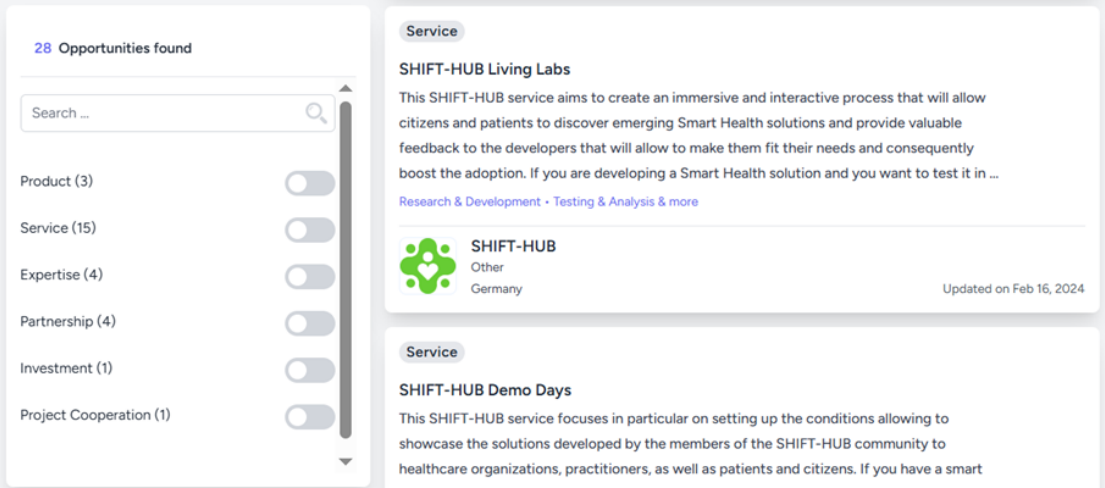

Figure 2. Snapshot of the Marketplace within the Community Platform

The decision to establish the Marketplace within the community platform, rather than on the separate technical infrastructure initially considered, was taken during the project's implementation phase. The process followed a natural development to improve the community platform's accessibility and user-friendliness. Embedding the Marketplace within this already active environment proved advantageous for several reasons.

Firstly, it ensured broader visibility for Marketplace content by leveraging existing traffic and user activity on the Community platform. Secondly, it removed unnecessary fragmentation by consolidating services into a single, user-centric space. Thirdly, it reinforced the collaborative and multi-stakeholder approach of SHIFT-HUB, enabling not only technical actors but also service providers, SMEs, researchers, or other stakeholders to participate in exchanges without requiring advanced technical integration or data handling capabilities.

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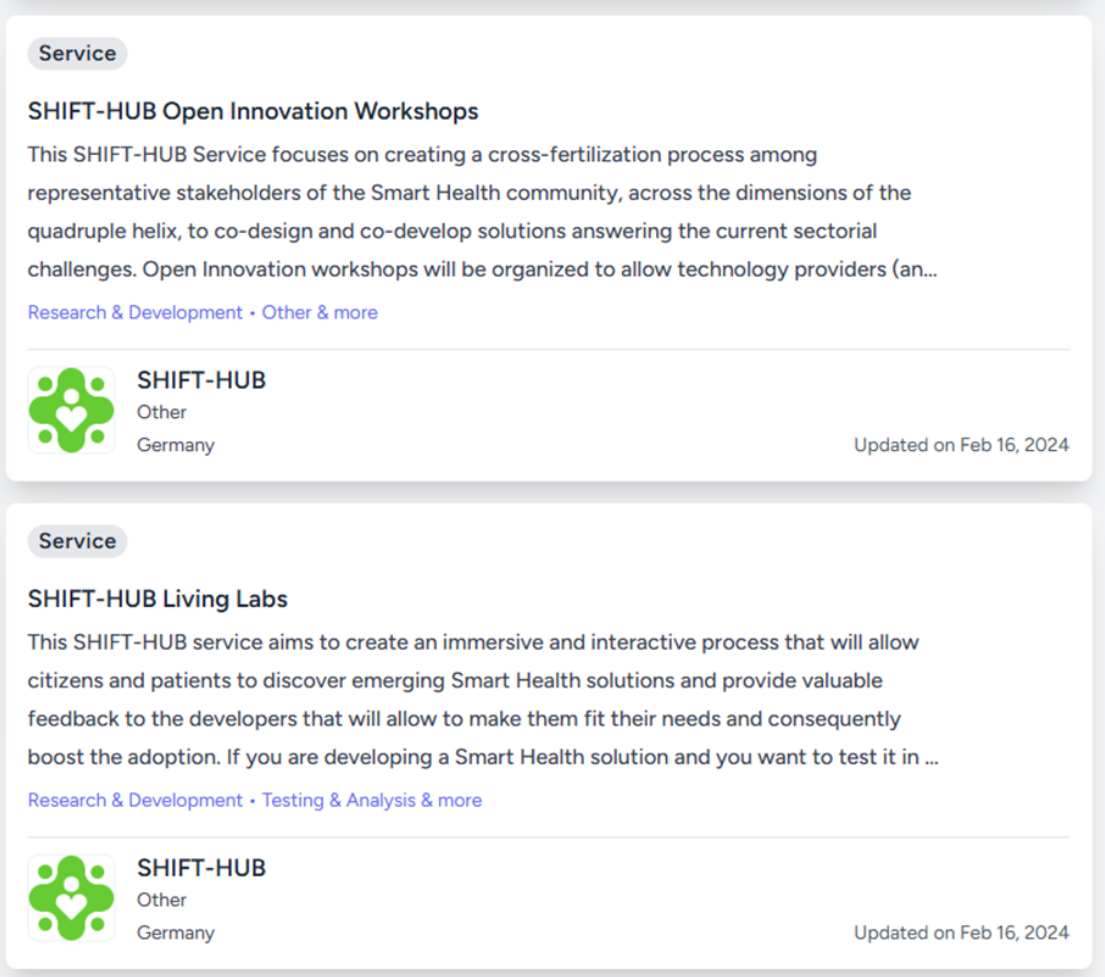

Figure 3. Snapshot example of Opportunities on the Marketplace

The Community Marketplace thus serves within the first layer of the SHIFT-HUB Smart Health Marketplace service offer: a low-barrier environment for knowledge exchange, business visibility, and collaboration. For stakeholders with more advanced needs,particularly those involved in data-intensive services or collaborative innovation, SHIFT-HUB offers a second layer through its dedicated technical data platform, the Smart Health Data Hub. This platform enables secure, compliant, and controlled data sharing and processing, and is tailored for actors requiring access to federated data environments, advanced analytics, or collaborative experimentation.

Together, these two platforms form a complementary and layered architecture. The Community Marketplace acts as the entry point, fostering visibility, networking, and collaboration across a broad range of stakeholders, while the technical platform builds upon this foundation by enabling more complex, data-driven interactions for those who require them.

2.3 Target Stakeholders and Use Cases

The SHIFT-HUB Community Marketplace has been designed as a versatile tool to serve a diverse group of stakeholders involved in the digital health and Smart Health innovation ecosystems. Its open and interactive structure enables a wide range of use cases, allowing users to present their services, identify potential partners, and explore collaboration opportunities. As part of

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the broader SHIFT-HUB Community Platform, the Marketplace benefits from other integrated functionalities such as user messaging, event-based matchmaking, and profile visibility, overall creating a supportive environment for dynamic stakeholder engagement.

The following stakeholder groups represent the main audiences that may benefit from participating within the Marketplace, each with distinct use cases and potential benefits.

2.3.1 Companies, SMEs, and Service Providers

SMEs and service providers can utilize the Marketplace to enhance their visibility within the European digital health ecosystem. By publishing their digital solutions, services, or innovation needs, these organizations can connect with potential business partners, customers, or investors. The Marketplace facilitates B2B activities, allows the promotion of ideas or consortia for funding calls, and helps identify collaborators for both public and private opportunities. Furthermore, organizations can demonstrate specific sectoral expertise, strengthen their brand presence, and access matchmaking features that support targeted outreach during dedicated events.

2.3.2 Innovators and Entrepreneurs

Startups, individual innovators, and entrepreneurs benefit from access to a platform that connects them with relevant stakeholders such as investors, corporates, and healthcare organizations. By showcasing early-stage or scalable solutions, these users can identify partners for co-development, gain visibility among potential supporters, and receive feedback to better align their innovations with market and policy needs. The Marketplace also supports the discovery of calls for proposals and joint funding opportunities, making it an effective entry point into collaborative innovation processes.

2.3.3 Investors

The Marketplace provides potential investors with a curated space to discover promising startups, SMEs, and innovation-driven organizations operating in the health and technology sectors. It offers visibility into concrete solutions and initiatives addressing current healthcare challenges, enabling the first glance to opportunities worthy of further investigation. Moreover, the community platform supports networking among investors and stakeholders through the dedicated SHIFT-HUB initiatives, facilitating opportunities for co-investment and strategic partnership formation.

2.3.4 Health Practitioners and Organizations

Hospitals, clinics, and healthcare professionals may use the Marketplace to explore and adopt new digital health solutions that enhance clinical practice, operational efficiency, and patient care. Exposure to innovative technologies, tools, and services facilitates informed decision-making and supports continuous improvement in healthcare delivery.

2.3.5 Patients and Citizens

Although not active contributors to the Marketplace, patients and citizens benefit indirectly by gaining access to information about new digital health solutions designed with user-centricity in mind. The platform may also provide opportunities to engage in co-creation or

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feedback processes, reinforcing patient engagement in innovation, and contributing to more inclusive, needs-based development of smart health solutions.

2.3.6 Innovation Intermediaries

Clusters, accelerators, incubators, and innovation agencies use the Marketplace as a tool to strengthen regional and sectoral innovation ecosystems. They can facilitate matchmaking between research organizations, corporates, and SMEs, promote specific innovation programs, and act as connectors between stakeholders. The platform's features support visibility and coordination of multi-actor collaborations.

2.3.7 Public Authorities and Policy Actors

Local, regional, and national authorities may use the Marketplace to monitor and understand the innovation landscape, gaining insights into emerging solutions that can inform policy design and strategic planning. Engagement with community members can support the co-development of public initiatives, pilot programs, and funding schemes aligned with real-world needs and capabilities.

Through these stakeholder-specific examples, the SHIFT-HUB Community Marketplace fosters a collaborative and inclusive environment where cross-sectoral partnerships are facilitated. By enabling interaction, promoting solution visibility, and supporting matchmaking around concrete needs and offerings, the Marketplace contributes directly to SHIFT-HUB's objective of advancing digital transformation in healthcare across Europe.

2.4 How to Use the Marketplace and Its Features

The Marketplace, thanks to being embedded in the SHIFT-HUB Community Platform, is convenient and very accessible for all the already registered members. It remains a completely facultative option that can, however, well complement and boost any other exchange or engagement activity when interacting within the community, or externally within the wider SHIFT-HUB network.

The Marketplace of the SHIFT-HUB e-Health Community and its items are visible and accessible to all stakeholders at any time and collects all the "*Opportunities*" that the users have posted. However, to be active within the marketplace, referring to adding opportunities, modify or change their own published items, users are required to be logged in and be affiliated with their organization, which remain connected to its related opportunities within the marketplace. To note, as the published opportunities are linked to the specific organization, users that are part of multiple communities – beyond only the SHIFT-HUB e-Health one, can show them in the marketplace of the other thematic communities once they formally register in them, without adding any complexities or time spent.

2.4.1 Posting Opportunities

The SHIFT-HUB Community Marketplace has been designed to allow users to publicly share their solutions, needs, and collaboration interests in a straightforward but structured manner. The process for publishing opportunities is accessible to all registered users and has been streamlined to encourage broad participation across stakeholder groups.

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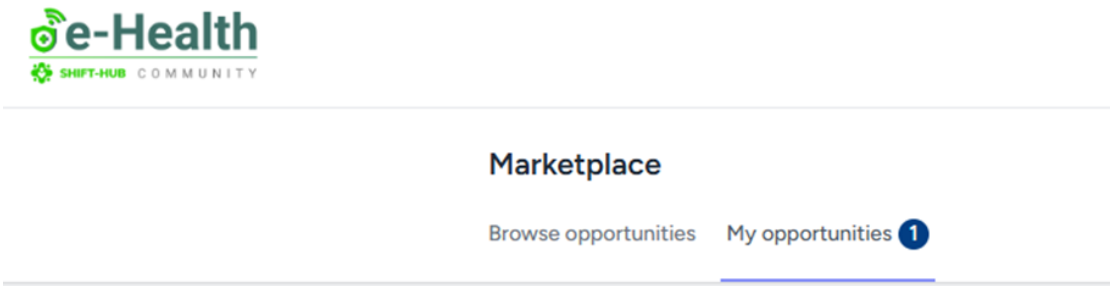

Figure 4. Snapshot of the Marketplace

Once logged in, users can access the "*My Opportunities*" section within the Marketplace. This area enables users to create new entries or manage existing ones. The system guides users through the publication process, offering tailored options depending on the type of opportunity selected. Each step is supported by clearly defined fields—both mandatory and optional—ensuring flexibility in the level of detail shared while maintaining a consistent structure for visibility and discoverability.

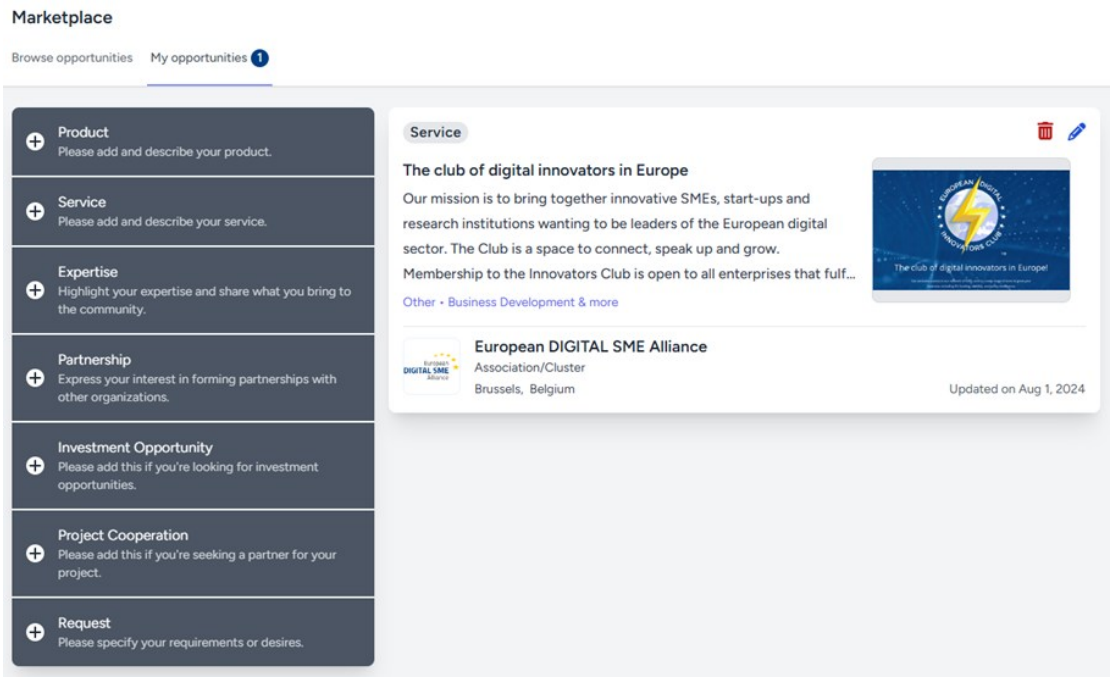

Figure 5. Snapshot of categories of opportunities to be published on the Marketplace

Currently, users may select from seven predefined opportunity categories, which are prominently displayed above the title of each published item. This categorization supports quick identification and filtering by other stakeholders, enhancing the usability of the Marketplace. The available categories are:

- Product: Designed for physical or material goods, often applicable to companies. In the context of e-Health, this might include medical devices, wearables, or hardware-based diagnostic tools, among others.
- Service: Suitable for a wide range of offerings including digital applications, platforms, or other health-related services.

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- **Expertise**: Intended for the promotion of individual or organizational know-how, such as technical consultancy, Research & Development (R&D) capabilities, or domain-specific insights.
- **Partnership**: Allows users to express interest in forming collaborations, either general or linked to specific projects, sectors, or goals.
- **Investment Opportunity**: Geared towards entities seeking private capital or investment partnerships. This category is particularly relevant to startups preparing for funding rounds or SMEs seeking scale-up support.
- **Project Cooperation**: Focuses on collaborative project ideas and initiatives. These may include proposals for upcoming funding calls, ongoing projects in search of partners, or concepts under development.
- **Request**: A flexible category for publishing needs that may not fall neatly under the previous headings. It allows users to articulate specific demands or interest areas for which they are seeking input, support, or expertise.

Each opportunity category is associated with a short form that collects structured information in a way that supports searchability and filtering across the platform. All entries require a title and description as mandatory fields.

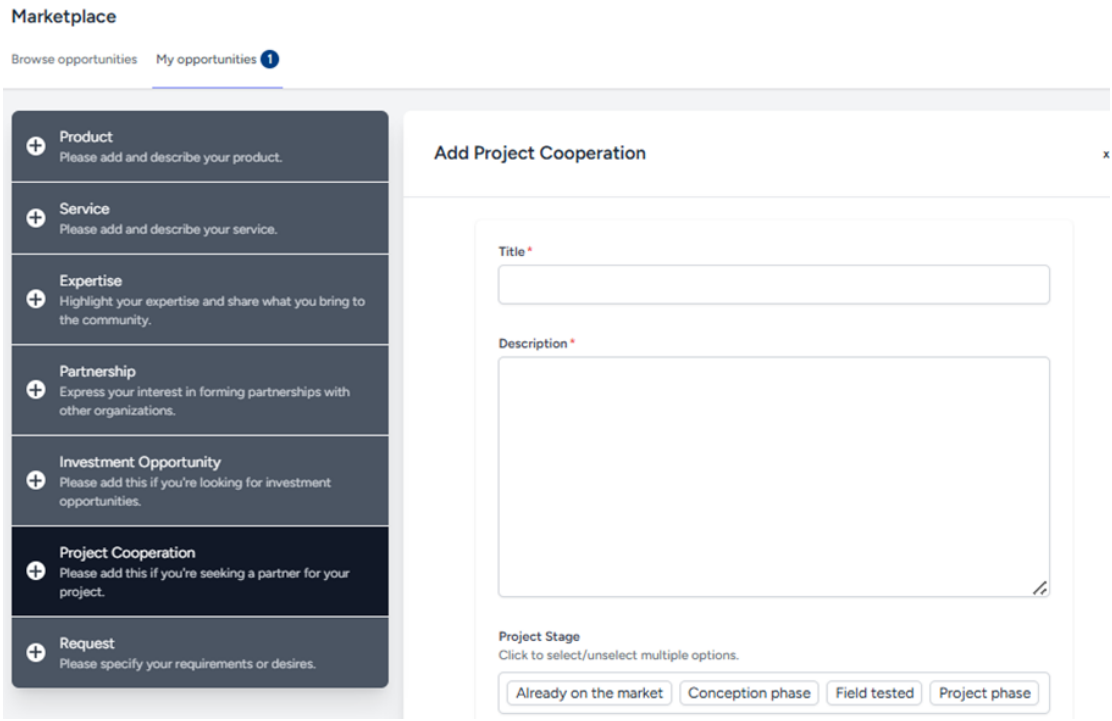

Figure 6. Snapshot of detailed fields for the categories of opportunities to be published on the Marketplace

Additional optional fields available across categories include the ability to upload an image or file, or to embed a video link. Furthermore, specific categories include tailored fields, such as:

- "What are you looking for" and "Market application keywords" for Product entries
- "Type of service" and "Market application keywords" for Service entries

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- "Field of expertise" for Expertise entries
- "Stage" and "Markets" for Investment Opportunities
- "Project stage" and "Type of collaboration sought" for Project Cooperation entries

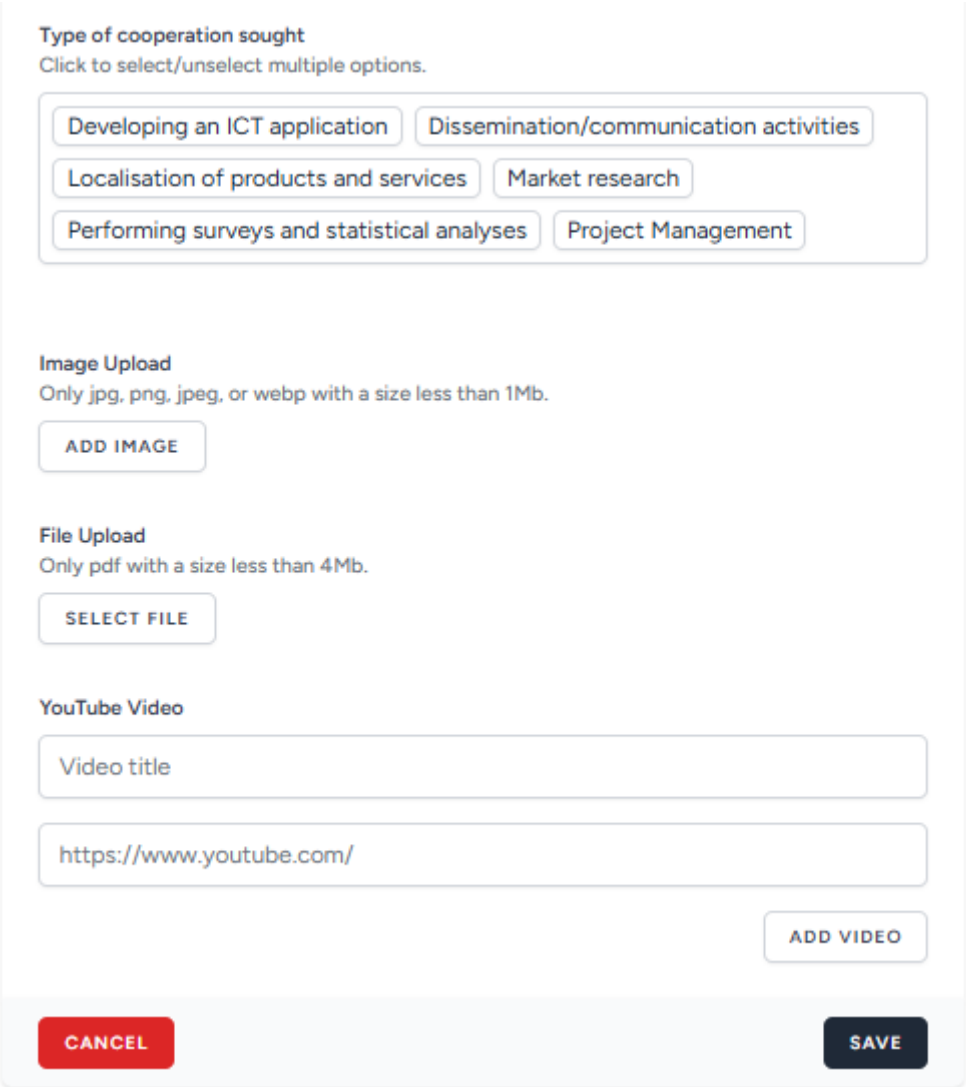

Figure 7. Snapshot of additional fields for any new opportunity

Importantly, the Marketplace accommodates both offer- and demand-oriented entries. This allows organizations not only to promote existing services or products but also to articulate specific needs or challenges they are seeking to address. Other users browsing the Marketplace can then evaluate whether their solutions, services, or expertise are relevant, and initiate direct engagement via the platform's messaging functionality.

To ensure the integrity and proper use of the Marketplace, all published content is subject to routine moderation. The SHIFT-HUB Community is managed by EDSA, in its role as platform owner, in cooperation with other project partners acting as community administrators. These actors regularly check submissions to prevent misuse, such as spam or any other inappropriate content, and to maintain the Marketplace as an accessible but monitored space for collaboration.

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2.4.2 Search and Filter Functionalities

The SHIFT-HUB Community Marketplace has been developed to ensure that both registered users and external visitors can efficiently browse and identify relevant opportunities. All published items are publicly visible, and the interface supports a comprehensive exploration of the content through intuitive search and filtering functionalities.

Users can either scroll through the full list of available opportunities or refine their search using the integrated search bar and filter system. The search bar allows for keyword-based queries, displaying only those opportunities whose titles or descriptions contain the specified terms.

In addition to free-words search, opportunities can be filtered by opportunity category, as previously outlined. This initial level of filtering enables users to narrow the scope of their browsing to specific types of offers or requests—such as products, services, project cooperation, or investment opportunities.

For more targeted results, advanced filtering options are available within each category. These sub-filters are linked to the category-specific data provided during the publishing process. For example, a user selecting the "*Project Cooperation*" category may further refine results by filtering for opportunities in the "Conception Phase" that are focused on "*Developing an ICT Application*". Only opportunities meeting these precise criteria will be displayed.

Such layered filtering becomes progressively more valuable depending on the volume of content on the Marketplace grows, ensuring that users can efficiently locate opportunities aligned with their interests or expertise. This contributes to a more effective and timesaving browsing experience, supporting the overall goal of fostering meaningful connections and collaborations across the SHIFT-HUB Community.

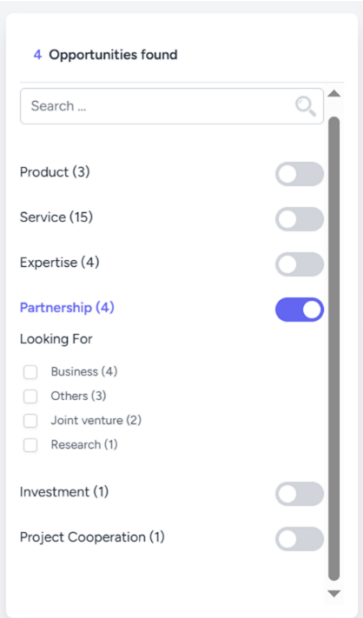

Figure 8. Snapshot of Search & Filtering functionalities of the Marketplace

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2.4.3 Viewing and Interacting

Each opportunity published in the SHIFT-HUB Marketplace includes a dedicated detail page, which can be accessed by clicking on the opportunity title. This page, automatically created, presents all the information submitted by the original poster, including both mandatory and optional fields completed during the publishing process. Additionally, the page prominently features the organization associated with the opportunity, including its logo, stakeholder type, country of origin, and other relevant profile elements.

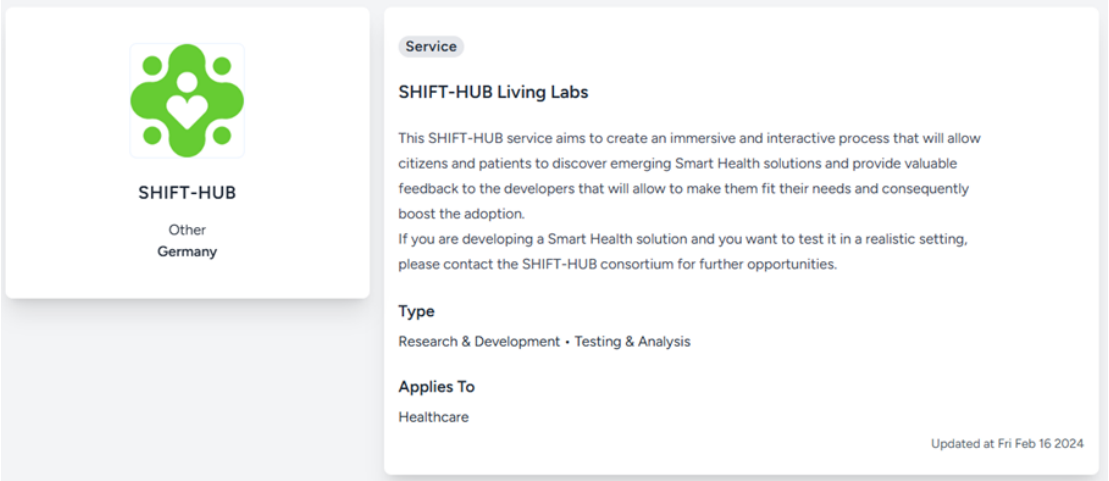

Figure 9. Snapshot of an example of full opportunity published on the Marketplace

The integrated nature of the platform allows users to easily navigate from the opportunity page to the profile of the corresponding organization. From there, further details can be accessed, and—where relevant—users may initiate direct contact with registered representatives of the organization through the platform's internal communication tools.

This interconnected functionality contributes to the facilitation of meaningful engagement across the e-Health community, supporting collaboration and the exchange of expertise. At the same time, it preserves flexibility, enabling stakeholders to explore potential partnerships or follow up on opportunities depending, of course, on their own willingness and interests.

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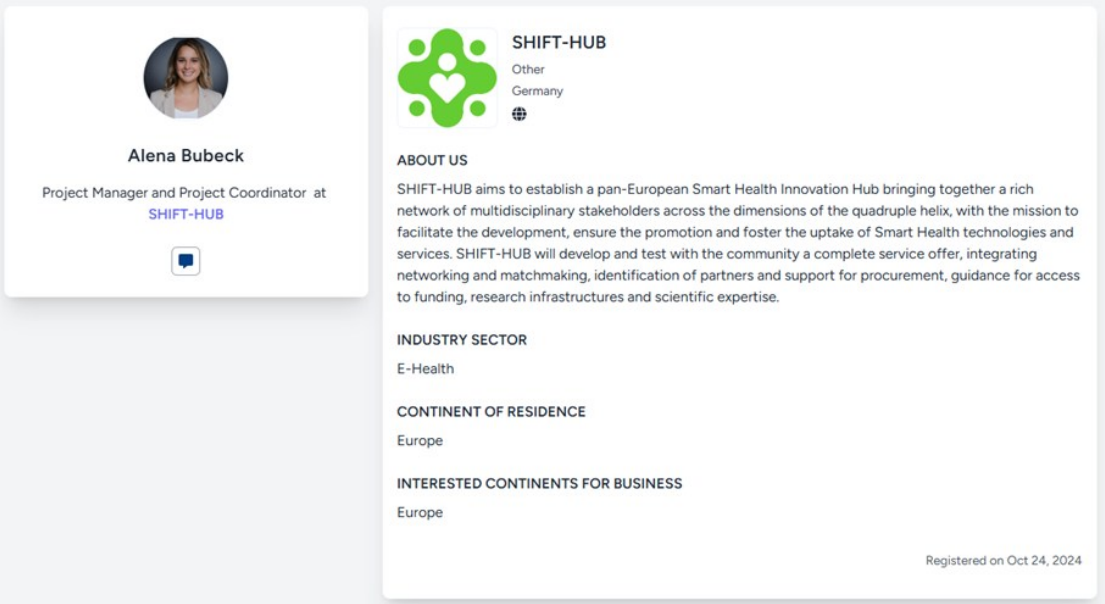

Figure 10. Snapshot of exemplary company profile and representative associated to each opportunity within the Marketplace

This open process facilitates the creation of connections between the stakeholders of the e-Health ecosystem, providing the adequate tools while leaving ample space for stakeholders to then interact or potentially proceed in the way they see most fit, depending on their interests, opportunities and needs.

2.4.4 Profile and Item Management, Interaction with events

Registered users of the SHIFT-HUB Community Platform can manage their published content within the Marketplace at any time. From the dedicated interface, users may create new opportunities, as well as edit or remove existing ones. Any modifications are immediately applied upon saving and become visible in the public Marketplace view without delay.

Figure 11. Snapshot of tools to modify or delete the own published opportunities

The Marketplace serves a particularly strategic function in the context of events focused on matchmaking, networking, and co-creation. When a registered member of the community

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signs up for an event through the platform, both the individual and their associated organization are automatically linked to the event. Consequently, any opportunities previously published by the users' organizations are displayed within a dedicated event-specific Marketplace page. This feature ensures that only opportunities originating from confirmed event participants are featured, thereby streamlining engagement among stakeholders with aligned interests, objectives, or thematic focus.

Figure 12. Snapshot of how the Marketplace is embedded for each event

These event-linked Marketplace pages can be activated or deactivated through the admin settings, allowing flexibility depending on the event's nature. In cases where the Marketplace would not add value, or may generate confusion, this function can be easily hidden. The decision to enable or hide this feature rests with the event organizers. Notably, the Marketplace function has proven especially relevant for large-scale initiatives such as the SHIFT-HUB International Brokerage Events, where targeted visibility and structured interactions are essential to facilitating effective partnerships.

2.5 Future potential, exploitation and sustainability

The SHIFT-HUB Community Marketplace has been designed not only as a project initiative but as a lasting and adaptable digital infrastructure with potential for long-term impact and exploitation. Its integration into the broader SHIFT-HUB e-Health Community ensures continuity and relevance beyond the project's formal duration.

2.5.1 Extending the Marketplace Beyond SHIFT-HUB

The Marketplace, while developed under the framework of the SHIFT-HUB project, has been embedded within a larger and more permanent digital environment—the EDSA Platform. This platform hosts a range of thematic communities (e.g., manufacturing, AI, digital skills, funding), of which e-Health (powered by SHIFT-HUB) is one. As a result, the SHIFT-HUB e-Health Community, along with its Marketplace, benefits from an ecosystem that fosters cross-sectoral interaction and broader stakeholder engagement. This configuration creates opportunities to extend the use of the Marketplace to other health- and tech-related initiatives, as well as to future projects seeking ready-made, operational community infrastructure. The platform will remain active beyond the project's end, and further opportunities are detailed in the dedicated Deliverable.

2.5.2 Potential for Integration with External Platforms

Looking forward, the Community Marketplace holds clear potential for collaboration with other initiatives or projects. Even beyond the project's end, stakeholders external to the initial consortium could benefit from this infrastructure. Among many other approaches, an example would be the hosting of thematically relevant events within the platform, thus benefiting from its already present community and all the other embedded features, including the marketplace. The marketplace specifically could also be further expanded or

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leveraged through external initiatives focused on matchmaking or accelerating connections within the ecosystem. Such integration would support increased visibility of posted opportunities, wider stakeholder reach, and a seamless experience for users already active in European collaborative frameworks.

2.5.3 Long-Term Community Engagement and Value Creation

The Marketplace's strength lies not only in its technical features but in its ability to support long-term community building and stakeholder interaction. By offering a user-driven space for publishing, searching, and connecting around concrete business, research, or collaboration needs, it fosters continuous engagement across the health innovation ecosystem. The simplicity of use combined with meaningful functionalities (e.g., profile linking, filters, integrated messaging) ensures that the platform remains relevant and attractive for future activities and initiatives. Since the Marketplace will remain publicly accessible, it can continue to generate value for new and existing members without further barriers, while encouraging participation through added benefits for registered users.

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3. The second layer of the Smart Health Marketplace - Data Sharing Opportunities via the Smart Health Data Space

The Smart Health Data Space is a key feature of the SHIFT-HUB service portfolio providing a secure data processing and data sharing platform, which acts as second layer of the SHIFT-HUB Smart Health marketplace. Hereafter, we describe the benefits and features of the Data Space as well as provide guidance on how to use it.

3.1 The Smart Health Data Space and it's Marketplace features

The Smart Health Data Space, forming the second layer of the Smart Health marketplace, serves as a secure, modular, and interoperable environment for data sharing, processing, and service integration. This layer complements the first layer of the Smart Health marketplace by enabling the technical deployment and exchange of data-driven services and applications in compliance with defined security, interoperability, and usability standards. It is implemented as a pilot hub on the platform developed and managed by Cleyrop, a trusted provider of secure data infrastructure. The Data Space is accessible via both the Cleyrop website and the SHIFT-HUB project website.

The platform is structured in multiple functional layers, all governed by a centralised data organisation setup managed by the data platform administrator. This ensures consistency, security, and scalability across all platform services. On one side, the Data Space offers data providers full control over their data—allowing them to store datasets in their original formats, configure security policies, and develop custom data transformations if needed, using a user-friendly development interface. This makes the platform highly adaptable for various Smart Health use cases, especially where data cleaning, modelling, or validation are required before application-level use. And on the other side, those data repositories will be exposed to data users, e.g. developers of Smart Heath Apps, that will consume prepared data following a permission schema decided by the data providers. Under these premises, the Data Space is designed to serve three distinct user groups.

- **Data providers** can easily add data, manage access rights, and update datasets using an integrated processing and orchestration tool.
- **Application developers** can efficiently list, discover and use available datasets through a user-friendly interface.
- **Application users** access the necessary data for the applications they use seamlessly and securely through application programming interfaces (APIs)-based connections, supported by token-based authorization.

This clear role structure ensures a transparent, collaborative, and well-governed environment for all users of the Smart Health marketplace.

Aligned with the user roles defined above, the Data Space incorporates a suite of marketplace functionalities that enable efficient onboarding, data operations, and cross-platform integration. These features include:

- **User-friendly access** to the Data Space for community members is ensured through an intuitive interface allowing data providers and application developers to easily create

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data sources, manage datasets, and configure access rights. This supports seamless onboarding and engagement from a broad range of users within the smart health community.

- The Data Hub enables a **"test before invest" environment**, offering sandbox-like capabilities through tools for data exploration, transformation, modelling, and workflow management. Users can explore, analyse, and transform data using Python or SQL-based tools, create data pipelines, and conduct pre-commercial testing within controlled, collaborative environments. This empowers innovators to validate their solutions under real conditions before commercial rollout.

- To meet the need for a **modular and lightweight architecture**, the platform operates with componentised services that enable data collection, transformation, access control, and delivery to be managed independently. Data providers can maintain control over their assets while exposing relevant datasets via Representational State Transfer (REST) APIs or messaging layers, in line with application-specific needs.

- The Data Space includes **bidirectional communication mechanisms and interoperability features**, ensuring compatibility with external systems through standardized APIs. Application developers are provided with unique authorisation tokens to securely access specific datasets, and real-time usage can be tracked and monitored. APIs support multiple methods of interaction (e.g., URL-based calls), ensuring full integration capabilities across Smart Health applications.

- The Data Space **hosts and distributes software modules and components** available in the platform to perform a specific function or set of functions. With that the necessary infrastructure enabling the implementation and deployment of Smart Health applications and their interaction with shared datasets is provided through the use of APIs. Thus, contributing to analytics workflows and a growing, collaborative ecosystem.

With the second layer of the Smart Health marketplace, the Smart Health Data Space ensures secure, scalable access to high-quality health data and fosters collaboration between stakeholders. At the time of submission, 24 external users are currently registered on the Smart Health Data Space acting as beta users to test the pilot hub. Strategies on linking the layers of the Marketplace are described in *chapter 4- Linking the Smart Health Marketplace Layers*.

3.2 How to access and use the Smart Health Data Space

In the following the access and usage of the Smart Health Data Space is outlined. A recording of an introductory session on how to access and use the Smart Health Data Space is available on **YouTube** (Link).

3.1 First initialization

For each new application provider, the Platform Manager will have to follow the steps below to initialize access:

1. Create a new data source to collect data from the app

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2. Create a new project and add the data source to the project
3. Create a new Data Worker account as member of the app project

After that, the Data Worker will receive an email inviting them to connect to the platform.

3.1.1 Workspace structure and Governance

On the Data Space, two workspaces are available: "My Studio" and "Projects". *MyStudio* is a personal workspace for each user and not accessible to other users. It can be used as a "sandbox" to do test and training. If users want to work on data and share them with others, the workspace *Projects* needs to be used. It is accessible only to other project members, which the Platform Manager can add. The dashboards in the projects are then accessible by default to all project members added. Depending on their roles, different access types can be assigned to the users *(see Users section below)*. The Catalogue contains all datasets of the platform and is visible to every Data Worker registered. Depending on the dataset stored, the access might be limited based on sensitivity levels and user access rights.

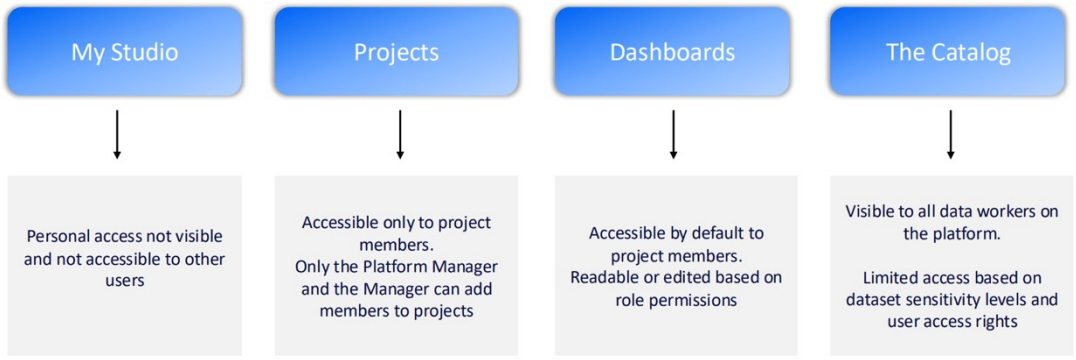

Figure 13. Overview of the dataset and data flow

3.1.2 Data Sources – uploading data to the Smart Health Data Space

To create a new data source, the Platform Manager must go on the "Data sources" menu and choose "Deposits" or "Data sources" depending on the needs.

Deposits offer an access to the Secure File Transfer Protocol (sftp) server include in the platform. Each provider can have its own folder to store data on it. The deposit can be created with a Secure Shell Protocol (SSH) key or with a User/Password access (Figure 14 and 15)

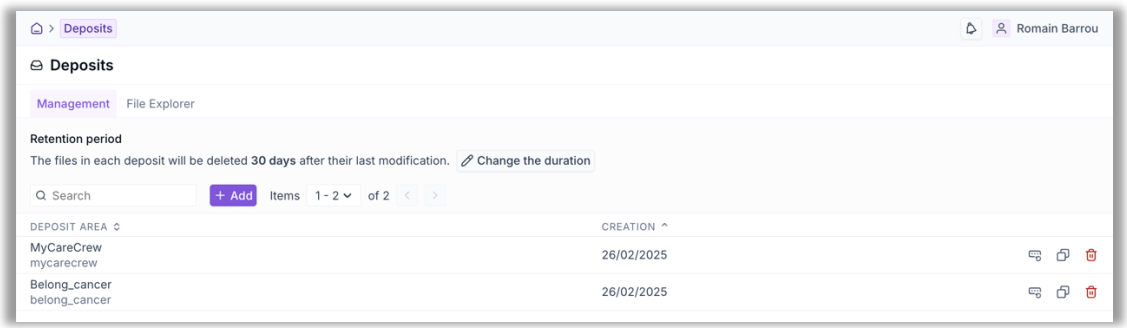

Figure 14. Deposits listing example

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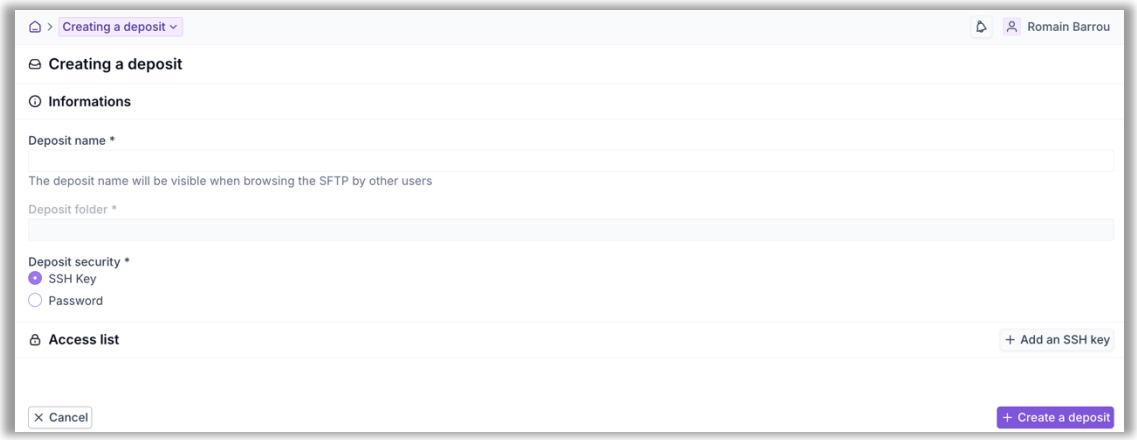

Figure 15. Deposit creation form with a SSH Key access

The **DataSource** section enables users to create a connector to obtain data from an external source (e.g. Api, Jira, Microsoft SQL, MySQL, Oracle, PostgreSQL, S3, SAP, SFTP). (Figure 16 and 17)

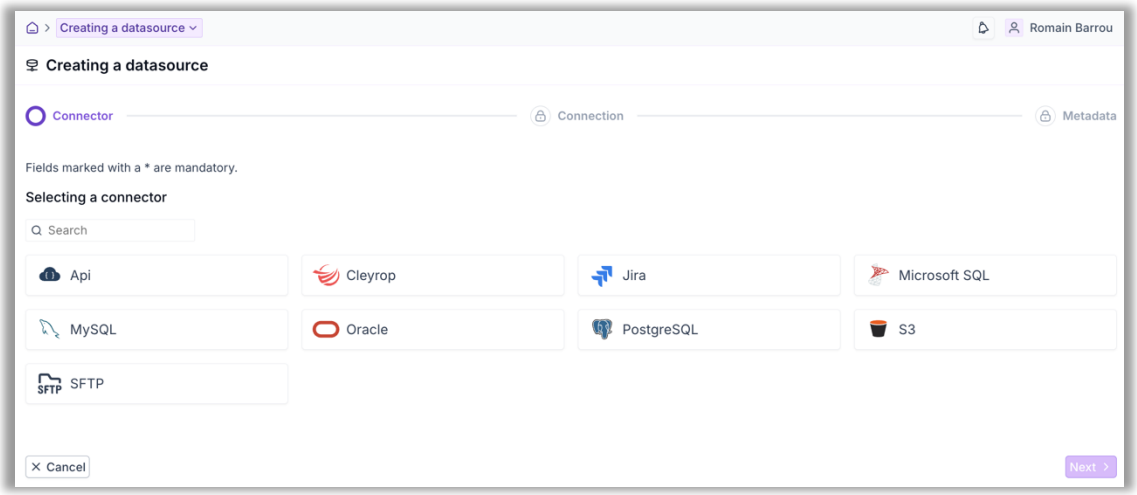

Figure 16. List of a data source connector available

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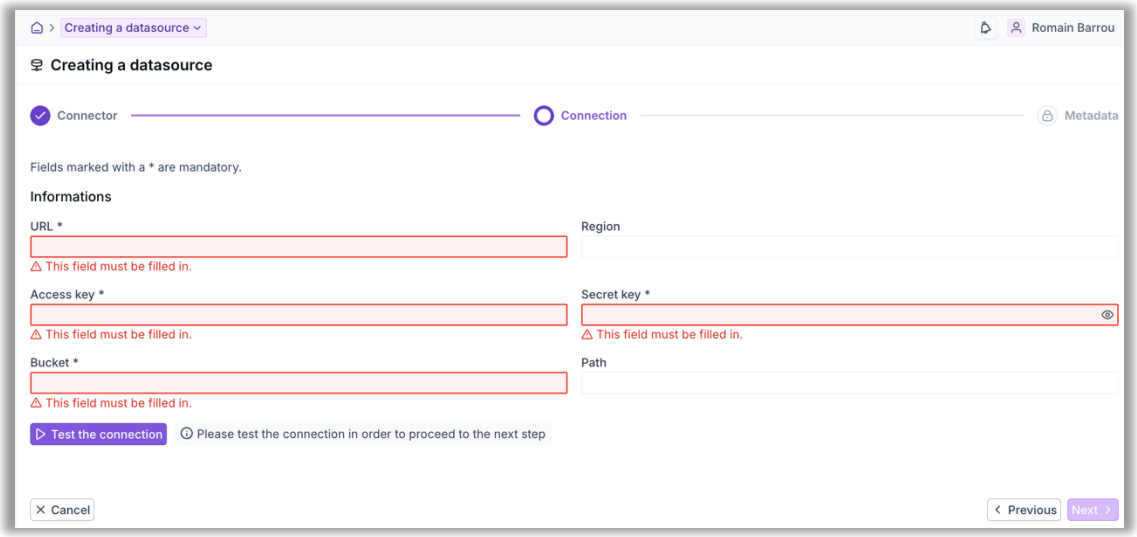

Figure 17. Example of data source creation form for a S3 connector

3.1.2 Project

To create a new project, the Platform Manager can go to the "Project" menu and click on the button "Create a project". In the "Administration" menu, on the "Project" item, the manager can see all projects on the platform and administrate them. (Figure 18)

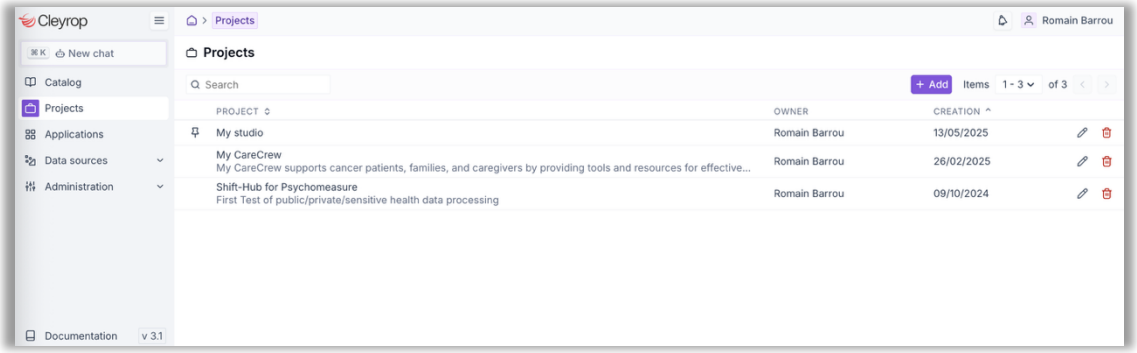

Figure 18. Example of project's app provider

The project owner has more permission than other members. They are responsible for the project's content and can manage who has access to the project. (Figure 19)

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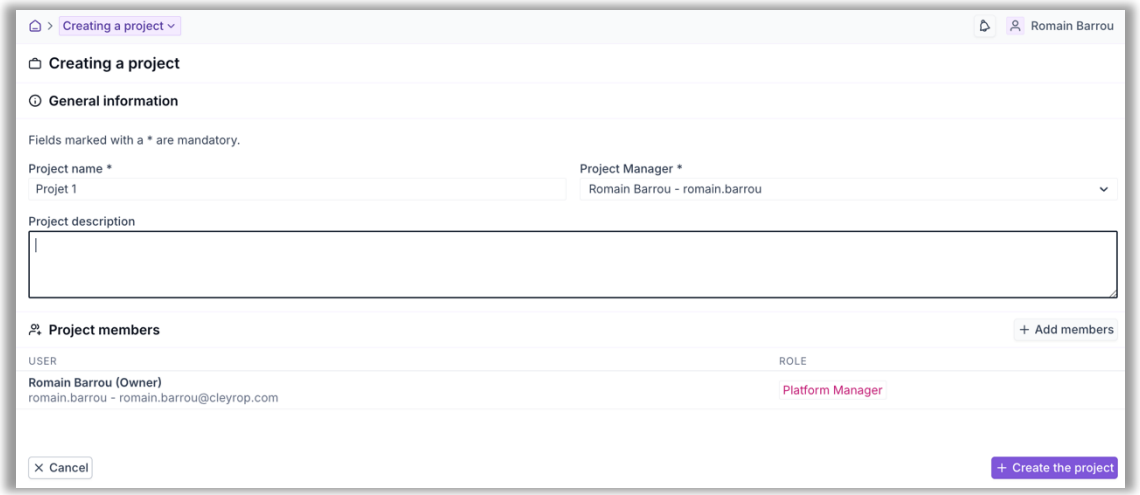

Figure 19. Example of project creation form

3.1.3 Users

To create a new user, the Platform Manager must go to the "Administration" menu and select the "user" item. The manager can see all users of the platform and manage them. They can also reset the user's password. This option will send an email to the user, inviting them to set up a new password.

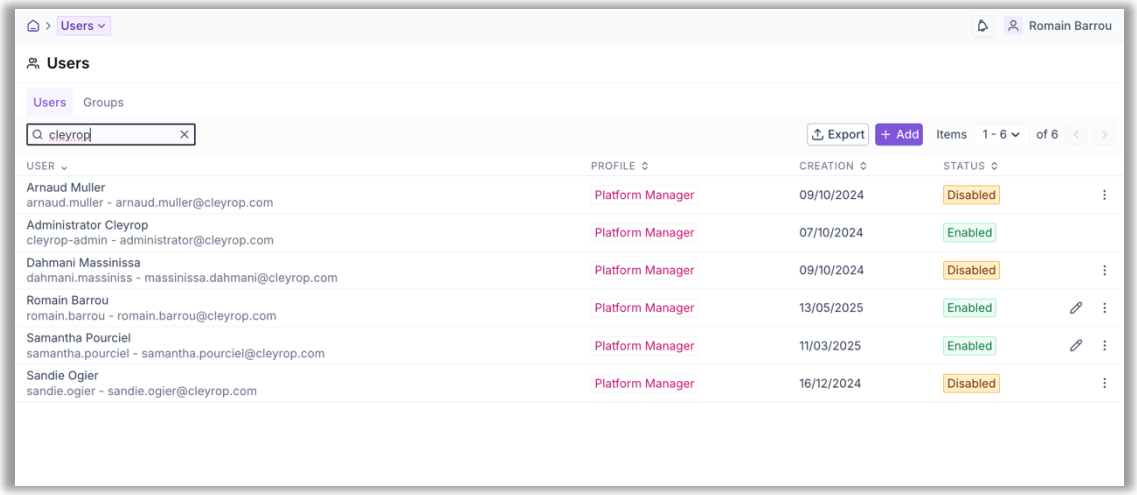

Figure 20. Example of users listing

The Platform Manager can create different profiles, such as other Platform Managers, Data Worker, Business Analyst or Viewer. These groups are used to classify users and provide defined permissions and access to the project's dashboard. (Figure 21)

- **Viewer**: can only read the dashboard
- **Business Analyst**: can read and edit the dashboards
- **Data Worker**: read and edit dashboard; has access to the datasets available in the data catalogue; is a data project member able to create dataset, workflow and access the notebook; can store data and make orchestration

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- **Platform Manager**: all right of Data Worker with additional access and rights in the data project member configuration including user, project, data source and governance management

The Business Analyst and the Viewer have access only to the data visualisation menu within a project. They cannot visualize or process datasets on the platform. In order to do that, they need to become Data Worker. Therefore, only Data Workers and Platform Managers can be added to a project and become its members.

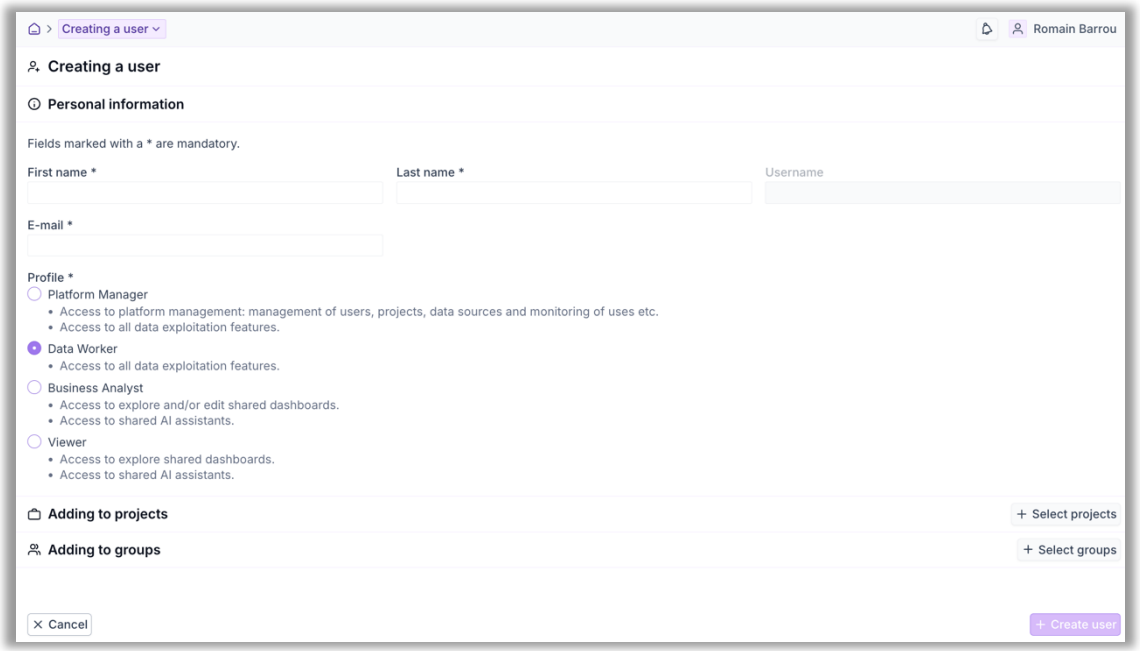

Figure 21. User creation form

3.2 Data processing tools

Data catalogue

Within the platform, the Data Worker can explore the catalogue to find data shared by other applications providers and can add it to their own project to process them. Filters according to sensitivity, classification, state, origin and refresh type can be used to explore. (Figure 22)

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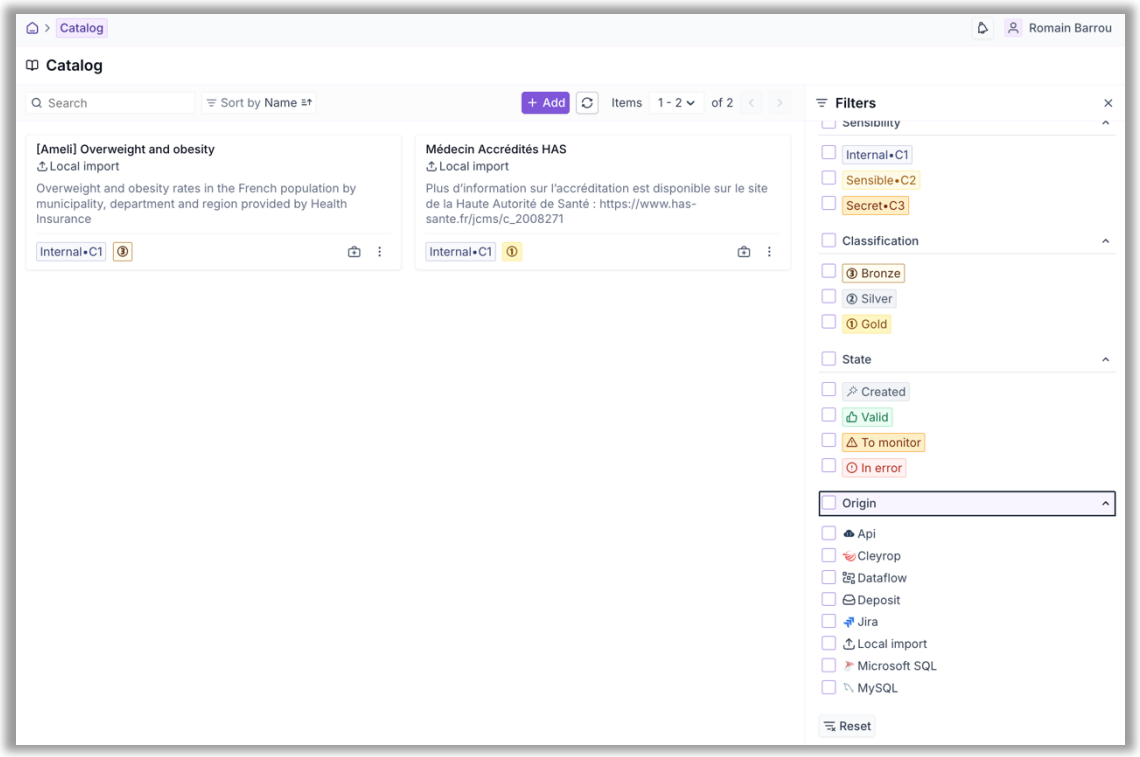
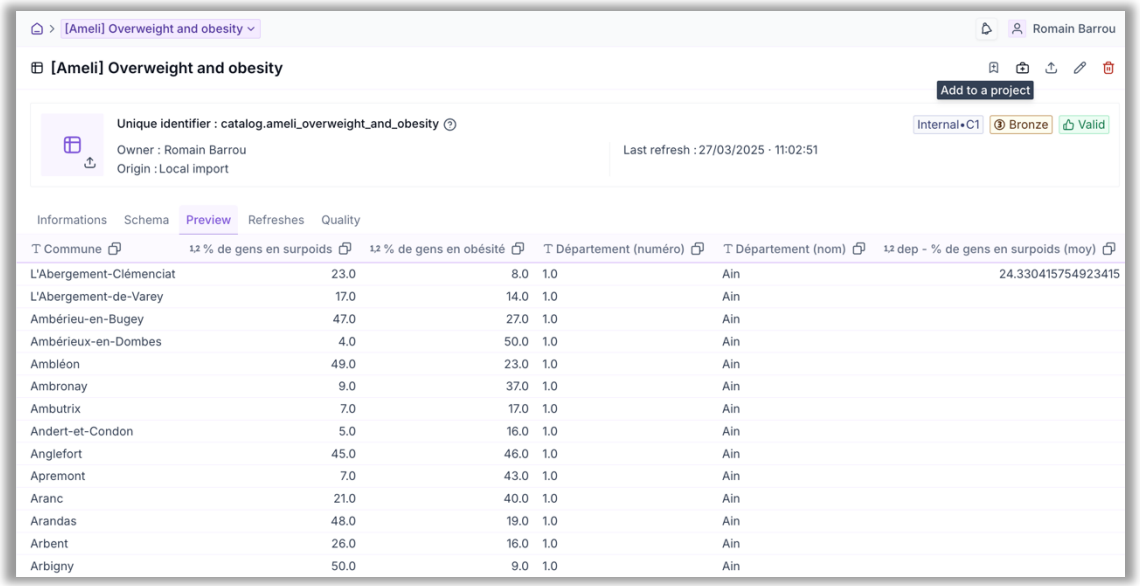


Figure 22. Filters available in the dataset catalogue

To add a dataset to a project, the user can click on the data description and use the small button upright to add it to a project. If the dataset is sensitive or restricted, a permission access will be sent to the Platform Manager. When the Platform Manager approves the access, the dataset will be automatically available in the project's library. (Figure 23 and 24)



Commune	% de gens en surpoids	% de gens en obésité	Département (numéro)	Département (nom)	dep - % de gens en surpoids (moy)
L'Abergement-Clémenciat	23.0	8.0	1.0	Ain	24.330415754923415
L'Abergement-de-Varey	17.0	14.0	1.0	Ain	
Ambérieu-en-Bugey	47.0	27.0	1.0	Ain	
Ambérieux-en-Dombes	4.0	50.0	1.0	Ain	
Ambléon	49.0	23.0	1.0	Ain	
Ambronay	9.0	37.0	1.0	Ain	
Ambutrix	7.0	17.0	1.0	Ain	
Andert-et-Condon	5.0	16.0	1.0	Ain	
Anglefort	45.0	46.0	1.0	Ain	
Apremont	7.0	43.0	1.0	Ain	
Aranc	21.0	40.0	1.0	Ain	
Arandas	48.0	19.0	1.0	Ain	
Arbent	26.0	16.0	1.0	Ain	
Arbigny	50.0	9.0	1.0	Ain	

Figure 23. Dataset preview

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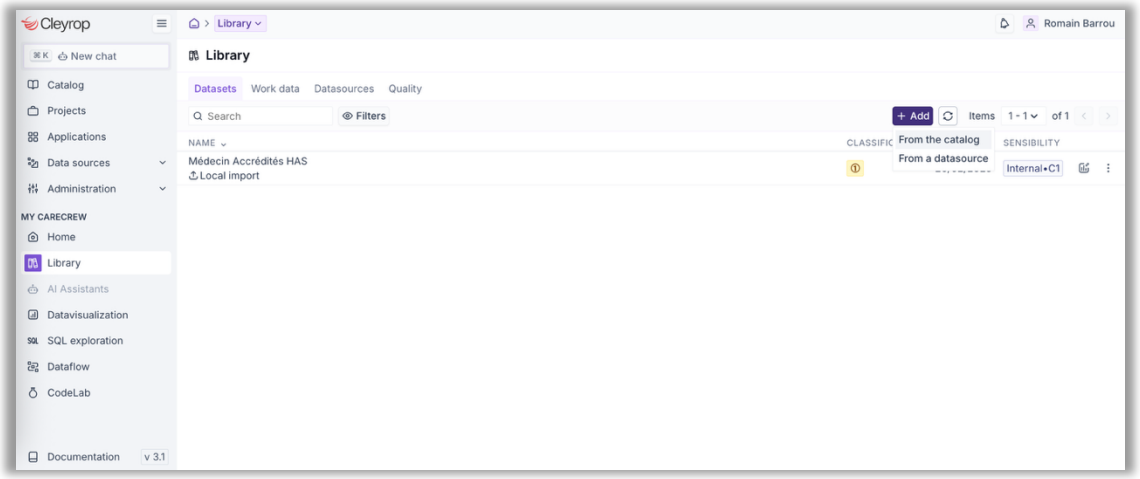

Figure 24. Example of project's library after adding a dataset from the catalogue

Project library

In the project's library, the Data Worker can add datasets from the catalogue or from the data sources created before by the Platform Manager. (Figure 25 and 26)

The Data Worker can configure and preview data before validation. They can also add metadata such as sensitivity, classification, diffusion, state, origin and description, which can all be used to sort and filter the datasets. (Figure 27)

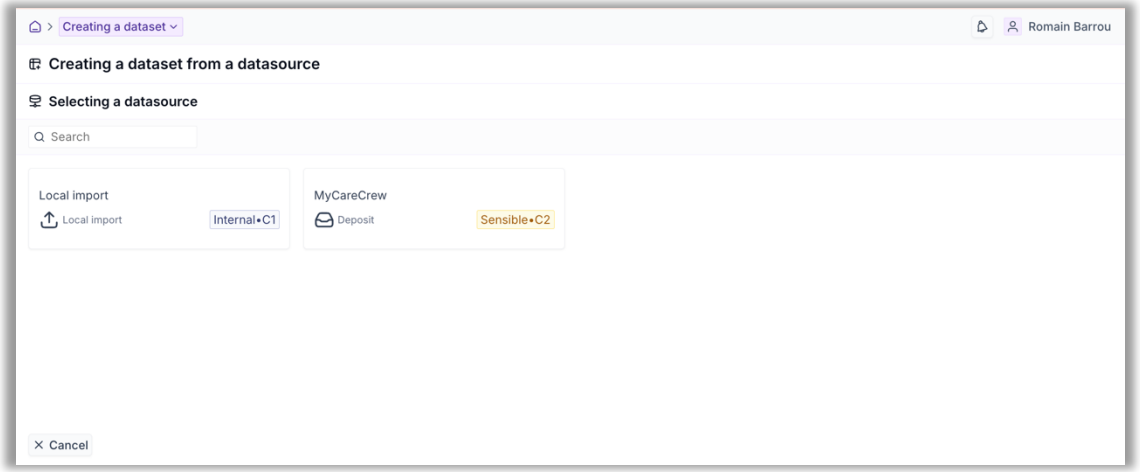

Figure 25. Adding a dataset from a data source

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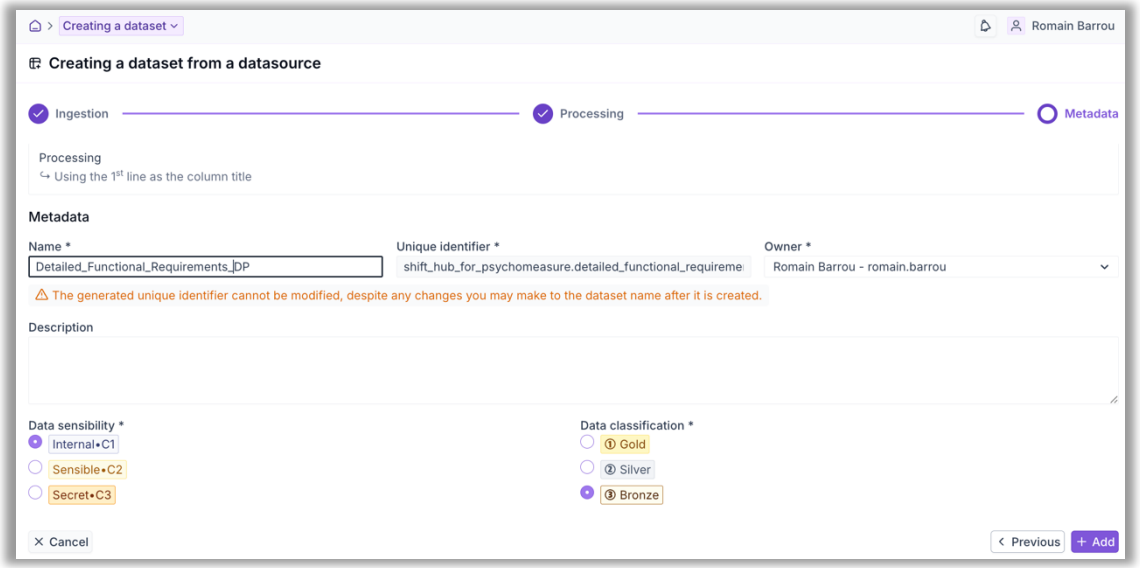

Figure 26. Adding a dataset from a data source - metadata

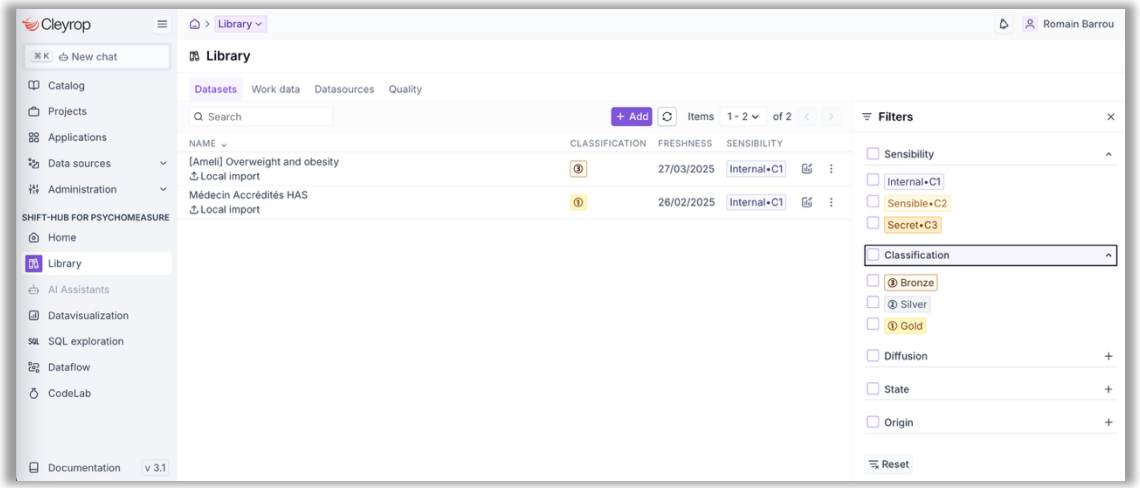

Figure 27. Filtering options in project library

Project's dataflow

The dataflow menu allows the Data Worker to transform datasets and create new insights. They can use different transformation tools (SQL, Python, Low Code) and create new datasets. When the result is ready to deploy, the Data Worker can deploy it and find the new dataset created in the project's library. Dataflows can be programmed to execute automatically at the frequency defined by the Data Worker. (Figures 28 and 29)

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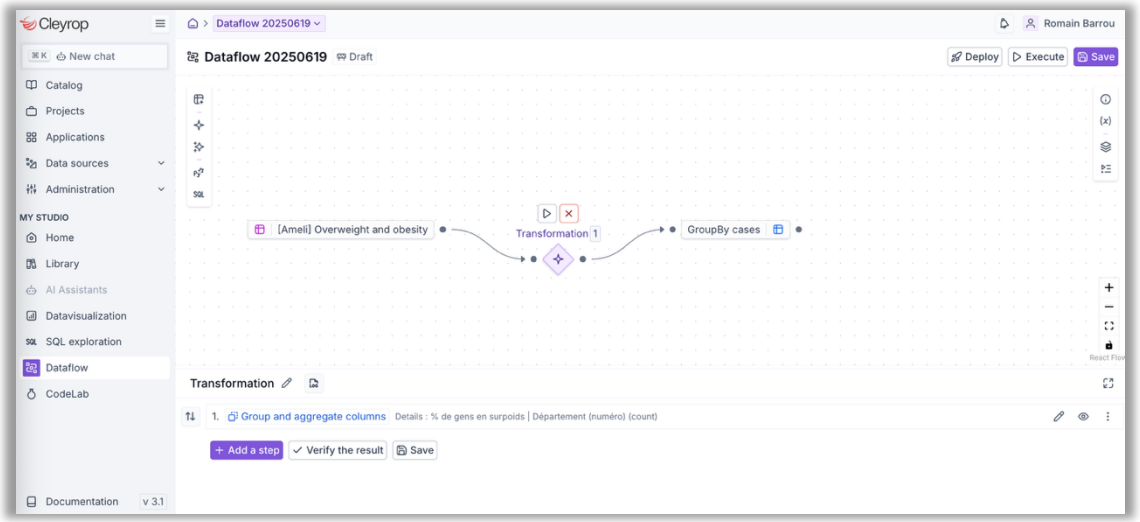

Figure 28. Example of dataflow creation with low code tools

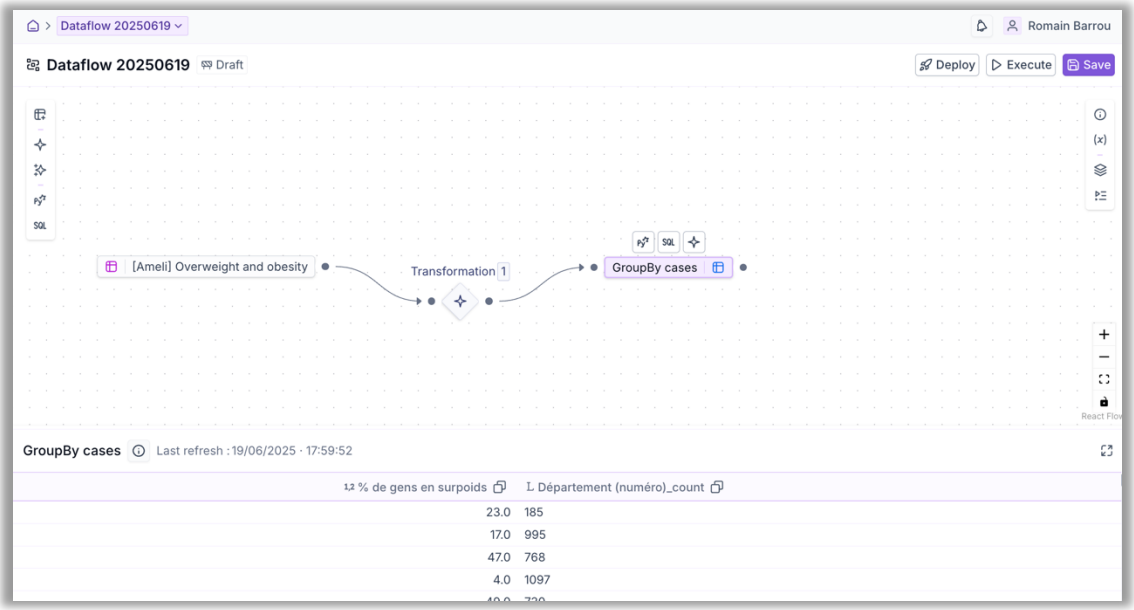

Figure 29. Example of dataset results from a low code transformation

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Publishing results

The datasets in the project library can be published any time to the catalogue via the icon “Publish to catalog” on the right of each dataset. (Figure 30) Access rights and settings for the published dataset can also be selected during this process.

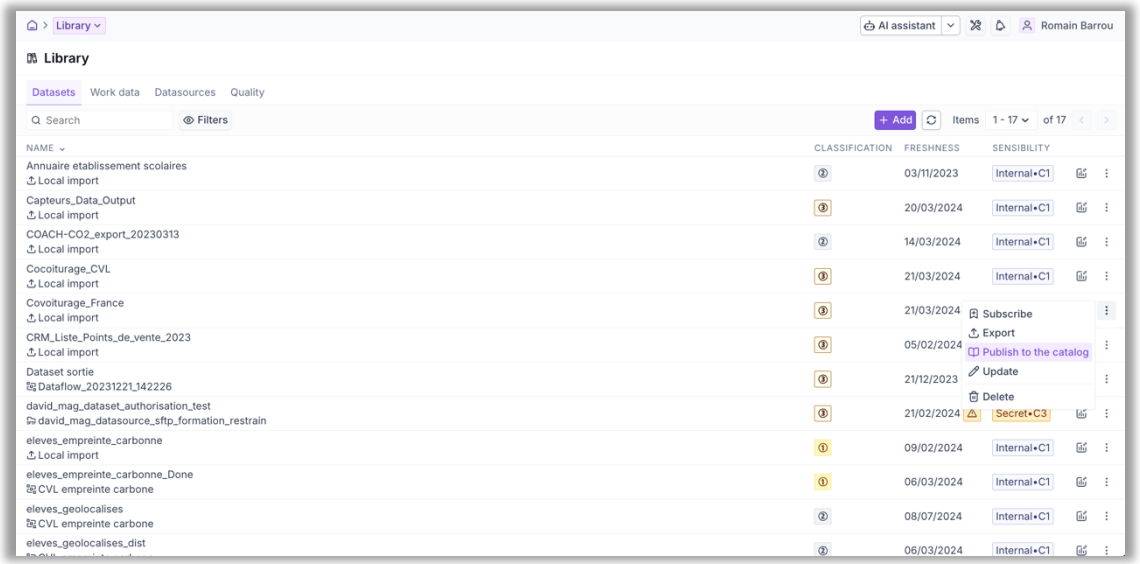

Figure 30. Example of project’s library dataset with options to publish to catalogue

Exposing results

If the dataset should not be made available in the catalog, but be shared with specific users, the Data Worker can expose all datasets he has access to by creating a token in their profile space and share it with selected users. The token is an access key that allows the user to use APIs. Users are encouraged not to share the tokens with websites and people they do not trust. An expiration date can be set but it’s not mandatory. (Figure 31)

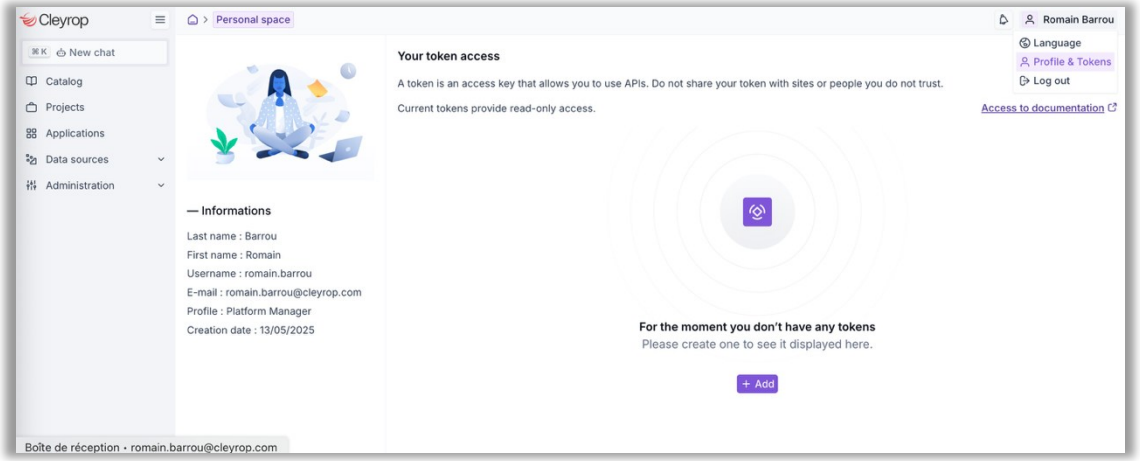

Figure 31. Example of token creation to expose data via API

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In summary, with its functions the SHIFT-HUB Smart Health Data Space, forming the second layer of the Smart Health marketplace, ensures secure, scalable access to high-quality health data while fostering collaboration among stakeholders, primary data provides and data users (e.g., app developers). By offering an industrial-grade, user-friendly solution for managing, processing, and sharing data, it supports the SHIFT-HUB's mission to build a robust and trusted Smart Health Hub and ecosystem. Its layered architecture and integrated governance tools make it a foundational component and addition to the first layer for establishing a sustainable, interoperable European marketplace for smart health innovation.

4. Linking the Smart Health Marketplace Layers

The two layers of the Smart Health marketplace—the **Community Platform** (first layer) and the **Smart Health Data Space** (second layer)—are closely interconnected to provide a seamless user experience. Community members engaging with the first layer for networking, collaboration, matchmaking and knowledge sharing are actively guided toward the second layer, where data-driven services and technical functionalities are accessible. To facilitate this transition, **regular onboarding sessions** moderated by Cleyrop are promoted via the Community Platform (e.g. Your access to the SHIFT-HUB Smart Health Data Space: WHY and HOW to join), offering live demonstrations and practical guidance on how to register, upload data, and interact with the Data Space. The sessions are also **recorded and one was made widely available on YouTube** (Link) to ensure continuous onboarding and access. In addition, a **comprehensive user manual** is provided, outlining step-by-step instructions for using the platform's features. The user manual is sent in a follow-up email to every participant of the session and is publicly available on the SHIFT-HUB project website under the Resources section (Link). For further assistance, users can reach out directly via a dedicated **support email** at Cleyrop: support@cleyrop.com. Together, these measures ensure that community users are well-supported in adopting the technical layer of the marketplace and can effectively contribute to and benefit from the services provided by SHIFT-HUB Smart Health Marketplace.

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Conclusion

The development of the SHIFT-HUB Smart Health Marketplace marks an important step towards establishing a sustainable and trusted digital health innovation ecosystem in Europe. By offering a two-layered architecture, the Marketplace addresses the needs of diverse user groups—ranging from stakeholders interested in simple visibility, collaboration, and networking to advanced users seeking secure environments for data processing and application deployment.

The Community Marketplace, the first layer of the Smart Health Marketplace, serves as an accessible entry point, lowering barriers to participation and encouraging cross-sector collaboration. Its integration into the broader SHIFT-HUB Community Platform ensures visibility, continuity, and alignment with the project's wider engagement and dissemination goals.

The Smart Health Data Space, representing the second layer of the Smart Health Marketplace, extends these capabilities by providing an industrial-grade platform for secure data sharing and service integration. Developed and managed by Cleyrop, the Data Space enables advanced technical collaboration while respecting governance and data privacy requirements. Through features such as API-based access, role-based permissions, and a modular structure, it supports the "test before invest" principle and fosters scalable innovation.

At the time of submission, with already 28 active opportunities posted on the Community Marketplace and 24 external users registered on the Data Space Pilot, the SHIFT-HUB Smart Health Marketplace demonstrates a clear value for start-ups, SMEs, innovation intermediaries, and public bodies.

By ensuring a mutually reinforcing connection between the two layers—supported by onboarding sessions, user documentation, and direct support channels—the SHIFT-HUB project has created a coherent, user-friendly Marketplace that can grow with evolving community needs.

Looking ahead, the Marketplace is well positioned for long-term sustainability. Embedded within a broader European SHIFT-HUB community infrastructure and linked to an expanding ecosystem of partners, it provides an adaptable and interoperable foundation for future collaboration in the Smart Health sector. In doing so, it directly supports SHIFT-HUB's goal of contributing to Europe's digital transformation in healthcare.

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