i4Trust

Data Spaces for effective and trusted data sharing

i4Trust.org

B2B Data Sharing Playbook - the i4Trust approach to Data Sharing

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About this playbook

The i4Trust Data Sharing Playbook was created by i4Trust, a collaborative initiative to boost the creation of Data Spaces enabling effective and trusted data sharing, in order to support European Companies and Digital Innovation Hubs DIHs to overcome the main difficulties and challenges in setting up a data space use case.

This playbook, gathers all the information available and provide detailed guidance to help you understand:

- What is a data Space?
- What are the benefits of creating a data space for your value chain?
- What are the steps to create a successful data space?

In this playbook, you will find all the training materials, technical documentation, and repositories related with the i4Trust Building Blocks as well as a step-by-step guideline to build B2B Data Sharing use cases. For each step, you will find some key questions that should be answered in order to move to the next step.

Moreover, you will get some examples of the more successful Pioneer Use Cases per domain, supported by the i4Trust support programme with lessons learned from the different sectors on how the implementation of trust data spaces provided impact.

i4Trust brings an integrated suite of mature open standard-based technology building blocks coming from FIWARE and iSHARE. Data Spaces built based on the i4Trust technology framework can be governed relying on business/legal, operational and organisational agreements like the ones defined in the iSHARE scheme.

i4Trust value proposition is contributing to building trust with data users and data suppliers. In that sense, i4Trust is already engaging with 156 SMEs connected to 31 DIHs, in sectors where data sharing practices are underexploited, supporting different experiments, where the SMEs adopt and implement i4trust technology to enable easy and secure data sharing.

Who should read this playbook?

This playbook was created to support SMEs and DIHs to overcome barriers and challenges in setting up a Data Sharing use case, with the objective to generate value by sharing data. This could generate new business opportunities, improve products and process efficiency, decrease costs and increase customers and revenues.

If your profile matches what is described below and you think you need some guidelines to get started, this playbook is for you!

European SMEs

Goal

Increase revenue and/or decrease costs, expand your portfolio of services by generating value from data sharing.

Motivation

Boost productivity, improve product and process efficiency, become more competitive, have a more sustainable business model in the mid-long term.

Barriers

- **Technical:** lack of technology standards, inherent cost of the acces to data and lack of data available for reuse.
- **Cultural:** building trust among the data users, consumers and providers. Lack of understanding of the demand of data. Lack of awareness about the potential business benefits of data sharing.
- **Socio-economic:** SMEs face regulatory and financial barriers, as well as lack of skills in data sharing.
- **Legal:** related with the ownership of the data and the agreements that need it for trusty sharing.

Digital Innovation Hubs

Goal

Expand your portfolio of services by becoming an expert in B2B data sharing and be able to support companies in your ecosystem

Motivation

Become a referent in understanding the needs of SMEs in your ecosystem and creating awareness about the opportunities that SMEs will be able to capture if they embrace B2B Data sharing.

Expand your cross-border collaborations

Barriers

- **Those derived from barriers faced by companies in your ecosystem mentioned above.**
- **Additional technical: in some cases, lack of own technical expertise** in B2B Data Sharing in order to provide support to the companies in your ecosystem.
- **Additional legal:** lin some cases, lack of own legal expertise in B2B data sharing required to support companies in their ecosystems.

How should you read this playbook?

- With this document, we want to provide some basics and essentials about what a data space is, why it is important and the most common business strategies around it as well as the benefits you could derive from implementing data spaces.

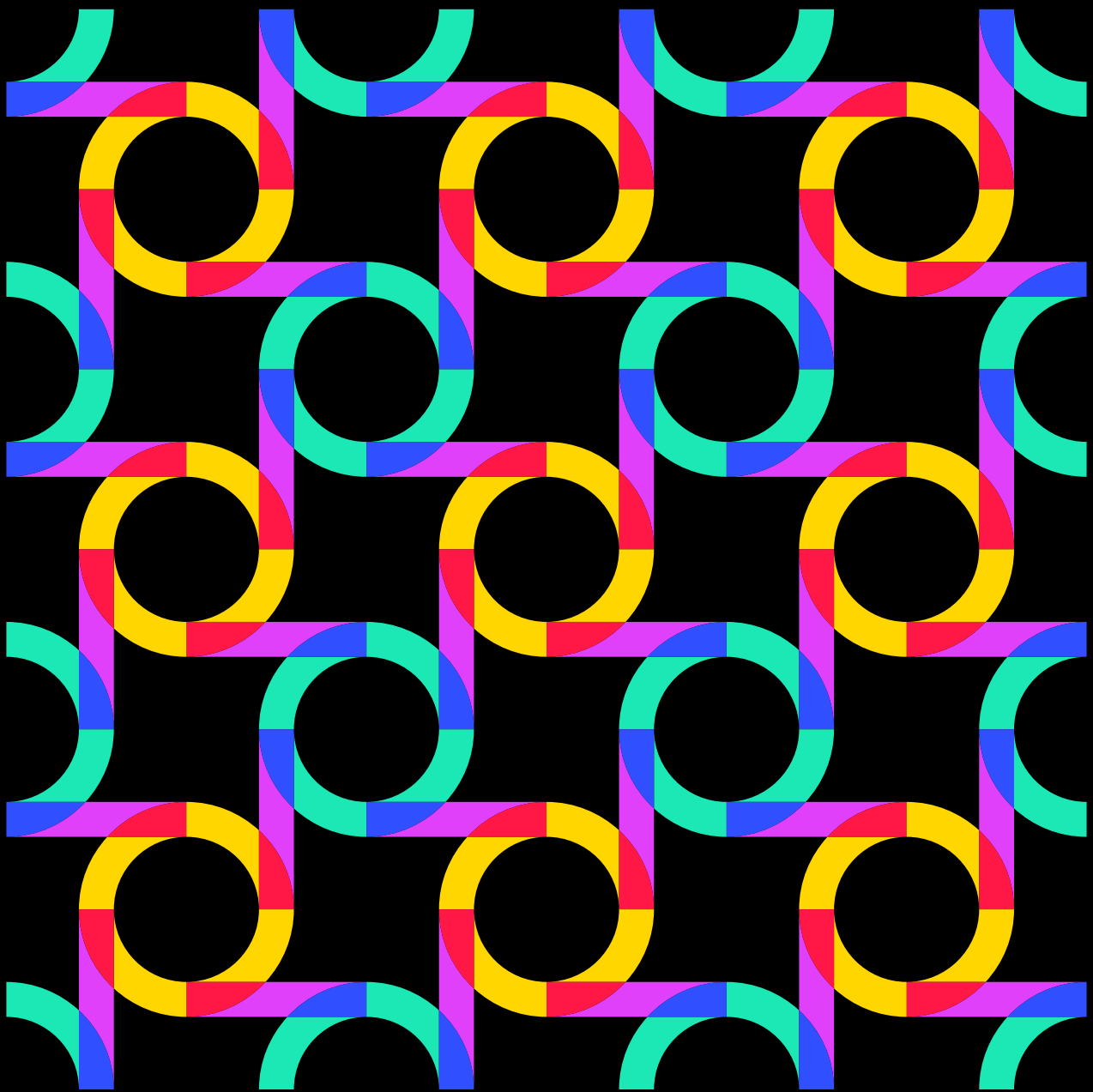
- As we would like to give you a starting point to start your data sharing use case, we present the i4Trust approach with six steps towards the creation of your data space, defining **key questions** in each step that should be answered in order to move forward to the next step. Each step includes some tips, links to materials and important notes for you to consider when building your use case, but most importantly, we show you how to leverage on the i4Trust technology building blocks.

- This playbook is not focused on any particular vertical, we are providing many examples in different domains to get you to understand the potential of data sharing across the different sections. You can learn more about concrete examples and its results here.

- Besides the key questions, i4Trust has prepared an online canvas available for free-access, for you to have a structure to answer your questions with a collaborative tool like a MIRO board.

- If you still need further assistance and materials, we have made available our Toolbox, including all training materials, slides, videos and most frequently asked questions. Check it here.

A few words of introduction



Why data sharing and how does the EU plan to foster it?

Data sharing has been identified as a key driver of growth and well being. Actually, when disclosed and shared, data can enable the full automation of processes, better decision-making and more transparency. Therefore, it can significantly boost business competitiveness and the creation of jobs, as well as higher quality of life and more inclusive societies. In February 2020, the European Commission (EC) announced the European Strategy for Data, aiming at creating a single market for data to be shared and exchanged across sectors efficiently and securely within the EU. Behind this endeavour stands the Commission's goal to get ahead with the European data economy in a way that fits European values of self-determination, privacy, and fair competition. For this to achieve, the EC considers that the rules of accessing and using data must be **fair, clear and practicable**. This is especially important as the European data economy continues to grow rapidly – from 301 billion euros (2,4 % of GDP) in 2018 to an estimated 829 billion euros (5,8 % of GDP) by 2025.

This European data strategy is accompanied by a series of measures aimed at promoting the leadership of the EU in the global data economy, legislative measures on data governance with the approval of Data Act, initiatives aimed at opening up sets of high-value public data across the EU, but also investment in creation of "**Data Spaces**" enabling data sharing, for which the Commission defined nine initial domains, all driven by sector-specific requirements: industrial (manufacturing), green deal, mobility, health, financial, energy, agriculture, public administration, and skills.

The EC expects €4-6bn in total to be invested in common European data spaces and a European federation of infrastructure and cloud services.

The creation of a data spaces can bring several benefits to organisations such as:

- Finding new business opportunities and synergies.
- Increasing the number of customers.
- Improvement of process efficiency.
- Improve products and/or services provided.
- Decreasing costs.
- Potential monetisation of data sets.
- Making services more attractive and sustainable, finding as well new lines of business.
- Building cooperation with other organisations to help operate and compete with the big market owners.

European DIHs are called to play a crucial role in promoting and bringing support to creation of data spaces in the EU.

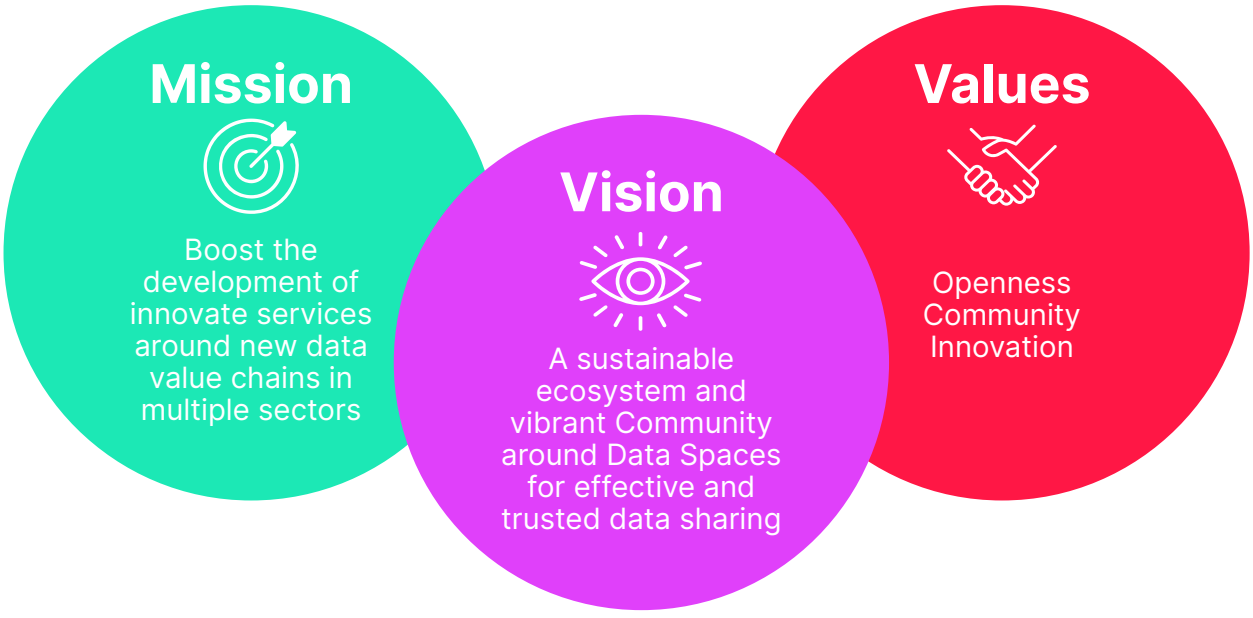
Why i4Trust?

i4Trust breaks down the barriers to data sharing by delivering a set of standard-based open source technology building blocks and legal frameworks enabling the creation of data spaces. Our main goal is to boost the development of innovative services based on the trustworthy and effective share of data across actors in multiple value chains..

Just like other technology infrastructures (e.g. the world wide web), data spaces basically are sector-agnostic, with many requirements and functions being similar or even identical across different sectors and data spaces. Therefore, creating the technology building blocks for data spaces primarily is not so much a technological challenge, as there are plenty of technical solutions and standards available. The main challenge towards interoperable data spaces is to agree on open standard-based building blocks and design principles that are accepted by all participants. In this respect, it is worth highlighting that i4Trust delivers an implementation of first results of the Technology Convergence discussions carried out under the umbrella of the Data Spaces Business Alliance launched by the Big Data Value Association (BDVA), the FIWARE Foundation, Gaia-X and the International Data Spaces Association (IDSA).

Besides providing the right tools, i4Trust comes with programs for education and training, as well as coaching and initial funding of pioneer use cases of i4Trust data spaces. A strong community of collaborating SMEs and supporting DIHs is emerging in a sustainable way around i4Trust.

Our vision, mission and values can be summarised as follows:



i4Trust Vision, Mission and Values

i4Trust main values are related to **openness** because of the nature of the technologies (open source and standard based) laying down the foundation of i4Trust Data Spaces. Connected at the same time with a truly open **innovation** approach promoting collaboration between different actors sharing knowledge and resources. The standard data models proposed by i4Trust; the concept of smart applications that speak the same language; the common mechanisms for Identification, Authentication and Authorization supporting real data sovereignty and trust; the data marketplace & publication services together with the alignment DSBA Technology Converge results makes possible for i4Trust to build this environment of collaboration and open innovation where a sustainable **community** can grow.

TRUSTWORTHINESS

Thanks to the unified framework for identification and the robust legal frameworks that i4Trust brings, you can **trust the participants** you exchange data with.

SOVEREIGNTY

i4Trust brings the means for enforcing the data access and usage policies you want to define, bringing you the power to **be the sovereign of your data.**

EFFECTIVENESS

Designed for the exchange of data among Smart Solutions, i4Trust brings a standard data exchange API and data models guaranteeing you to **effectively share data.**

OPENNESS

i4Trust is open, based on open-standard and implemented as Open Source, allowing you to **avoid vendor lock-in**, thus protecting your investment and reducing costs.

CROSS-DOMAIN

i4Trust unleashes the potential of data sharing among different participants in multiple domains, allowing you to **define cross-domain data value chains**.

INNOVATION

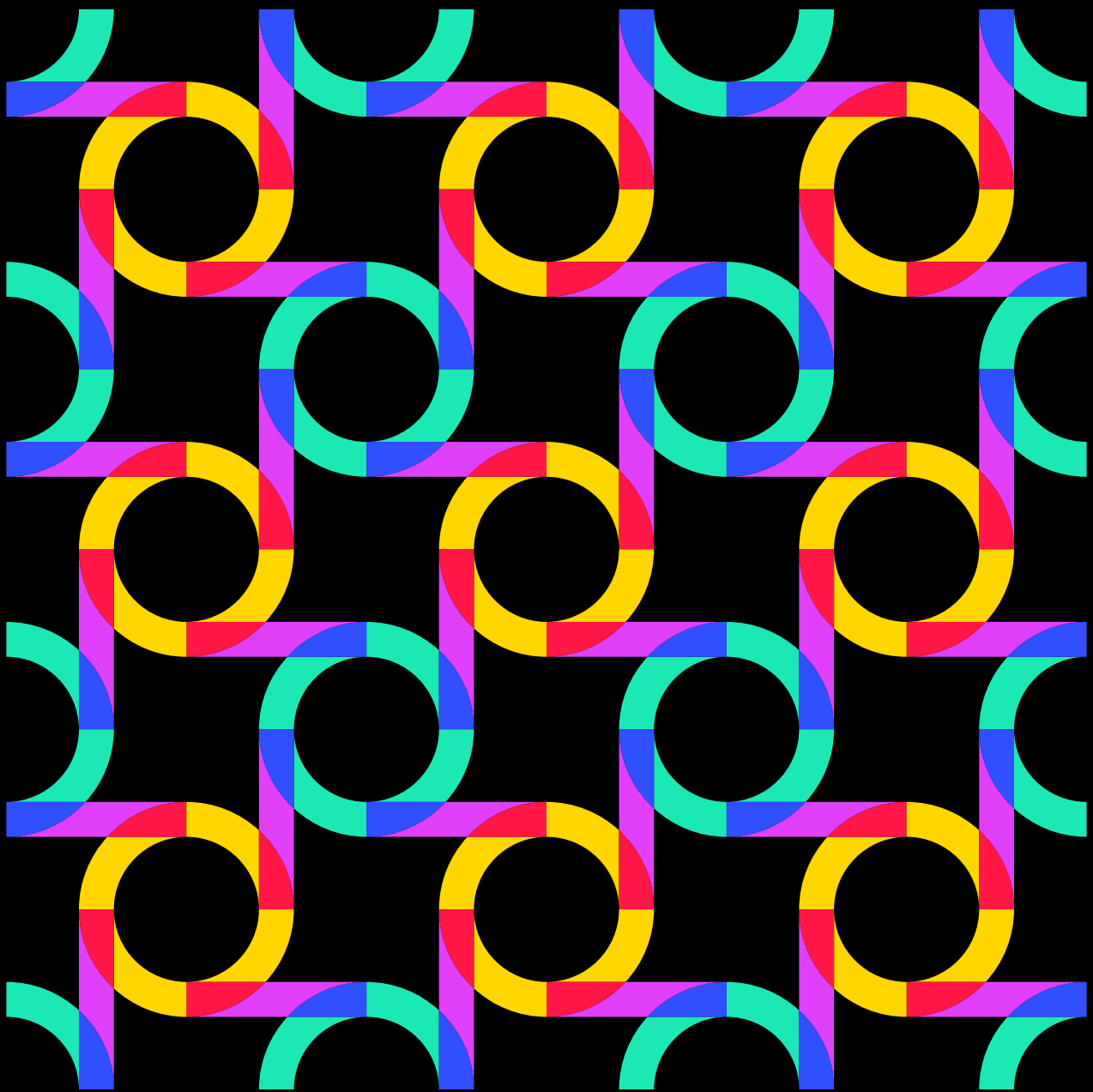
By combining tools enabling multi-side markets and the ability to monetize data, i4Trust will bring you the opportunity to **create innovative business models.**

GROWTH

i4trust Community is formed by experts engaged in a process of collective learning and human endeavor to **scale your business** and gain stronger position in the market.

European Companies and DIHs could benefit from the adoption of user-friendly and proven technology building blocks, as well as governance agreements covering all business/legal, operational, and organisational aspects in Data Spaces.

Basics and Essentials about Data Spaces



What is a Data Space?

A **data space** can be defined as a decentralised data ecosystem built around commonly agreed building blocks enabling an effective and trusted sharing of data among participants. From a technical perspective, a number of **technology building blocks** are required to materialise data spaces ensuring:

- **Data interoperability** - Data spaces should provide a solid framework for an efficient exchange of data among participants, supporting full decoupling of data providers and consumers. This requires the adoption of a "common lingua" every participant uses, materialised in the adoption of common APIs for the data exchange, and the definition of common data models. Common mechanisms for traceability of data exchange transactions and data provenance, are also required.
- **Data Sovereignty and trust** - Data spaces should bring technical means for guaranteeing that participants in a data space can trust each other and exercise sovereignty over data they share. This requires the adoption of common standards for managing the identity of participants, the verification of their truthfulness and the enforcement of policies agreed upon data access and usage control.
- **Data value creation** - Data spaces should provide support for the creation of multi-sided markets where participants can generate value out of sharing data (i.e., creating data value chains). This requires the adoption of common mechanisms enabling the definition of terms and conditions (including pricing) linked to data offerings, the publication and discovery of such offerings and the management of all the necessary steps supporting the lifecycle of contracts that are established when a given participant acquires the rights to access and use data.

Besides the adoption of a common technology foundation, data spaces also require governance, that is the adoption of a number of business, operational and organisational agreements among participants:

- **Business agreements,** for example, specify what kind of terms and conditions can regulate the sharing of data between participants and the legal framework supporting contracts established through the data space.
- **Operational agreements,** regulate policies that have to be enforced during data space operation like, for example, compliance with GDPR (General Data Protection Regulation) or the 2nd Payment Services Directive (PSD2) in the finance sector.
- **Organisational agreements**, establishing how evolution of technology building blocks specifications is governed (e.g., definition of releases) or business and operational agreements are created and maintained, and what governance bodies are implemented.

The complete taxonomy of building blocks required for creating data spaces is illustrated in the figure below

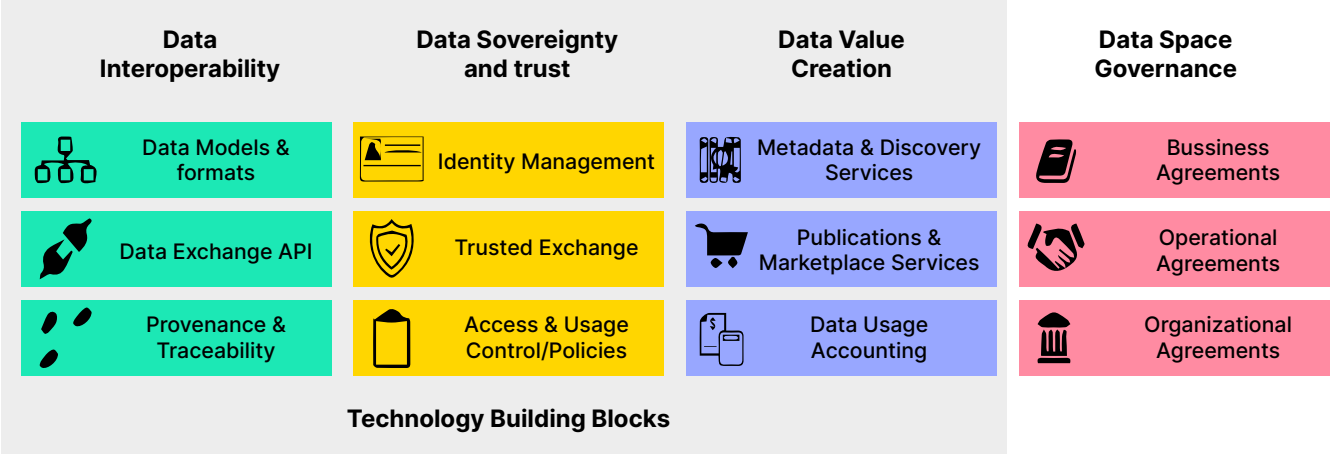


Figure 2.1 - Building blocks in a Data Space

Sharing of data within a given data space should not be limited to a single domain. This would severely limit the creation of new innovative services since individuals and organisations usually act in multiple domains at the same time and many opportunities will flourish when data generated within organisations operating in certain domain (management of traffic in cities, for example) is shared for its exploitation in processes relevant to other domains (continuing with the example, logistics). Therefore, technology building blocks for data spaces must be general purpose, that is domain-agnostic. On the other hand, they should **rely on open standards**, allowing multiple infrastructure and global service providers to emerge and support data spaces, without getting locked in any particular provider. Given this, while making things work in living labs and pilots is relatively easy, the main challenge towards definition of successful data spaces is the decision of what concrete standards and design principles are adopted, since they have to be accepted by all participants.

How does a data space work? Participants and roles

From an operational perspective, a data space ecosystem built around the mentioned building blocks basically involves participants playing the role of data consumers, **data owners and/or data providers** on one hand and a number of actors playing the role of **service providers** at overall data space level on the other hand.

- **Data Consumer:** is a role played by an organisation or a person who is interested in data at another party either for its own use or to provide services to the data owner/data provider. It needs to handle data it receives in accordance to the conditions set by the data owner
- **Data provider:** is role played by organisations who provide data via means of service or portal. Data Service Provider relies on data owners to provide authorizations and usage rights for the data services provided to data consumers.
- **Data owner:** is the party who has rights over the data in given context and time. it provides authorization, so data consumers can get access to data.
- **Data Space Services provider:** include providers of trust authority services as well as providers of service and data discovery, brokering, logging or marketplace services enabling data-driven multi-side markets.

The Figure below summarises the different roles played by actors involved in a i4Trust data space ecosystem:

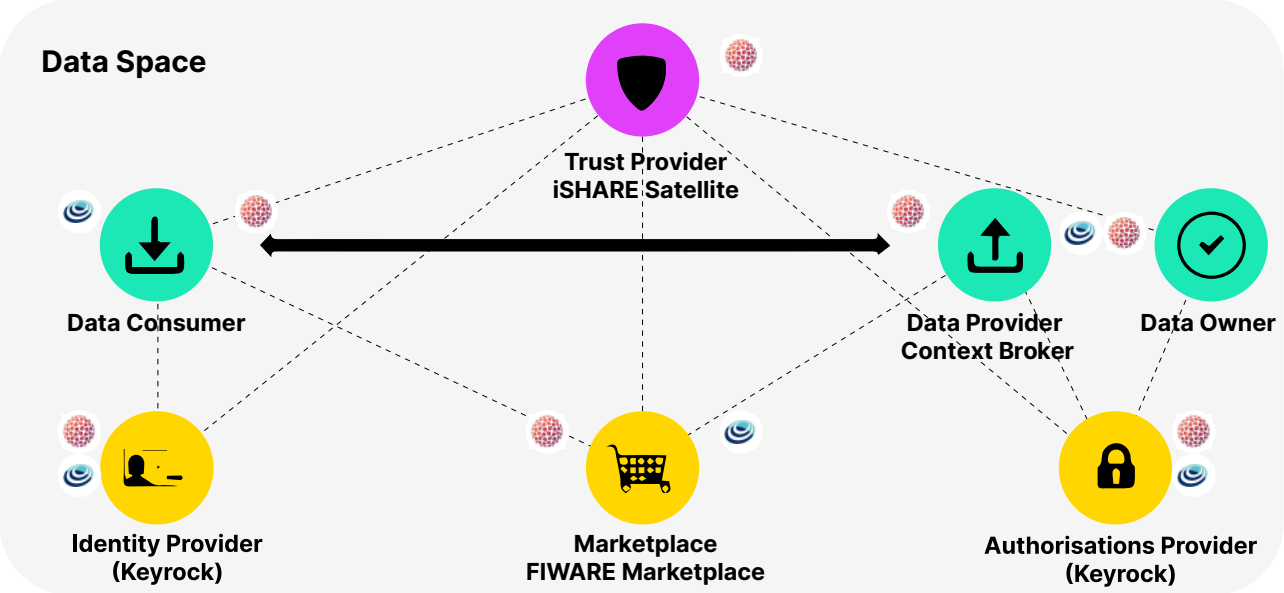
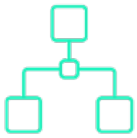


Figure 3: i4Trust data space ecosystem

What are the most common business models implemented in data spaces?[1]

Based on our experience working with use cases, the most common business models related to data spaces can be summarised in the categories below. Note that the participants in a data space may be adopting different business models:

- **Improved product or service:** An organisation adopting this business model has as its main focus the improvement of an existing product or service it offers. Such improvement is not limited to the implementation of the product or service but may deal with improvement of support or sales channels, for example.

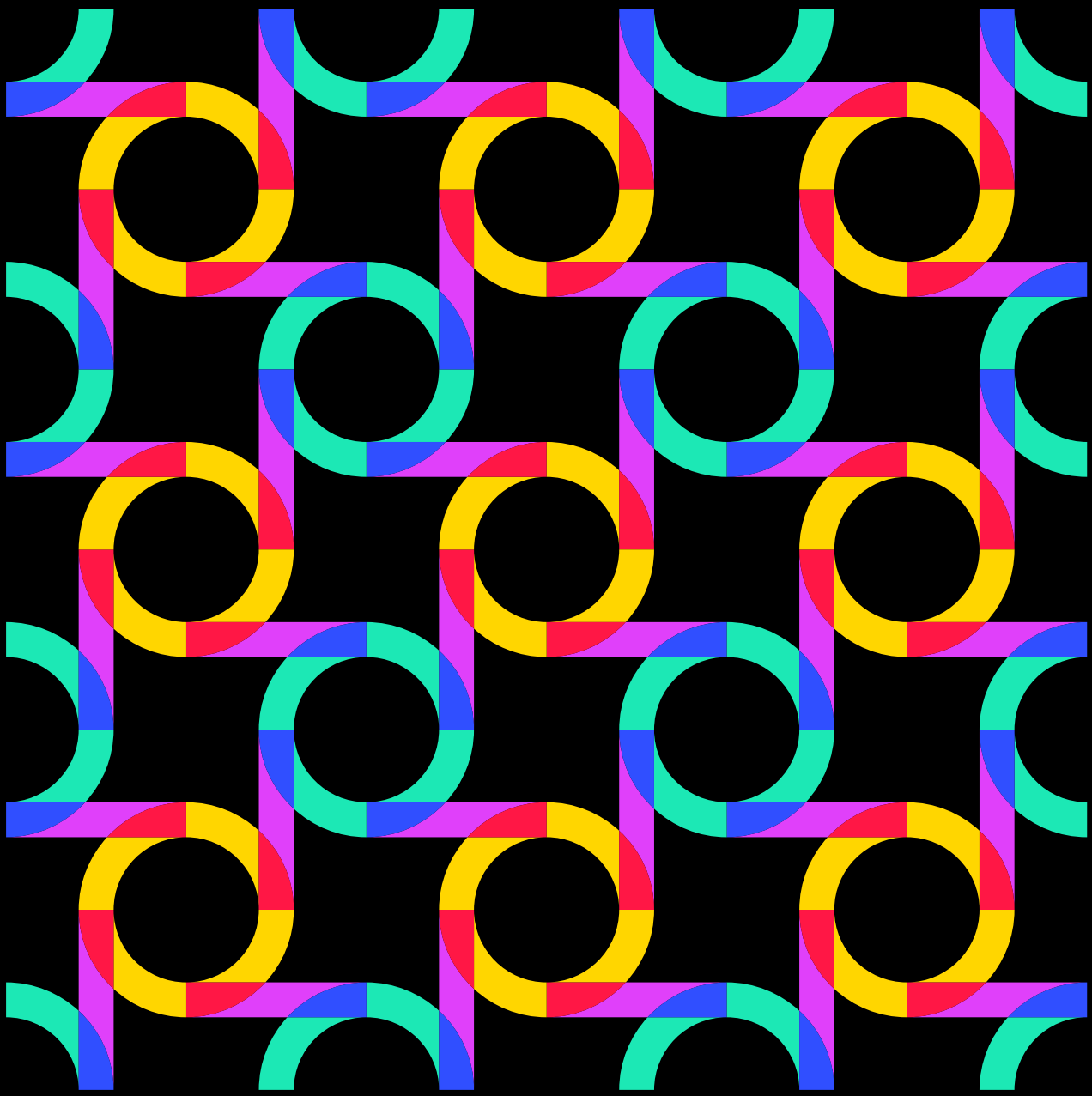


- **Data - driven Services:** An organisation adopting this business model provides a service that impacts in the improvement of an existing business processes and value chains. When dealing with this type of business model, you may be working and focusing on a specific type of customer linked to an application domain (e.g., farmers, cities) even though there may be services valuable to multiple domains (e.g., a weather prediction service is relevant in different domains including farming, energy, tourism, mobility, ...). In this type of business, the channels through which your service will be discoverable are key (example: data services marketplace, search engines).

- **Data - driven marketplace:** An organisation adopting this business model within a data space is focused on intermediation among the participants of the data space supporting creation of multi-sided markets. This type of business is built around a dominant interaction, relying on the marketplace platform provided to participants offering data services.

[1] This was inspired by DDI - Data Driven Innovation Canvas. This framework was used in i4Trust business mentoring program

The i4Trust Approach: Getting started



Steps towards creating your Data Space

These guidelines will help you to assess and understand how to build your own B2B Data Sharing use case from scratch, understanding the basics of it, the parties and data sources involved, their inter-relations and how complex they can be, as well as the potential of the proposed use case.

For each of the steps presented, there are some key questions that should be answered in order to move to the next step. What has enriched the process was the experience of the i4Trust consortium for the selection and assessment of practical pioneer use cases creating their data spaces in different domains.

Useful tools

We have created a canvas including all the steps to build and assess your use case.

You can either print the template and complete the hardcopy or if you prefer, you work on directly on a collaborative tool MIRO, here. Once you access this MIRO template, you can copy and paste it in your own MIRO board.

Step 1 -Assess your readiness by analysing the opportunities and challenges of your use case

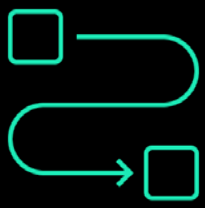
Let's start by assessing your readiness to set your practical use case., For this analysis, prepare to answer questions to describe the context of your data sharing use case, identifying what **opportunities** can be captured and/or **challenges** can be solved by means of sharing data.

The key questions at this step are the following:

- What are the main challenges you have identified?
- Can the challenge be solved by sharing data? Is decentralised identity and access management required because each participant requires to manage the identity of its users? Is a trust framework required because certain participants don't know a priori whether other participants are legal or comply with certain agreements they need to verify?
- Can your product or service be improved?
- Have you identified who will provide/consume the data?
- Have you identified the benefits for each participant?
- How can the participants obtain some gain from sharing data?

In order to move to the next step, you should be able to answer these questio

TIP! If you need inspiration and want to learn from other use cases, check this section, with i4trust success stories from our first support programme batch.



Step 2 - Refine the scope of your use case

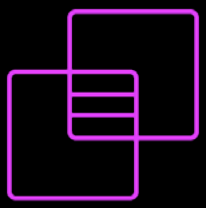
Once the potential challenges and benefits have been identified, it is time to enter into detail with your use case.

Here you should consider not only the type of data that will be shared but also who will be the main actors/stakeholders in your scenario. Do not forget to assess who will be the data provider (entity(ies) providing the data) data consumer (entity(ies) using the data) and how the i4Trust will act as facilitator of the services and tools to enable data sharing in your use case.

You should be ready to answer the following questions:

- What is the kind of data that should be shared?
- What kind of data access policies do participants sharing data need to define?
- What type of processing is done on the data?
- Is a marketplace service useful/needed as a mean for discovering and acquiring rights to use a data service

TIP! Are the entities aware of the concept of data sharing? Have they followed the materials and training provided by i4Trust? Check the presentations available here Prepare to describe the interaction between all the relevant actors in the next step.

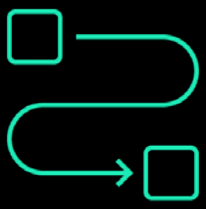


Step 3 - Describe the interaction among stakeholders

Now that you have defined the challenges to overcome and benefits to derive, as well as your scope and the main actors involved, this next step will be to describe the relations between all the stakeholders and how they will be exchanging data using the i4Trust building blocks. It is time to define the interactions and work-flows (e.g., sequence diagrams of your use-case.

You should be ready to answer the following questions:

- How do the different stakeholders interact among each other?
- What about the ownership of the data?
- When is a data provider involved?
- When is your data consumer involved?
- What is the frequency of data sharing?
- What type(s) of data are you sharing within your use case?
- Is the data sensitive?



Step 4 - Analyse your use case potential

Now think about the benefits and potential costs/risks associated with each of the stakeholders/actors when implementing your use case. The assessment should be focused to what extent the expected outcome will transform the businesses of the stakeholders and at what pace it will contribute to increase revenue and/or reduce operational costs.

A good question to ask at this point is The assessment of the potential of your use case should be also made taking into consideration the social impact, data sharing can also have benefits for the people by improving health care, creating safer and cleaner transport systems and reducing the cost of public services, among others. You can answer the following question to better understand the social impact potential of your use case:

- Is your use case contributing to job creation?
- Will your experiment contribute to reducing poverty or more responsible consumption/production?
- Did you analyze the gender impact of your use case?
- Does your use case have a positive impact on reducing the carbon footprint or a positive environmental impact?

Be ready to complete the following template, assigning a numerical value to each of them (it is absolutely subjective, but indicate it from 0 to 10, being 0 the lowest benefit/cost, and 10 the highest). If the result of computing Benefit minus Cost turns out negative, it means you probably need to reconsider how to better address that stakeholder, or otherwise, your entire use case is at risk. Add as many lines as needed based on the number of stakeholders participating in your use case.

Stakeholder	Benefit (0-10)	-	Cost (0-10)	=	Result (Benefit-Cost)	Comments
Data Service Consumer						
Data Service Provider						
Data Owner						

Tip! Need more inspiration? Check out the interviews to the experiments selected and funded by i4Trust here

Step 5 - Leverage on i4Trust technology building blocks

Now that you have your use case refined and assess its potential in terms of benefits, you can move to our next step, that is to leverage on the i4Trust technology building blocks which provide **concrete open source components as well as global services implementing core technology building blocks required to support data interoperability, data sovereignty and trust, as well as data value creation in any data space**.

The following table summarises available components and services you can leverage to build your own i4Trust data space or connect to existing i4Trust data spaces. A reference to the standards or industry specifications these components/ services comply with is provided.

Building Block	Component/Service	Baseline standard / specification
Data Interoperability		
Data Models & Formats	Smart Data Models (website, github)	Múltiple (domain specific)
Data Exchange API	Any FIWARE Context Broker implementation: Orion–LD Scorpio Stellio	NGSI-LD
Traceability	FIWARE Canis Major	CanisMajor DLT Adaptor API specification
Data Sovereignty and Trust		
Trust Anchor Services	iSHARE Satellite node	iSHARE Satellite specification (endpoints: / parties, /trusted_list, / version)
Identity Management (classic)	FIWARE Keyrock (IdP functions)	OIDC
Identity Management (based on DID and VC/VP)	FIWARE Wallet and SIOPv2/OIDC4VP server: VCWallet, VCBackend, VCWaltid	W3C DID (Decentralized Identifiers), W3C Verifiable Credentials SIOPv2, OIDC4VP

Access Management (classic)	i4Trust PEP/PDP components: Kong + FIWARE Kong NGSI/iSHARE PEP/PDP plug-in	i4Trust PEP function specs (see i4Trust building blocks specs)
		i4Trust PDP function specs (see i4Trust building blocks specs)
	iSHARE compliant AR components FIWARE Keyrock (local deployment) or Test iSHARE AR service	iSHARE Authorization Registry specs (XACML PMP/PAP -like functions): /delegation endpoint, delegation evidence
Access Management (based on VC/VP)	i4Trust PEP components: Kong + FIWARE Kong PEP plug-in	i4Trust PEP function specs (see i4Trust building blocks specs and DSBA Technology Convergence)
	FIWARE Keyrock (local deployment), PDP server	i4Trust PDP function specs (see i4Trust building blocks specs and DSBA Technology Convergence)
	FIWARE Keyrock (local deployment) or Test iSHARE AR service	iSHARE Authorization Registry specs (XACML PMP/PAP -like functions)
Data Value Creation		
Metadata & Discovery	Idra (optional)	DCAT, DCAT-AP
Publication & Marketplace	FIWARE BAE	TM Forum Open APIs
Data Usage Accounting		

TIP! Check our Toolbox you will find a summary of resources that can be used to learn how to use the referred components and services.

More specifically, on GitHub, i4Trust provides all the necessary components for setting up the i4Trust reference example as well as recipes for the deployment of all the different building blocks which allow you to set up data spaces. Check it here

Step 6 - Leverage on i4Trust governance building blocks

Every dataspace must have a body which is responsible for governance and evolution of the dataspace so that it meets the requirements of the participants as well as keep it relevant for them. Participants as well as potential participants of the data space need certainty not only on the above mentioned technical building blocks but also on non-technical aspects of data space like Business, **Operational, Legal and Business aspects**. Data space governance is not only necessary for specifying these aspects but also in evolving them with time so that it is always relevant for the participants of the data space. Before sharing data with another organisation, first they both need to sit together and understand each other's requirements and agree on all aspects related to data sharing.

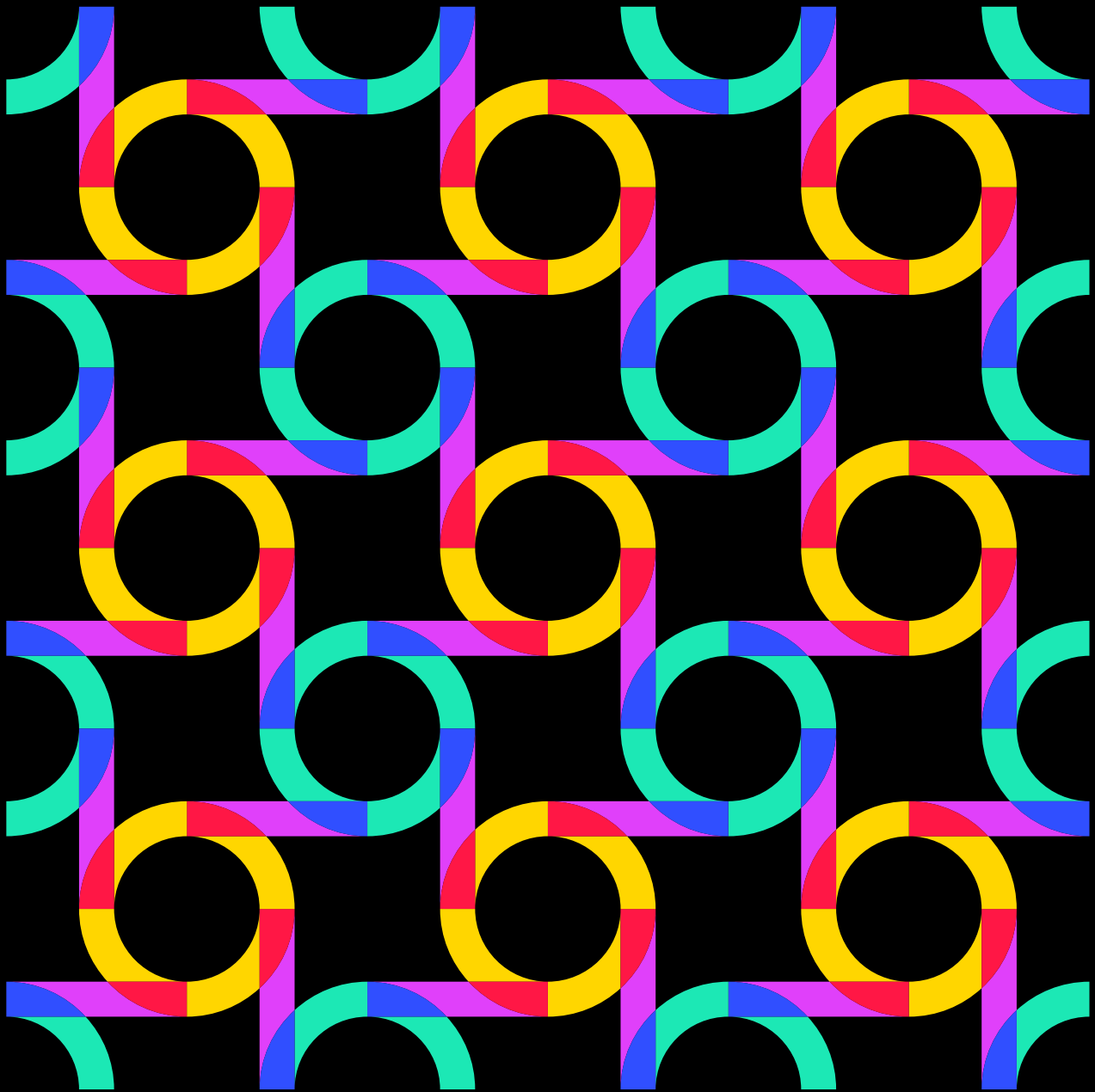
For this step, you are asked to fill out the following table to describe the legal and governance building blocks which apply uniformly to all participants of the dataspace

Describe Business aspects of your data space:	**<like, common services or role model of the business for whom this dataspace is primarily for, legal agreements all data space participants have to sign off including compliance with certain regulations, etc.>**
Describe Operational aspects of your data space:	<like, what are the SLAs for certain roles within your dataspace, minimum LoAs for certain roles, etc.>
Describe Organizational aspects of your data space:	<like, bodies established for the governance of releases of technical building blocks to be used by the participants, or the definition and maintenance of legal agreements covering business and operational aspects, etc.>
Describe other mandatory requirements for participants:	

Given this, governance may be performed by a body that is ideally an independent and neutral organisation with a not for profit motive to enable and maintain the trust needed by participants to join and participate in the dataspace. This governing body would be responsible to check and maintain all the different agreements and ensure that they are met at all times by the participants of the dataspace

iSHARE framework covers some of the above mentioned requirements which can be used as basis for further defining these aspects of a dataspace.

i4Trust Pioneer Use Cases



As mentioned above, our mission in i4Trust is to break `data silos' and stimulate sharing, re-using and trading of data assets in business sectors by SMEs. That is why we have implemented our 9-month customised support programme, where we provided funding, coaching and support to more than 70 companies from 14 countries in the first round. In the use cases, the participation of 13 DIHs was also included.

At the moment of writing this playbook, we are about to kick-off our second round where we will support more than 80 SMEs from 16 countries.

The use cases supported are focused on 6 sectors:

Smart Agrifood

Smart Cities

Smart Energy

Smart Ports

Smart Logistics

Smart Environment

In the first round Smart Agrifood (38,5%) and Smart Logistics (30,8%) were the most represented.

Learning from your peers

In this section, we showcase the most successful examples on the creation of data spaces and its application in B2B relationships for different sectors within the framework of the i4Trust project so you can learn from these examples and the added value they provided.

TIP! If you are interested in knowing all of them you can find their description and impact stories at i4Trust website.

AgroTrust

Impact Story

Country lead: Italy **Domain:** Smart Agrifood

What is the challenge to be solved?

Lack of trust in data food

Product's quality assessment

Certification of products origin, privacy and traceability

Decline in consumer Confidence

Which is the solution proposed?

AgroTrust aims to be a solution for transparent certification of authentic agricultural products, which reinforces the relationship of trust between the consumer and the entire food production chain, enhancing high-quality farmers and producers to guarantee food security for every citizen. At the same time, the tool allows the farmer to trace all technical information on the products used

Which are the main participants and what are their roles? What type of data are we sharing in our use-case?

- **EzLab (software platform):** It helps farmers in the traceability and certification of products using blockchain technology.
- **ImageLine (software platform):** a tool for compliance with the register of treatments compulsory for farmers
- **Finapp (data provider):** Provide data of the water content present in the soil, in the biomass
- **Coppo e Garrione (data provider):** Italian rice producer that manages all data collected in the field with an internal ERP.
- **Riseria Campanini (data consumer/ provider):** a prominent rice transformer that implements the most advanced traceability policies, Riseria received data
- **Noima (data consumer/provider):** User Interaction expert: provide a solution for Smart Labeling of Agricultural Products that closes the information gap from the farm to the consumer providing consumers with certified

FIWARE Innova iHUB - gives support to the coordination and results dissemination.

What is the actual potential of the use- case?

Improves the traceability and certification of agricultural products, comprising the interaction from the farm to the final consumer.

What are the benefits of building this use-case?

- Agrotrust connect different softwares platforms solving the mistrust on the food chain data
- High replicability in other Adrigfood fields and different domains like health and energy
- Evaluation of agro-industry products by final consumers and other stakeholders

SLAM: Smart Lamppost Asset Marketplace

Country lead: Netherlands **Domain:** Smart Cities

What is the challenge to be solved?

Staggering amount of data the multiple IoT produce

Growing concerns on data ownership, GDPR-compliance

Lack of standards to use the data

Interdependencies between stakeholder and devices

Which is the solution proposed?

SLAM aims to connect the dots and take away these barriers, with an integrated approach combining a technical data platform, marketplace and service portal. SLAM provides insight for cities and companies. Cities know exactly what is implemented in which lamppost (with all relevant data) and companies gain insights on what is allowed or possible in which location (including relevant criteria and conditions). A structured data sharing approach helps to engage citizens and improves transparency and access to open data.

Which are the main participants and what are their roles? What type of data are we sharing in our use-case?

- **WeCity (software platform provider/ data consumer):** connects all data and service processes for cities and suppliers.
- **Tecnoteca (software provider) :**Used by the service portal and configuration.
- **HubLogiq (software provider):** They act as a service integrator for a diverse range of IoT sensors including the visualisation in a dashboard.
- **Civity (data provider):** collecting data from IoT-devices, transforming data to harmonised smart data models.
- **Teneo IoT (software/ data provider):** company focused on the development of embedded systems in the field of Internet of Things.
- **HubLogiq (software provider):** They act as a service integrator for a diverse range of IoT sensors including the visualisation in a dashboard.
- **SensoTerra (software/ data provider):** IoT-devices for measuring soil moisture
- **Mobility Sensing (software/data provider):** collect data of the intensity, temperature and air quality of roads. Use for available parking places.
- **Avutec (software/data provider):** collecting data from smart traffic camera solutions, measuring traffic flows and environmental zones.

Stichting StartupUtrecht (DIH): gives support to the coordination and results dissemination.

What is the actual potential of the use- case?

Utilising the potential of smart lampposts for cities and suppliers by offering secure data sharing and integrated service processes.

What are the benefits of building this use-case?

- 25-30% savings through lower costs and data sharing
- Less CO2-emission, less material used, lower energy consumption and less, cluttering in public space

Impact Story

DSWEU: Energy consumption in non-residential buildings

Country lead: Netherlands **Domain:** Smart Energy

What is the challenge to be solved?

Growing gap between energy label predicted norm and the measured energy consumption.

Data Silos

Data lack of standardisation and coordination

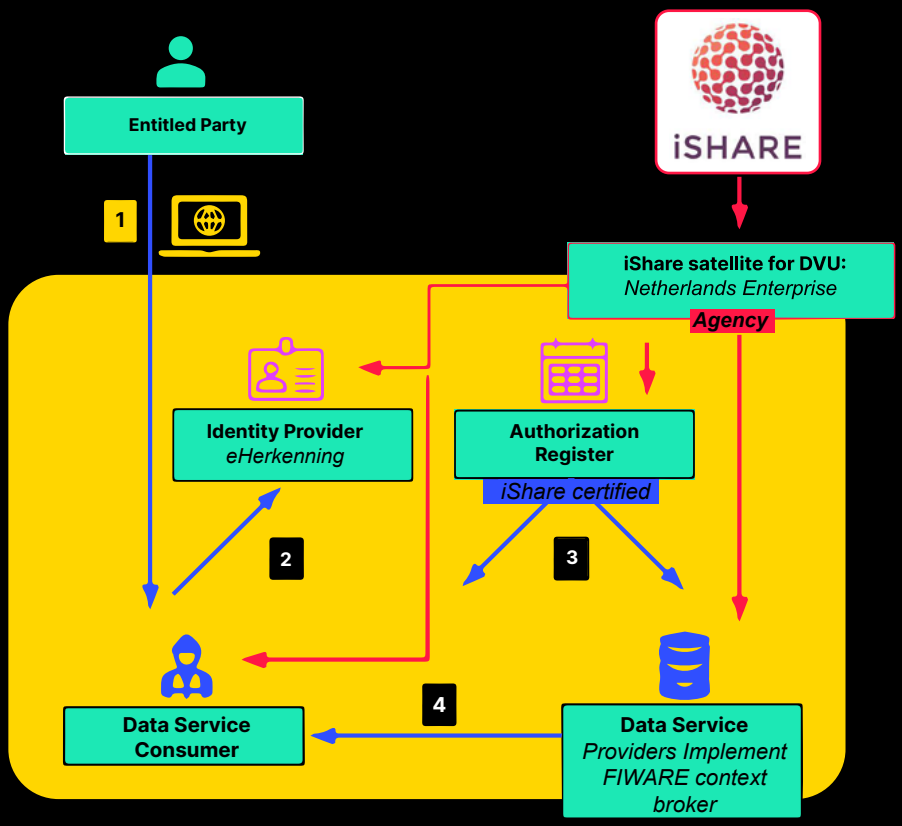
Which is the solution proposed?

The experiment will facilitate sharing of data using the standard NGSI-LD API to create digital twins. Developing more ambitious CO2-reduction projects for non-residential buildings increasingly requires complete and up-to-date data on the measured energy consumption in relation to key construction features. With this data, Data Service Consumers (such as installation companies and consultancy firms) can create digital twins of non-residential buildings, modelling the desired energy / CO2 reduction in various renovation scenarios for their clients (Entitled Parties). These digital twins are conditional to developing cost-effective CO2-reduction projects with reliable business-cases.

Which are the main participants and what are their roles? What type of data are we sharing in our use-case?

- **Stichting Platform Duurzame Huisvesting:** project coordinators
- **Facility Management Nederland (data owner/Entitled Parties:** non-residential building owners and tenants
- **The Netherlands Enterprise Agency (data service provider/consumer):** Standardised energy-label data
- **Central Government Real Estate Agency (data owner/consumer):** test user
- **Techniek Nederland (data consumer):** energy Installation company
- **Enexis (data provider):** Standardised energy-consumption data per year, month, day, hour and quarter (last 13 years)
- **Bouwend Nederland (data consumer):** Construction company

DigiCenterNS (DIH): gives support to the coordination and results dissemination.



What is the actual potential of the use- case?

Testing & showcasing the Dataspace Measured Energy Consumption in Non-Residential Buildings.

What are the benefits of building this use-case?

- optimising a maximum CO2-reduction per euro investment
- Historical energy consumption data per year, month, week, day, hour and quarter which is conditional to developing cost-effective CO2-reduction projects with reliable business-cases
- At least 50,000 users in the first year after launching.

iGreenPort

Impact Story

Country lead: Spain **Domain:** Smart Ports

What is the challenge to be solved?

Pollution and eutrophication of the sea water

Increase the acidity levels in the open sea

risk of extinction that Posidonia, an endemic Mediterranean aquatic plan

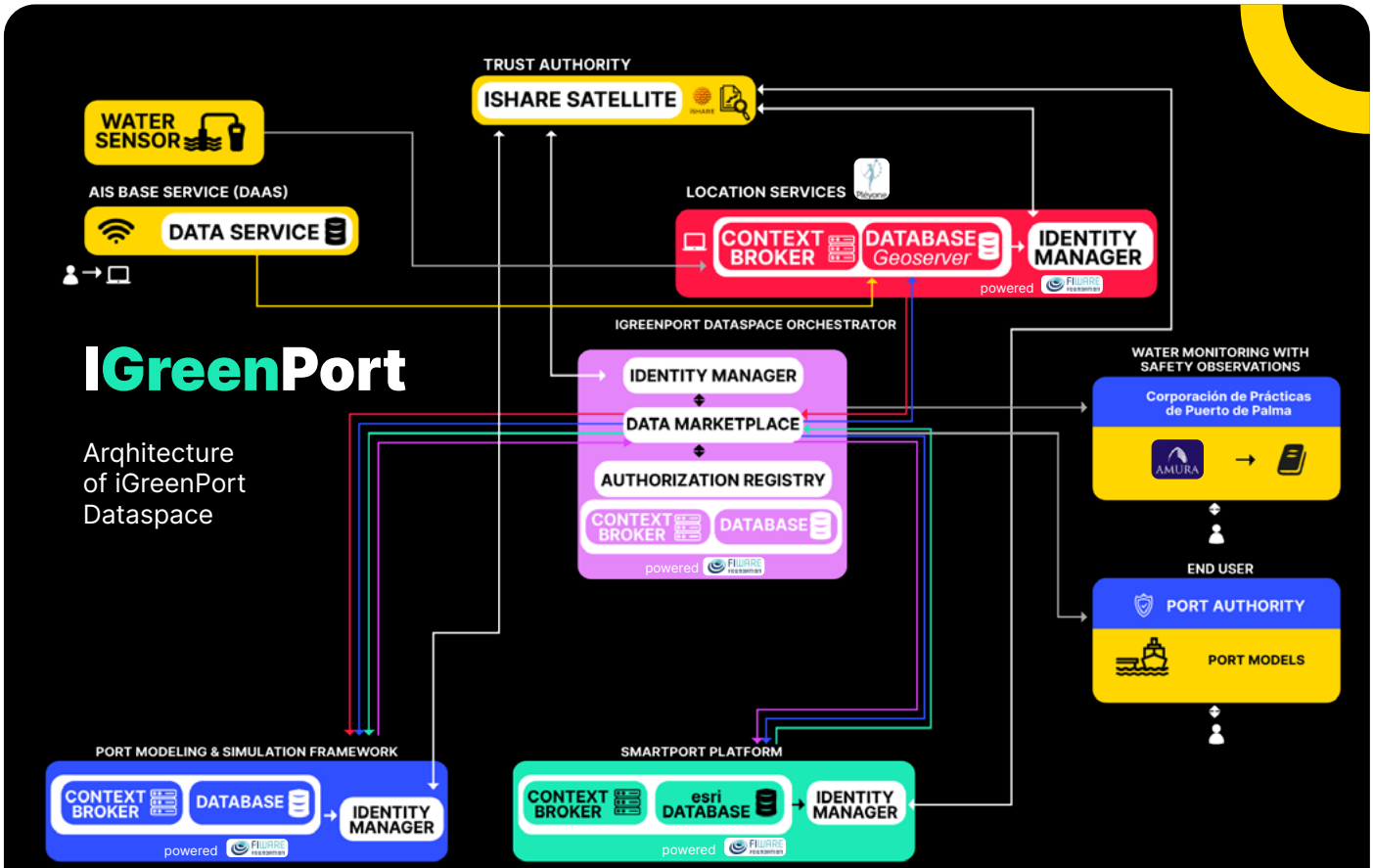
Lack of seawater quality control digitalization

Which is the solution proposed?

A data space to share and consume environmental and operational data (such as the seawater quality in the port) in near real time, with which they will be able to take more intelligent and faster decisions aimed at the efficiency and environmental sustainability of its ports.

Which are the main participants and what are their roles?
What type of data are we sharing in our use-case?

- **HIADES (Data consumer/ provider)** specialised in the digitization of nautical services, with its suits of products
- **MNX Online (services software provider):** its is the coordinator of iGreenPort Orchestrator.
- **Corporation of Maritime Pilots in the Port of Palma de Mallorca (Data Consumer):** PALMA PILOTS is the direct client the project.
- **PLEYONE (Data consumer/ provider):** it provides a service package with the heat map of the port, where the different areas from lowest to highest turbidity and ship traffic are visualized in real time.
- **CANARY Islands Connection (Data consumer/ provider):** data consumer of water quality data, and provides real-time dashboards and a port characterization model.
- **JEMINOAL (Data provider):** data provider by installing an AIS radar receiver, with information dynamic and static of vessels.



CIDIHUB, the Canary Islands Digital Innovation Hub, gives support to the coordination and results dissemination.

What is the actual potential of the use- case?

The creation of a dataspace aimed at smart control and monitoring of sea water quality in different port areas.

What are the benefits of building this use-case?

- Services packages “Notification system” and 2Ship identification of traffic density fro anomalous turbidity values
- Introduction of a new sea water pollution indicators
- New consumer segment: pollution monitoring on busy beaches

Impact Story

CollMi: Collaborative Micro-hubs

Country lead: Netherlands **Domain:** Smart Logistics

What is the challenge to be solved?

Growth of the e-commerce

Expand logistics operation to rural areas

Make the deliveries more efficient

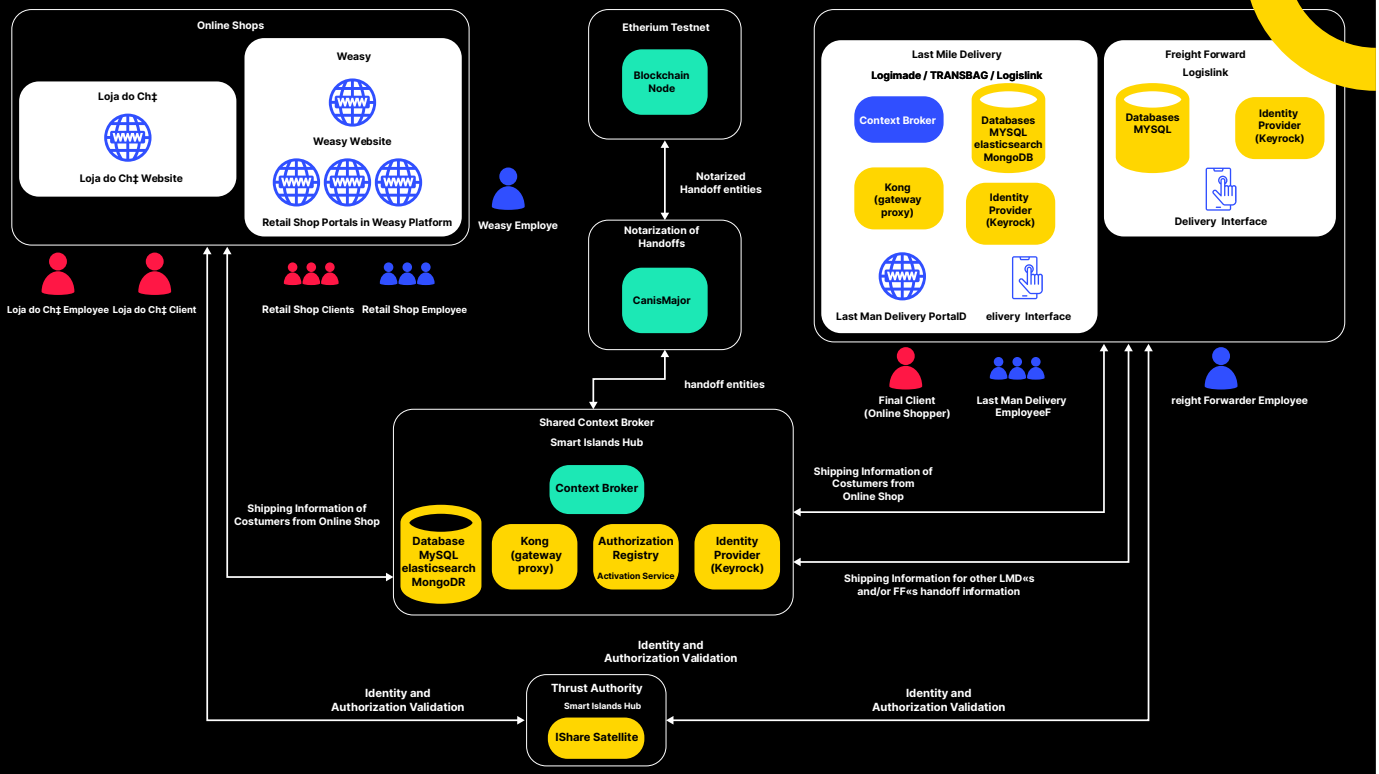
Contribute to green mobility

Which is the solution proposed?

This project aims to develop a practical solution by applying blockchain technology (distributed ledger technologies) for the implementation of a robust digital solution that solves the collaboration and trust issues that are at the base of the implementation limitation of collaborative micro-hubs, as they have the potential to record all transactions of the micro-hub, last-mile carriers, freight forwarders and sellers, in a verifiable, permanent and transparent way for all interested agents.

Which are the main participants and what are their roles? What type of data are we sharing in our use-case?

- **Logimade, Logislink and Trans Bag (data provider/ consumer):** Logistics operators. They keep the context information of packages (in a form of a virtual waybill) that they were entrusted (and contracted) to deliver; as a data consumer they will obtain the waybill's current information of packages from other logistics operators
- **Weasy (data consumer):** e-commerce Multi Channel Sales Platform. receiving the relevant package information from orders made in their platform.
- **Loja do Chá (data consumer):** tea retailer that sells online, obtain the information of their deliveries from the contracted logistics operators
- **Keyruptive Technologies (services software provider):** design and development of a blockchain solution to support the transparent and trustful registration



Smart Islands Hub (DIH): gives tech support as an expert in B2B data sharing.

What is the actual potential of the use- case?

Integrating FIWARE, iSHARE and blockchain technologies for a more trustable and sustainable logistics value chain and micro-hub development.

What are the benefits of building this use-case?

- lower delivery costs
- shorter delivery times
- a wider geographical area coverage (rural areas)
- more detailed and correct information for the end customers
- less traffic, and less carbon emissions.

Impact Story

CO2-Mute

Country lead: France **Domain:** Smart Environment

What is the challenge to be solved?

Generation accessibility to urban green related data

Transport environmental impact

Improve the mobility habits

Climate change

Which is the solution proposed?

The CO2-Mute concept is to gamify alter-mobility usage by proposing collective and individual achievements to commuters and workers to evaluate the effective impact on costs, traffic, and the environment (air and noise pollution). The definitions of collective and individual alter-mobility challenges are directly linked to local government policies and the available local offers and possibilities for alternative and sustainable means of transport. The strategic objective is to contribute to pollution reduction and climate change mitigation whilst also supporting optimised decision-making for green space implementation in urban planning.
CO2-Mute has a high level of flexibility in its configuration and a strong capacity to deal with various types of data thanks to its "interoperable by design" approach and the use of a Digital Twin platform implementation based on NGSI-LD standard. The capacity to personalise and correlate the data depending on local situations is crucial to engage citizens on concrete actions leading to measurable impacts. The fair and controlled sharing of heterogeneous data plays a central role, and as transparent business models are needed, CO2-Mute relies on i4Trust architecture.

Which are the main participants and what are their roles? What type of data are we sharing in our use-case?

- **Montem (data provider):** data from five air quality and noise sensors.
- **Sis.Ter (data consumer/ provider):** correlates and analyses the shared CO2-Mute data provided in order to support local governments in their strategies decision making processes to reduce traffic congestion and the related environmental impact.
- **Hostabee (Data Consumer/ Provider):** delivered relevant information about the result of the test to the pilot city, by building a dashboard to present analysis and global results and suggest the local mobility strategy.

Faubourg Numerique (DIH): gives tech support as an expert in B2B data sharing.

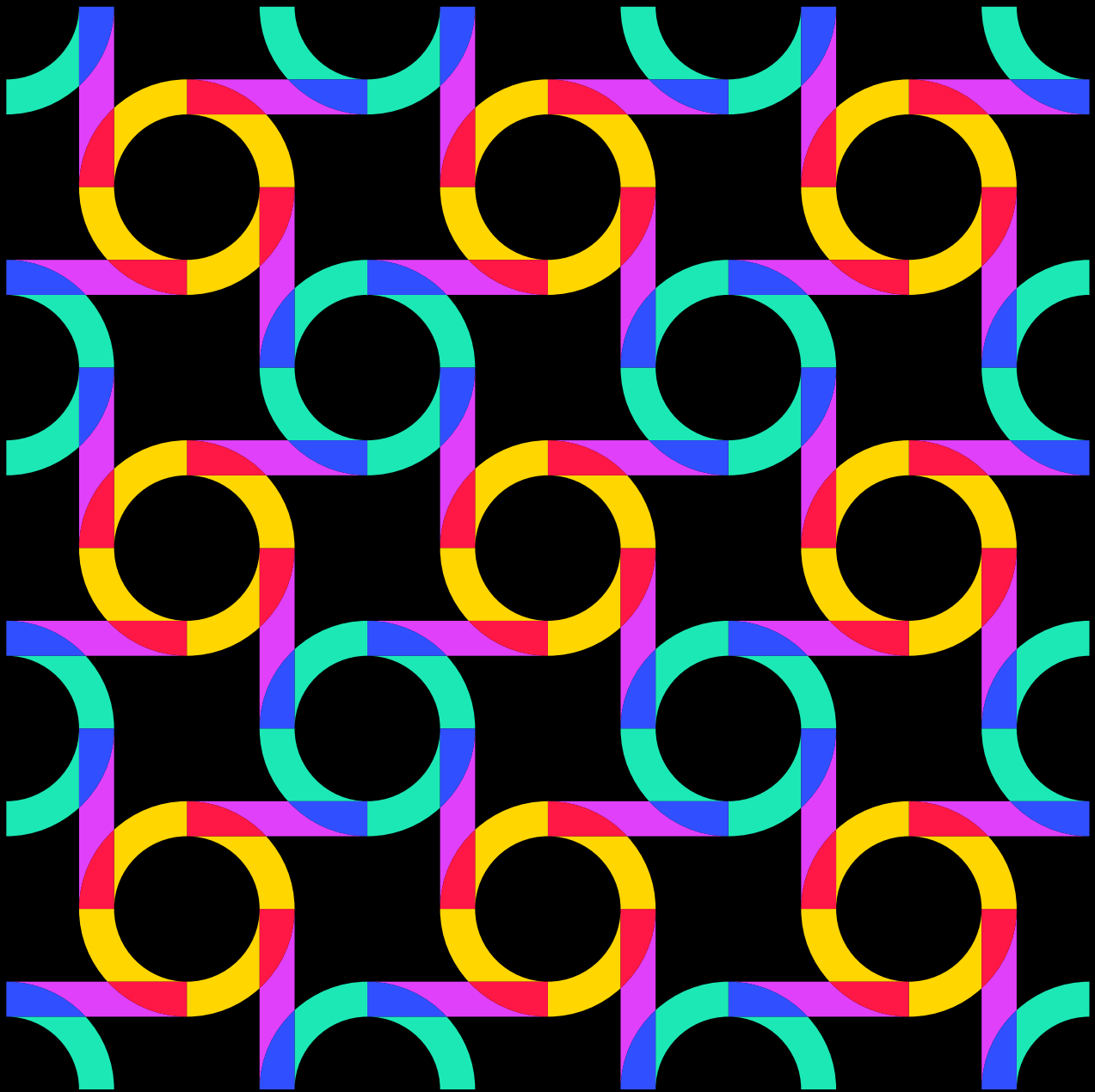
What is the actual potential of the use- case?

Support alter-mobility usage by proposing achievements to commuters and insights to public decision makers on sustainable mobility policies.

What are the benefits of building this use-case?

- The experiment contributes to the creation of qualified jobs in the logistics sector
- The experiment opens new ways for smaller logistic companies to operate and compete with the big "market owners"

i4Trust Toolbox



To unleash the potential of the data sharing enabling cross-domain data value chain, you can access i4Trust know-how through our toolbox. i4trust has made available free to access resources for those looking for data driven innovation. We have four main repositories (Github, Slideshare, Youtube and i4Trust Helpdesk) where all training materials and technical documentation are available to guide the newcomer's use cases in adopting i4Trust building blocks. The presenting training materials were used during the implementation of the i4trust Experiments to teach and certify experts in data sharing, experts which worked in the successful implementation of the i4trust Experiments.

i4Trust GitHub

The i4Trust · GitHub contains a set of useful materials to help setting up a data space using the i4Trust framework. More specifically:

i4Trust Building Blocks documentation - this repository contains a detailed description about i4Trust Data Spaces, the different Building Blocks and the reference examples.

Tutorials - Tutorials and descriptions on how to setup the components within an i4Trust data space

Training materials - This repository contains a collection of all training material for i4Trust. This may include slide decks and code snippets. The provided slide decks, code snippets, etc. correspond to the latest i4Trust training camp that has taken place.

i4Trust Youtube Channel

A repository where you can find all the videos produced throughout the i4Trust Project, the videos are grouped in different playlists to facilitate access to the different training materials and resources, including train the trainers course, experiments interviews to inspire new data sharing use cases and our networking and technical online events and sessions.

Get access to our free resources here.

i4Trust Slideshare

In the i4Trust Slideshare, all the decks from i4Trust sessions can be found.

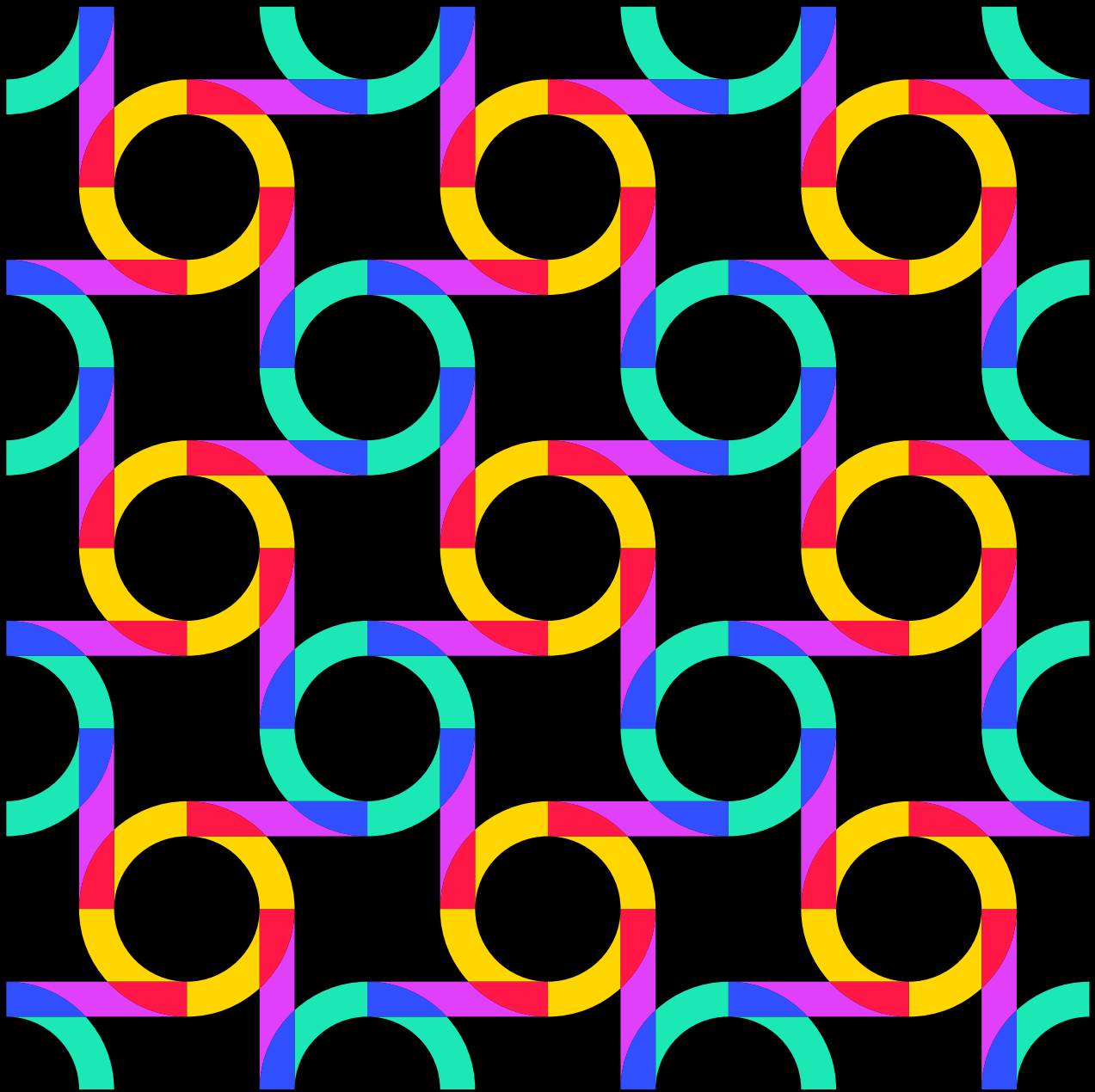
Below is a summary of the topics and links to each deck.

Session	Topic
Introduction to i4Trust Data Spaces, building blocks, and roles | Train the Trainers Program	This session on the i4Trust overall mission and vision and introduce you to data spaces: how they enable the development of innovative services and what building blocks are required to build data spaces. It elaborates on what i4Trust is aiming at beyond building blocks which is the creation of a vibrant community. In addition, there is an introduction to the role of DIHs and to i4Trust open calls. The session for Local Experts in Data Sharing & Ambassadors.
NGSI-LD primer & Smart Data Models | Train the Trainers Program	This session consists of two parts. In the first part you will get introduced to NGSI-LD: the basic model/concept behind and basic operations allowing you to start developing applications with the API. In the second part, you will get introduced to the Smart Data Models initiative. Technical Session for Local Experts in Data Sharing.
i4Trust components for Identity Management and Access Control i4Trust Marketplace| Train the Trainers Program	This session consists of two parts. The first part of the session provides an introduction to the i4Trust IAM components in detail while the second introduces i4Trust Marketplace Services.
Bringing the pieces together - Detailed review of a reference example | Train the Trainers Program	In this session we explain how everything comes together under i4Trust using a reference example and then explain that example in detail. It will be bringing the pieces together: Detailed technical review of a reference example: the prerequisites, creating an offering, acquiring rights/activation, & consumption. And the setup of components of the i4Trust experimentation framework. The technical session for Local Experts in Data Sharing.
NGSI-LD Advanced Operations | Train the Trainers Program	A Technical session on data sharing focused on NGSI_LD Advanced Operations
Ecosystem building & Role of DIHs | Train the Trainers Program	This session consists of two parts. The first part elaborates on the approach adopted towards building the i4Trust Community and the second elaborates on the OnBoarding: the role of DIHs. The session for Local Experts in Data Sharing & Ambassadors
Connecting to Legacy Systems, IoT and other Systems | Train the Trainers Program	Technical session on data sharing with the focus on connecting to Legacy Systems, IoT and other Systems
Creating Data Processing Services | Train the Trainers Program	This session explains how to create data processing services that are key to i4Trust, providing info on End-to-end AI Solution With PySpark & Real-time Data Processing With Apache NiFi
Community Support for trainees (Tier 1, 2, 3)	This session will explain the multi-tier support system in i4Trust. The session for Ambassadors & Local Experts in Data Sharing (LEBDs)

i4Trust FAQs

If you need answers to questions and topics related to data spaces for trusted data sharing, you can check the top frequently asked questions to our experts here. If you need even more information, we have also available our i4Trust Helpdesk, a space where anyone can post questions about i4Trust of any kind, technical and non-technical. You can find the most relevant FAQs related to the implementation of the i4Trust framework.

Testimonials



We are very proud of the results of our support programme and we have asked our participants about their experiences when creating their own data spaces using the i4trust building blocks. Below you can check out some of the testimonials:

Smart Buildings and Smart Energy

DSWEU DVU:

"the i4Trust program has offered a unique co-funding opportunity by focussing the requested i4Trust subsidies on boosting market-adoption through substantial testing, showcasing and launching with 30 - 40 test users (Entitled Parties and Data Service Consumers) from various relevant market-perspectives"

Smart Agrifood

AGRIMED:

"i4Trust technology has made it possible to face the challenges that characterise the development and implementation of digital agriculture services in an integrated way."

Farm4All:

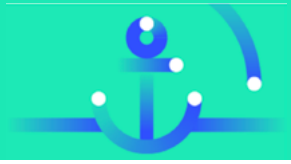
"through i4Trust Business mentoring, combining Miro's template with the help of work sessions with the mentor, has been of great help. It has helped us explore to better understand the ecosystem and reflect on the role that each of the actors involved can play. This has been essential to define a strategy to follow around the generation and sharing of data, as well as the creation of new services."

SMART Logistics

COLLMI:

"The combination of FIWARE technologies with iSHARE is a great combination for thrusted data sharing by SMEs."

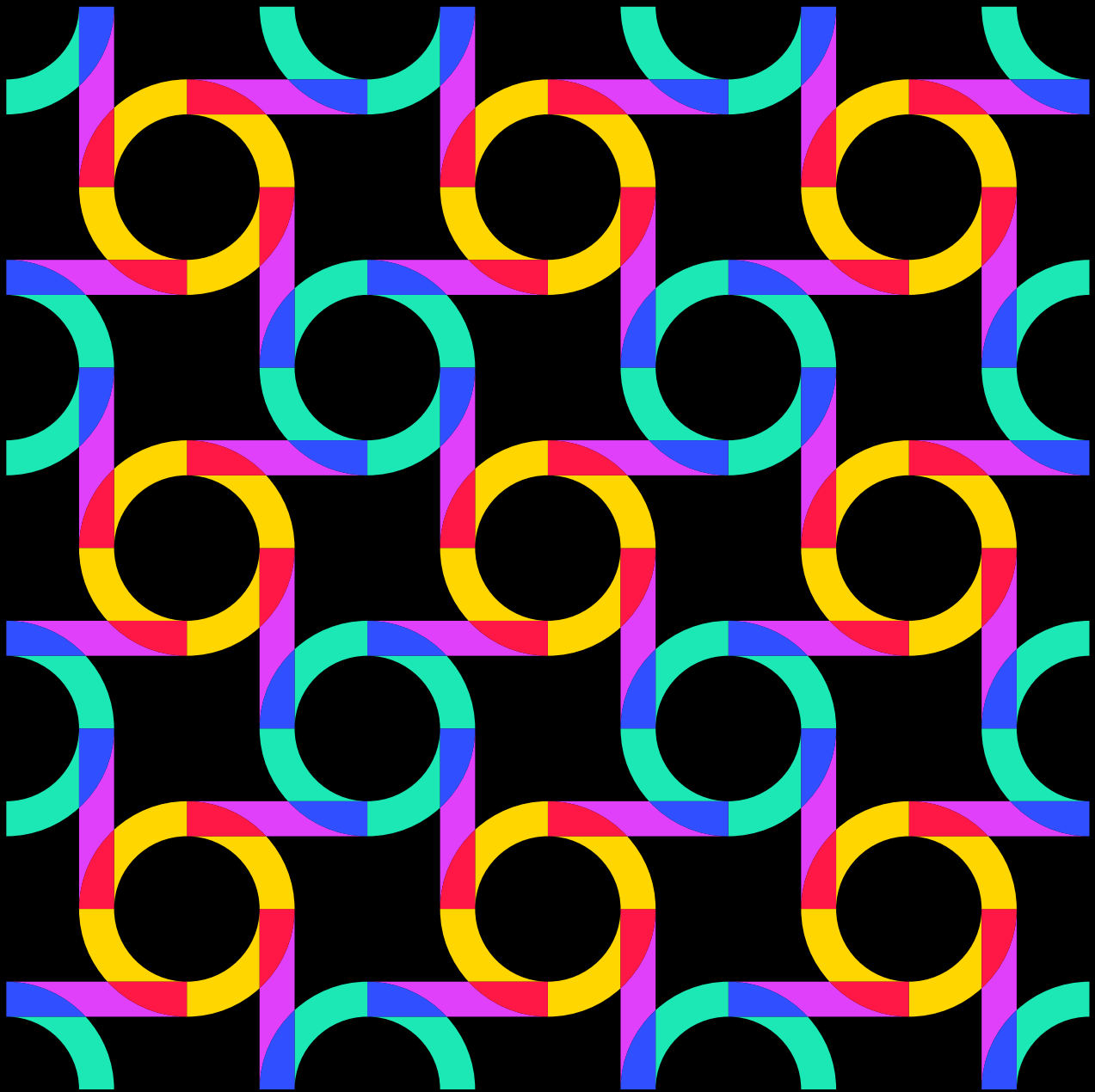
SMART ENVIRONMENT / PORTS



iGreenPort

"The main value-added created ***in iGreenPort has been the development of a new architecture, based on the i4Trust standards, with which for the first time many companies can share data on the quality of seawater in ports in almost real time."***

Main takeaways



After the first implementation of the i4trust support program, we can conclude that i4Trust basic components provide a solid foundation for building data spaces using open source, mature (production-ready) standard-based technologies and solid legal frameworks from FIWARE and iSHARE, as evidenced by the implementation of the 12 data spaces created in our first round of funded use cases.

Analysing the feedback received from the participants, we can say that i4trust provides solutions to common challenges in the implementation of data spaces, standardisation, interoperability, sovereignty of the data but also some specific ones depending on the type of vertical of each use case.

Agrifood

The **agricultural and food value** chain is facing a rapid digital transformation, however, the high cost of access to new technologies, the need for a large amount of data and the need to share this data are some of the obstacles to its success. We have seen that these challenges can be easily overcome using the technologies offered by i4Trust to build a space for data exchange and cooperation between farmers characterised by trust and openness mechanisms, but also involving end consumers who increasingly demand more reliable information on the traceability of the food chain. This is of main importance for the EC[2], aiming to make food systems fair, healthy and environmentally-friendly.

Logistics

Based on the i4Trust experience and analysis, the main challenges that the **logistics industry** has been facing for years, is the rapid growth in the volume of online sales, together with the demand of consumers to reduce delivery times to a minimum. These two factors, among others, exert a lot of pressure on logistics companies that are forced to introduce changes that improve the efficiency of their service without increasing costs, especially when we refer to access to rural areas.

That is why the creation of data spaces can make the difference, in this case, the different logistics operators together with retailers work collaboratively to overcome these challenges by offering benefits to all of them from this collaboration. The i4Trust technology provided components that allowed our experiments to speed up the implementation of their use case and to do so with regular support along the way to navigate through most implementation issues.

Energy and smart building

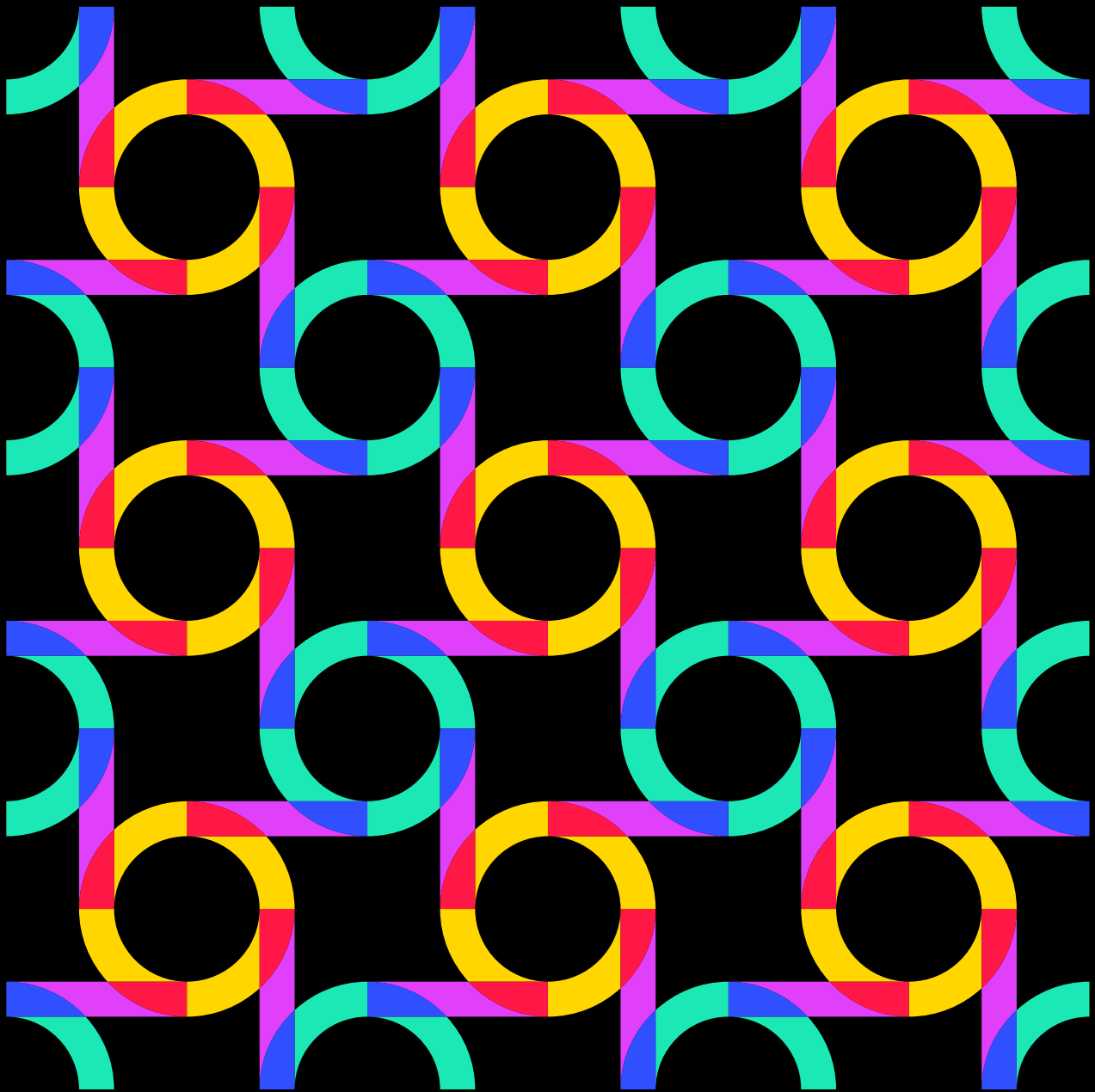
The current and profound energy crisis that is affecting the whole of Europe is showing more than ever the need for greater control over energy consumption by both consumers and suppliers companies. This control of consumption is only possible if large amounts of data are available, and if this data is shared with all the parties involved in near real time, which will also favour the correct energy transition.

However, its success can only be implemented by improving the efficiency of buildings and household facilities, which play an important role in total energy consumption. i4trust provides the necessary technology to capture and make the data from home IoT devices interoperable, and share it in near real time.

Energy and smart building, logistics and agrifood, are just three specific sectors that provide concrete examples of how i4trust can help create data spaces and can solve specific challenges and barriers in different domains, but if you want to delve into all of them we recommend reading the all the i4Trust impact stories.

[2] From farm to Fork. Check this European strategy is at the heart of the European Green Deal aiming to make food systems fair, healthy and environmentally-friendly.

About the i4Trust consortium



The i4Trust initiative was formed by 3 partners: FIWARE Foundation, ISHARE Foundation and FundingBox, being FIWARE Foundation the coordinator.

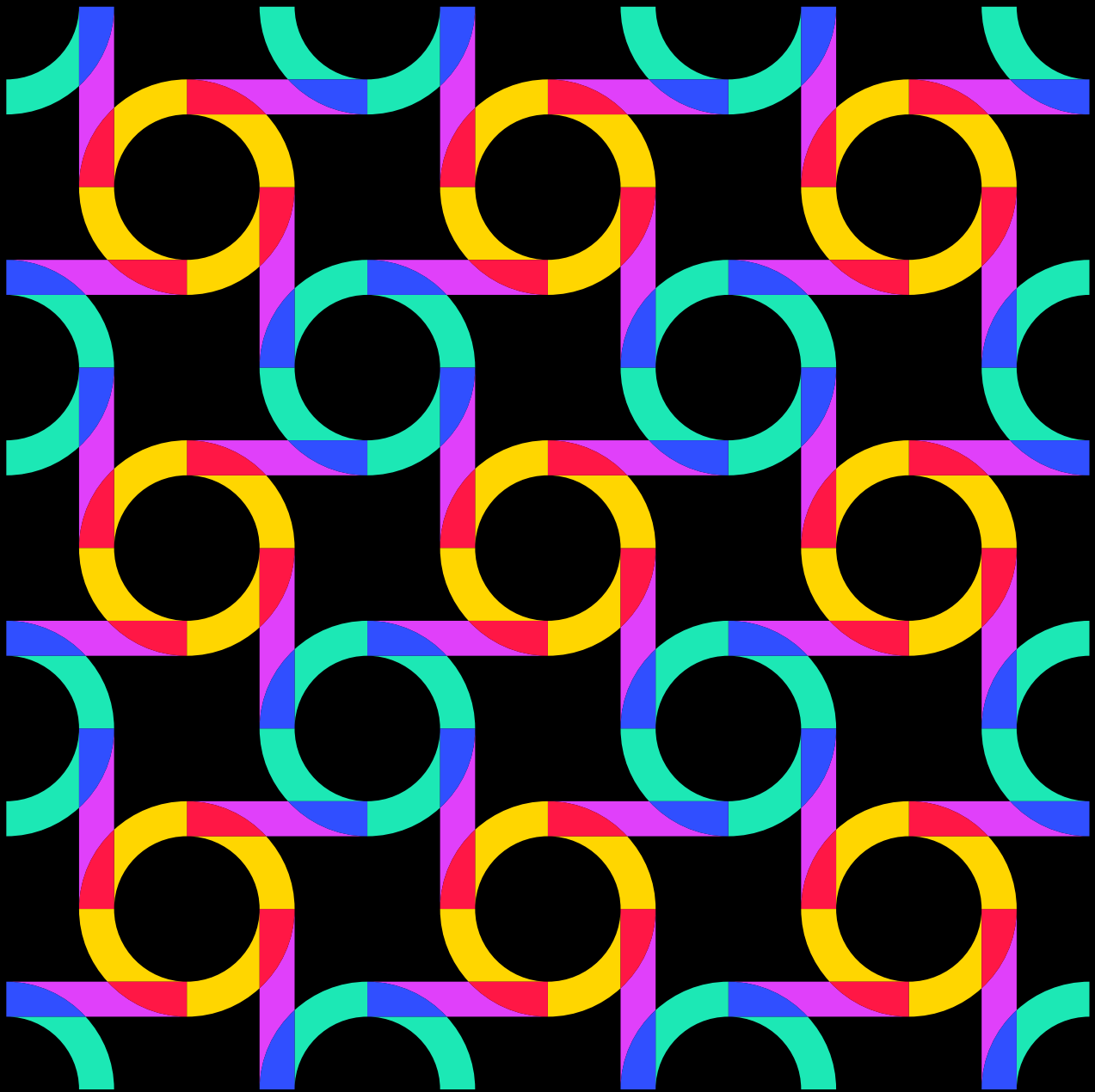
FIWARE Foundation together with its >500 members is contributing to the implementation-driven definition of key open de-facto standards supporting creation of portable and interoperable smart solutions in multiple sectors. FIWARE Foundation leverages on a growing network of iHubs and the adoption of standards implemented in FIWARE in alignment with DSBA Technology Convergence results.

iSHARE Foundation provides in-depth knowledge and experience on operational, technical, legal and governance issues related to data sharing. It maintains the iSHARE scheme that provides a uniform set of agreements or schemes that enables organisations to give each other access to their data in a trustworthy manner. Organisations that participate in one of the i4Trust projects are automatically using software components which comply with the iSHARE scheme for secure and controlled data exchange.

FundingBox provides the largest European deep tech ecosystem consisting of know-how, tools and networking opportunities to support the i4Trust initiative. Additionally, the company is a member of six DIHs and a partner of another 37 DIHs, all across Europe. The platform Fundingbox Spaces, in which the i4Trust community gathers virtually, is a dynamic and multi-way communication space that allows members to contribute to i4Trust's community of practice.

[2] From farm to Fork. Check this European strategy is at the heart of the European Green Deal aiming to make food systems fair, healthy and environmentally-friendly.

Do you want to be involved?



Join the vibrant i4Trust Community our inspirational and innovation-driven Open Space with a wide range of services, information and tools to communicate, align, collaborate and share knowledge. You will be able to connect with experts to develop innovative services based on data sharing.

Do you need more information? Write to us at info@i4trust.org and we will get back to you as soon as possible.

Stay connected with us through our i4Trust Twitter and i4Trust Linkedin

i4Trust

Data Spaces for effective and trusted data sharing

Do you have questions or want to know more?

CONTACT US

Founding Partners

FIWARE FOUNDATION

iSHARE

FundingBox

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