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PASSION FOR INNOVATION

# BLOCKCHAIN FOR DATA MARKETPLACE: ENHANCING SECURITY, PRIVACY, AND TRUST

Silvio Meneguzzo



# Team

**2** Professor + **1** Program manager  
**1** PhD student



- **Silvio Meneguzzo** PhD Student - Unito, Unicam, Links Foundation
- **Claudio Schifanella** Associate Professor - Unito
- **Valentina Gatteschi** Associate Professor - Polito
- **Alfredo Favenza** Program manager - Links Foundation



# Introduction

## Research Programme



- Blockchain and DLT in Social systems and smart societies

## Context



- University of Turin
- Links Foundation
- **DATA CELLAR**

## Data Marketplace

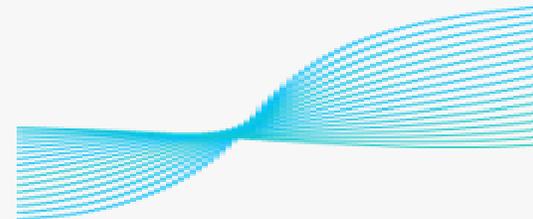
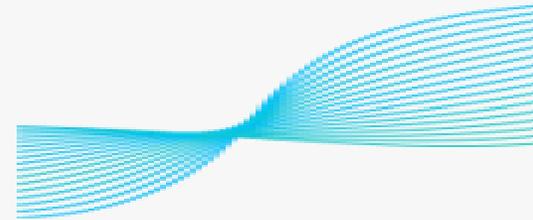
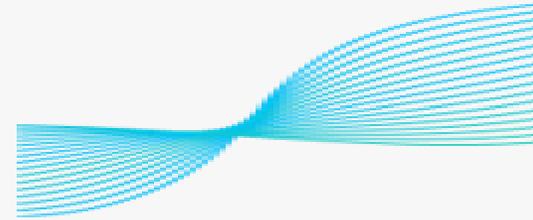


- Create a federated energy dataspace
- Develop a decentralized data marketplace

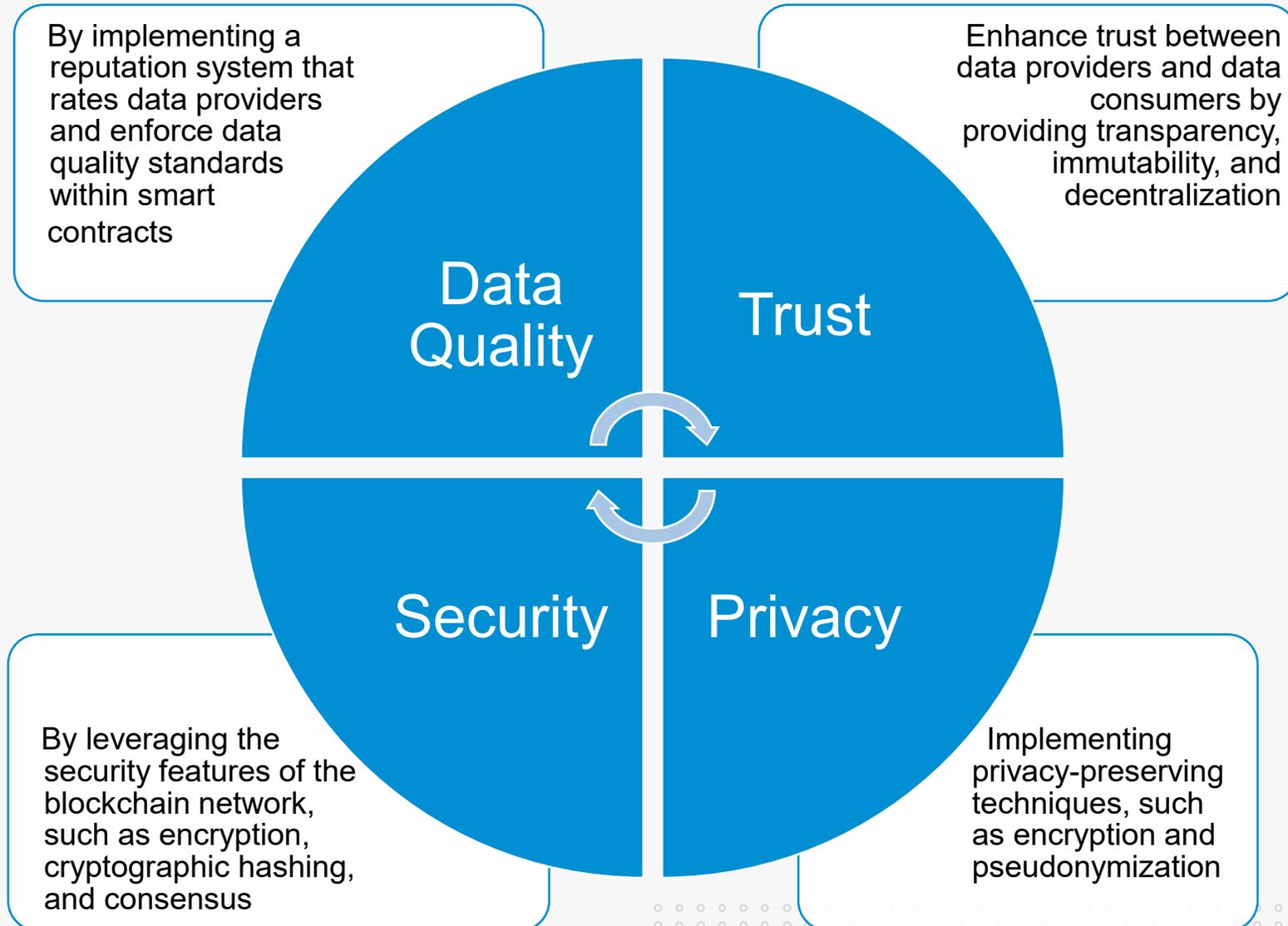
# Data Cellar Objectives

## Ambition

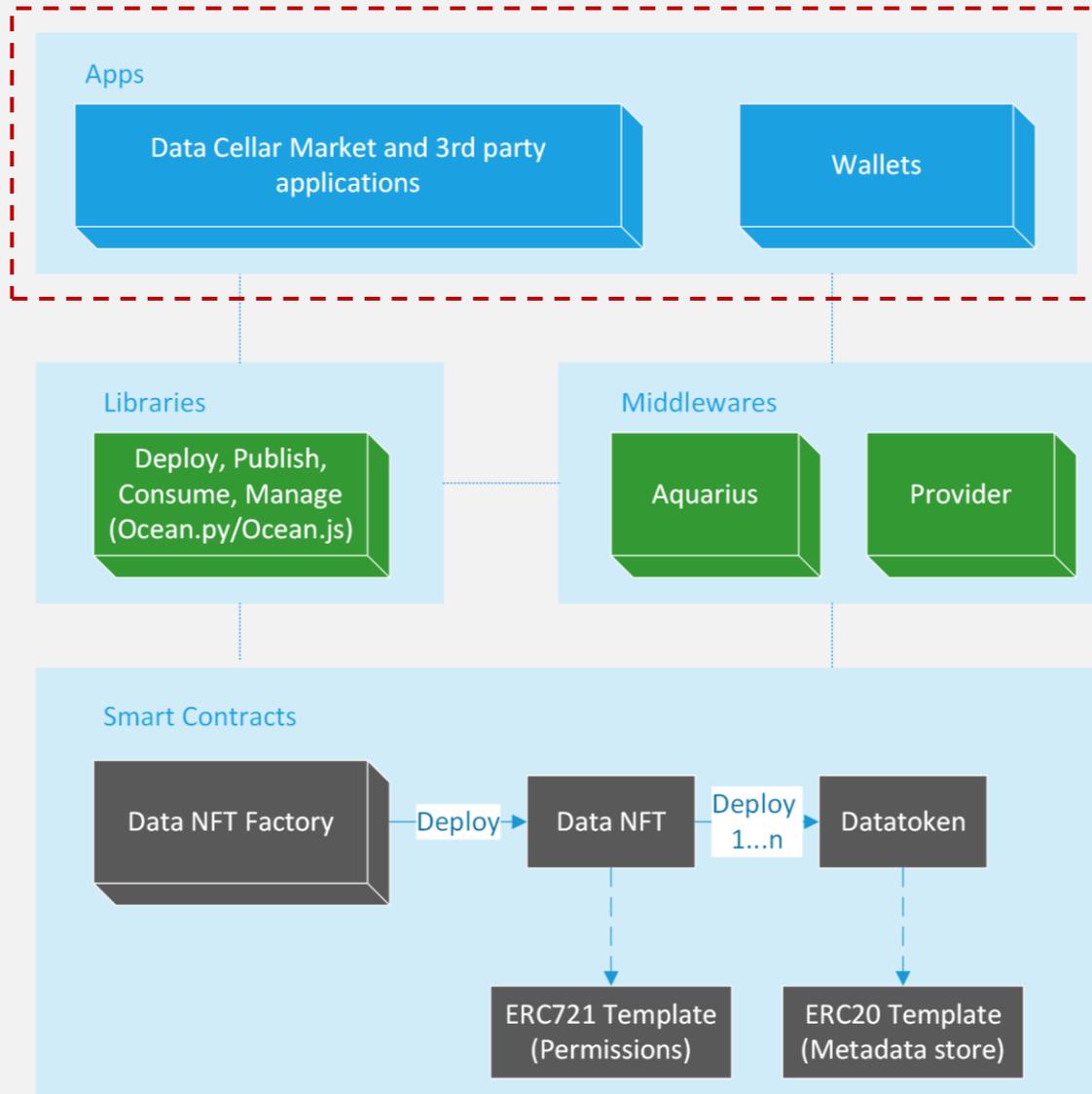
- Create a public energy data space that will support the creation, development and management of Local Energy Communities (LEC)
- Based on an open and interoperable cloud-to-Edge data Exchange architecture & aligned with current and future EU data spaces initiatives
- DLT-Driven Marketplace to engage users and extract value of data



# Addressed Challenges in Blockchain-based data marketplaces



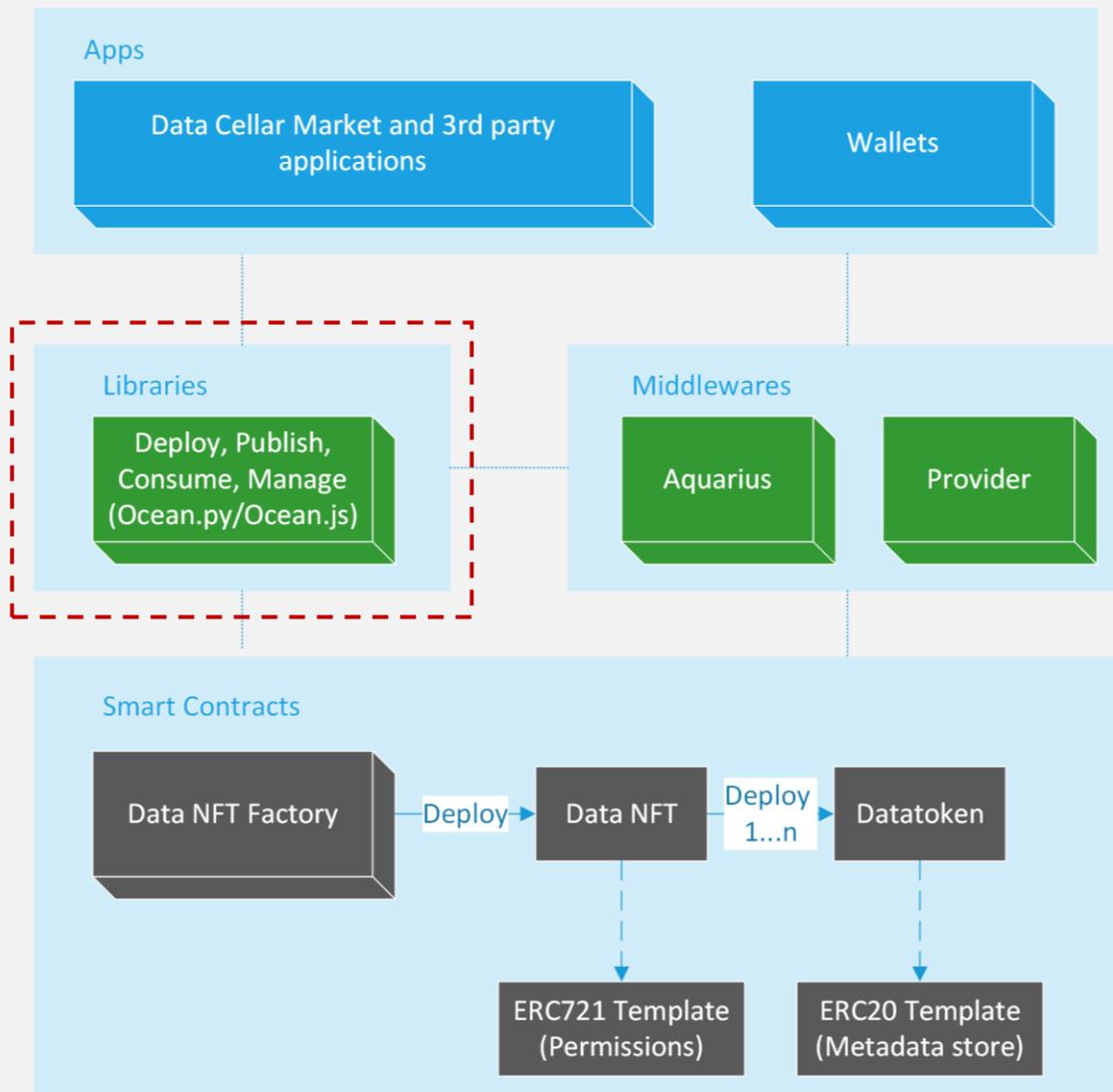
# Data Cellar conceptual Architecture



## Software architecture overview - Marketplace

- **Applications** layer is the topmost layer of our architecture. This layer in our use case consists of applications such as:
  - Data Cellar Market that provide users with a platform to onboard services like data, algorithms, and compute-to-data. Users can publish and mint data NFTs and datatokens.
  - Wallet that enables users to hold datatokens as assets, and use data services by spending datatokens.

# Data Cellar conceptual Architecture

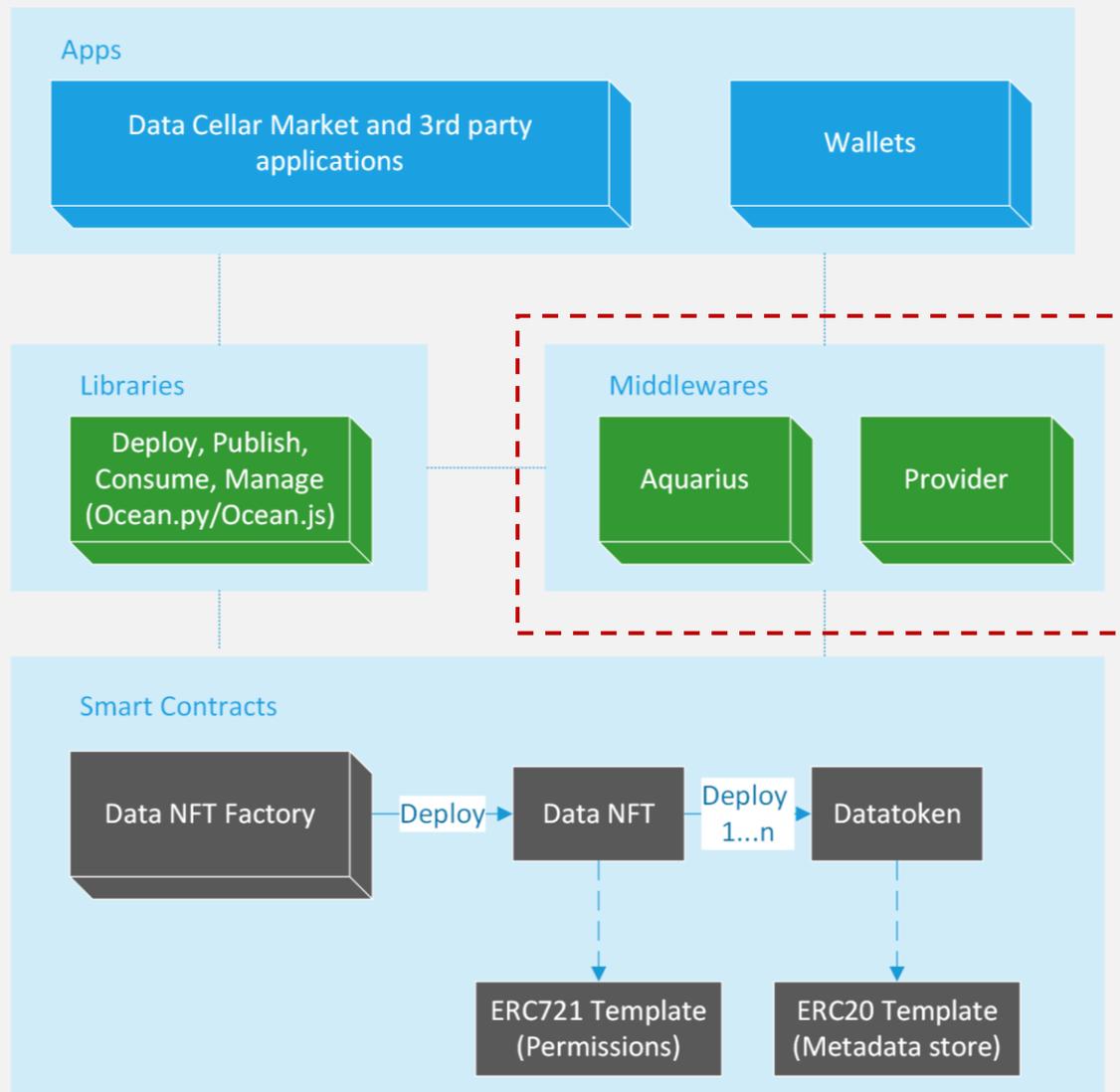


# Software architecture overview - Marketplace

- **Libraries layer** consists of libraries used by the applications to interact with the smart contracts.
  - These libraries encapsulate the calls to the smart contracts and provide features like publishing new assets, facilitating consumption and much more. Additionally, the libraries also integrate with Provider to provision and access data services and Ocean Aquarius for metadata.



# Data Cellar conceptual Architecture

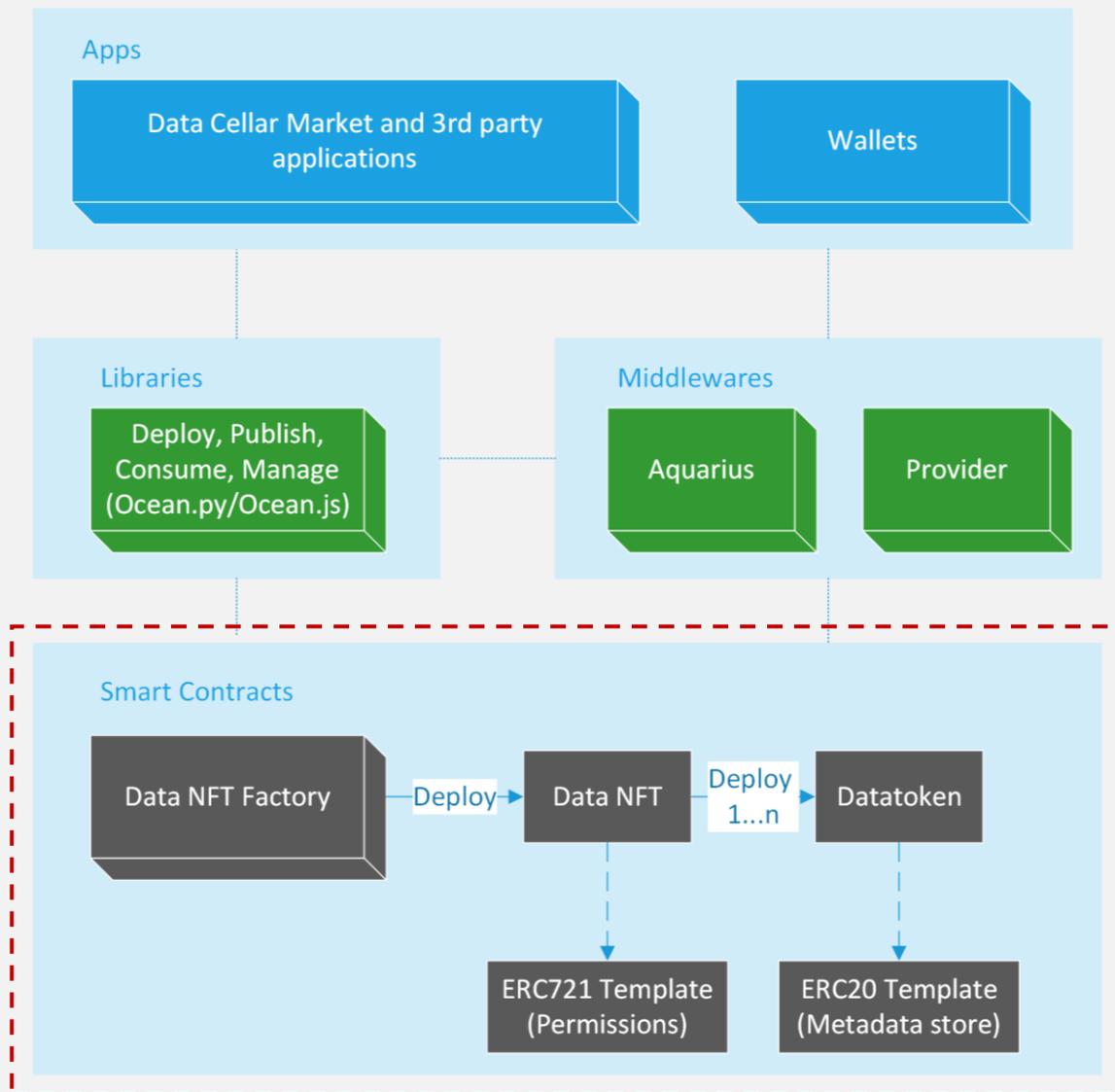


# Software architecture overview - Marketplace

- **Middleware layer** provides the necessary infrastructure for discovering and accessing data assets. This layer comprises:
  - Aquarius, a metadata cache for faster search.
  - Provider, which facilitates downloading assets and DDO encryption.



# Data Cellar conceptual Architecture



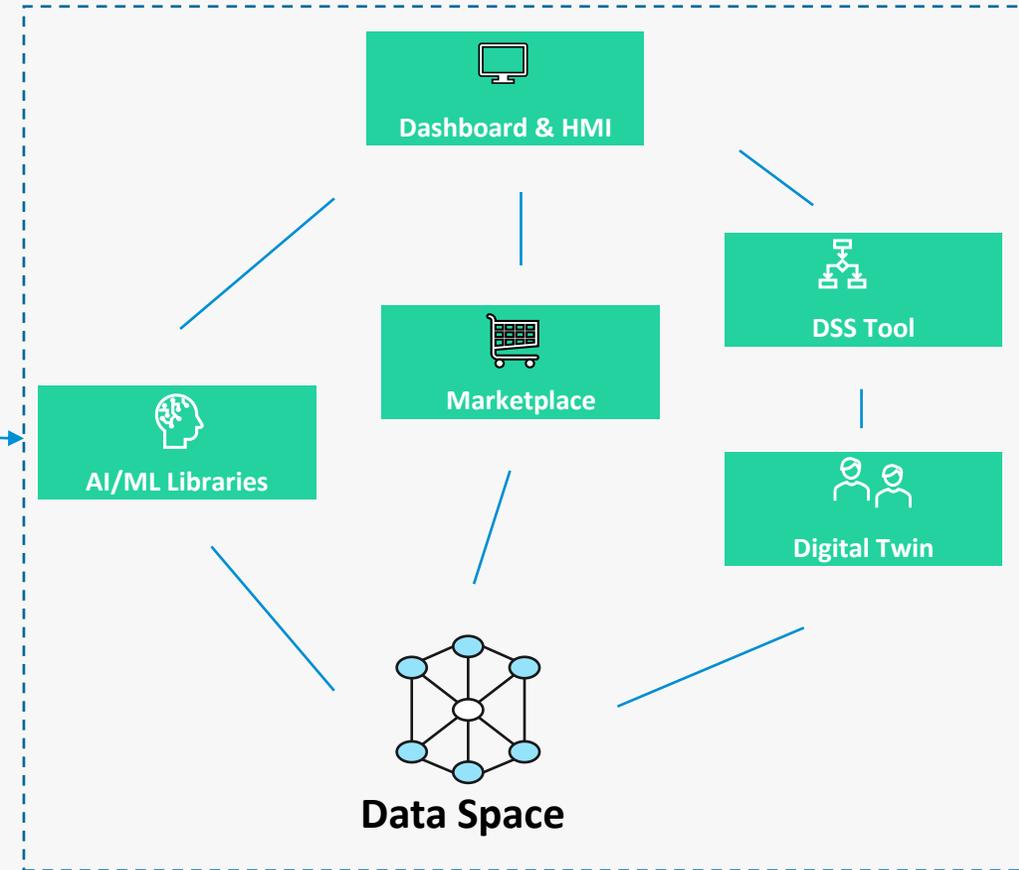
## Software architecture overview - Marketplace

- **Smart Contracts** layer is the lowest layer of our architecture, and it is responsible for managing the interactions between data providers, consumers, and the network. This layer consists of
  - smart contracts deployed on the Ethereum mainnet. These smart contracts are used to facilitate the creation, management, and trade of datatokens. The libraries interact with these smart contracts to provide features like publishing new assets, facilitating consumption, and much more. Additionally, the smart contracts support various token standards like ERC721 and ERC20 to represent data assets and licenses to access them.

# NEXT STEPS



Gaia-X compliance of Data Cellar (especially on Gaia-X Trust Framework and federated architecture)



# CONTACTS

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