

SEDIMARK: A Decentralised Data and AI Marketplace

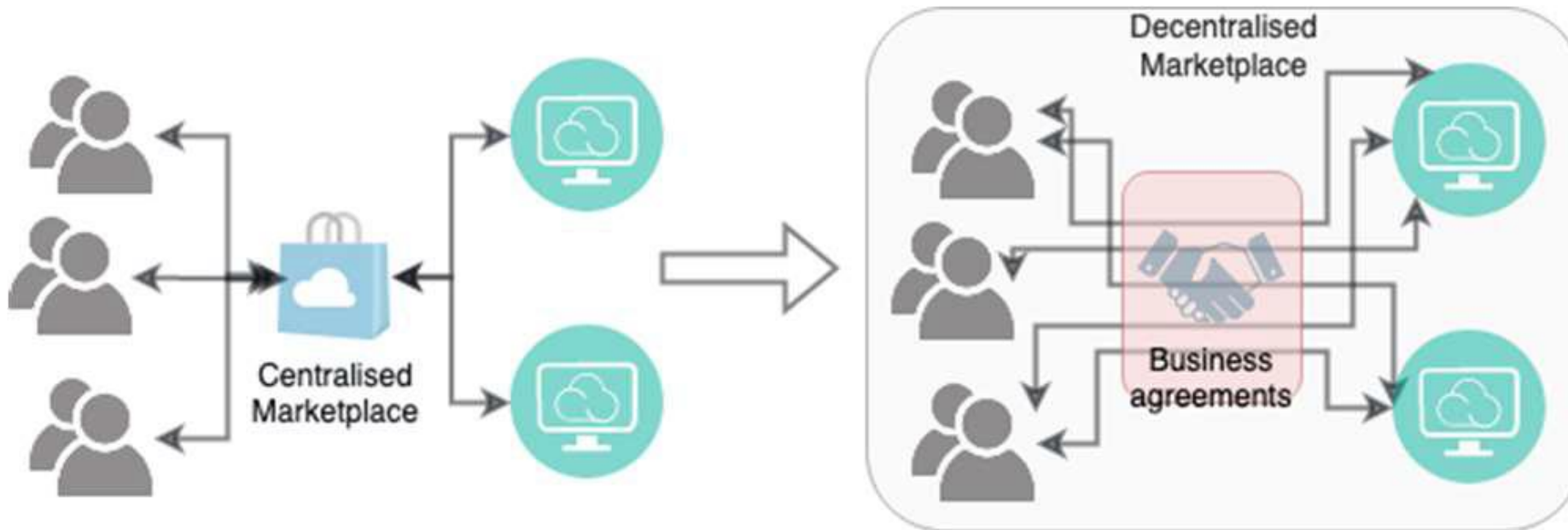
Open-source framework for Data Spaces

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- ❖ SEDIMARK is a **decentralised data and services marketplace** designed to:
 - » **Bridge remote data platforms** across sectors and geographies.
 - » Enable **secure, privacy-preserving data sharing**
 - » Support **FAIR principles** (Findable, Accessible, Interoperable, Reusable)
 - » Leverage **blockchain** and **AI** for trust, automation, and intelligence.

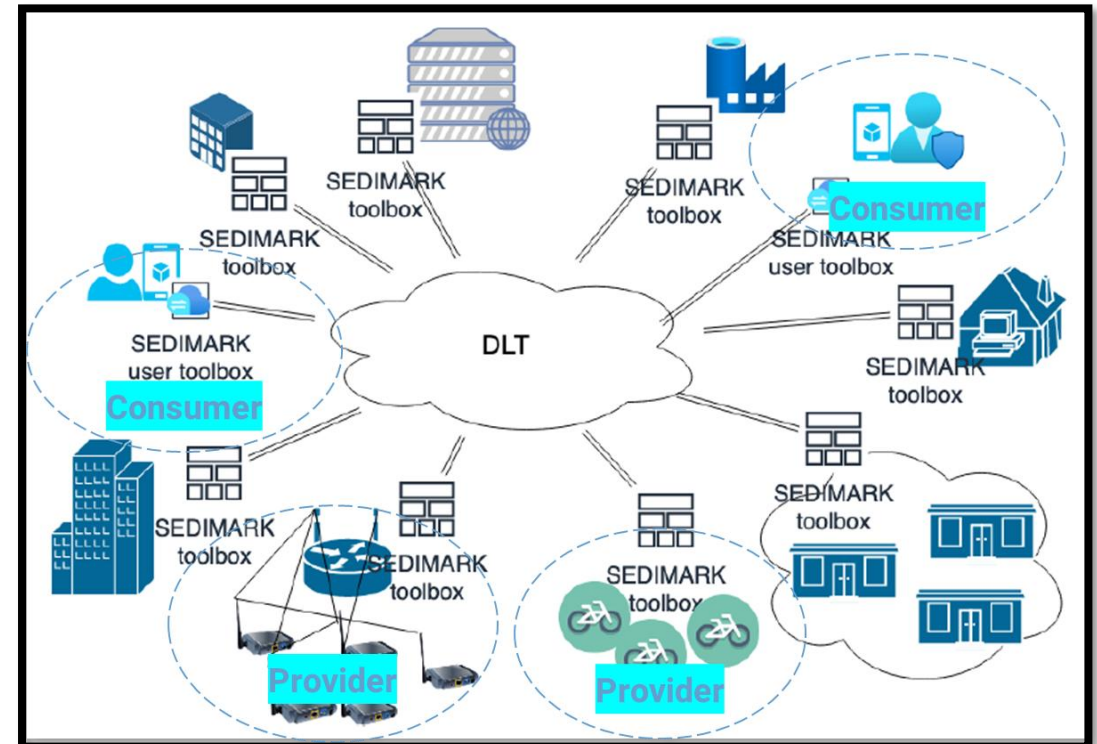


- ❖ **Edge AI Data Management:** Automates quality assessment, labeling, analytics and generation, through Orchestration.
- ❖ **Edge Data Storage:** Keeps data close to where it's generated, improving security and efficiency
- ❖ **Semantic Interoperability:** Uses common information models to make diverse datasets work together seamlessly
- ❖ **Decentralised Identities:** Users retain control over their data and credentials
- ❖ **Distributed Ledger Technology (DLT):** Ensures transparency and trust without central control

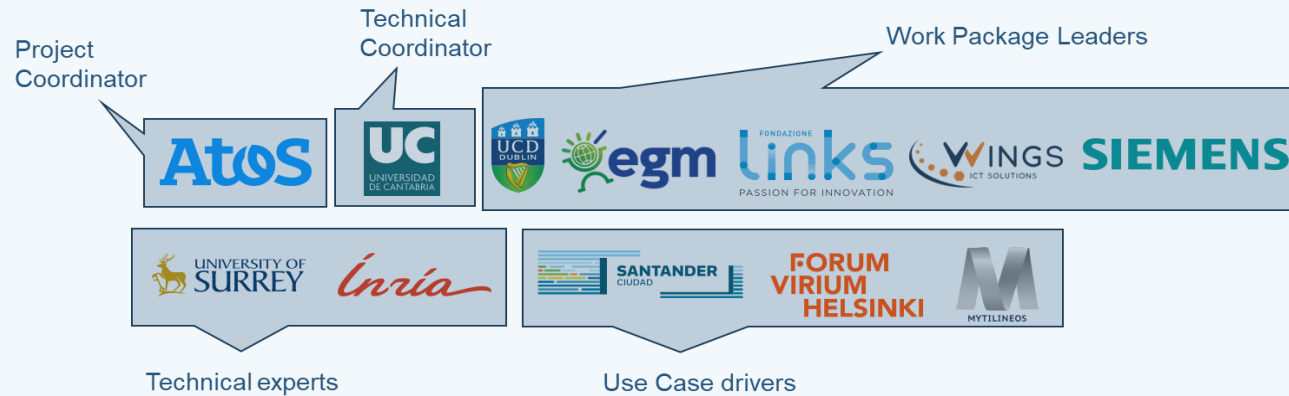
- ❖ Sources: water quality, energy consumption, location, traffic flow (numerical time-series data)



- ❖ Improve **Data Quality** and **ML inference models** through (distributed) **energy-efficient** processes.
- ❖ Connect **Edge-based Providers** and **Consumers** for value exchange via secure, interoperable data sharing mechanisms.



8 Countries / 12 partners



4 Domain Use Cases

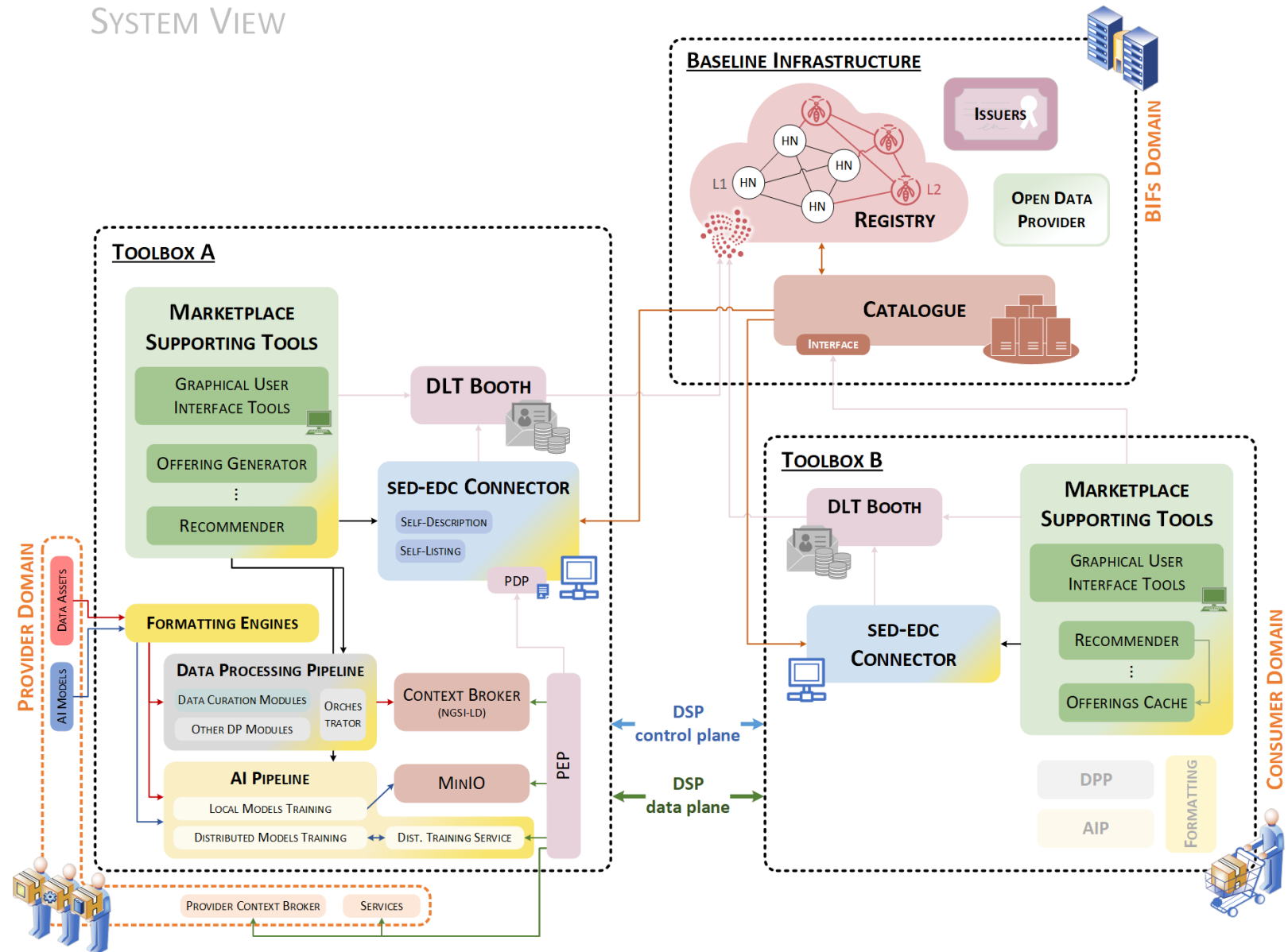
- Mobility Digital Twin (FI)
- Urban bike mobility planning (SP)
- Valorisation of energy consumption data (GR)
- Valorisation of water-related data (FR)

Project Dates

- Start: 1st October 2022
- End: 30th September 2025



- ❖ **Baseline Infrastructure**
 - » Registry (DLT)
 - » Catalogue
- ❖ **Provider Toolbox**
 - » DLT Booth
 - » Dataspace Connector
 - » Offering Manager
- ❖ **Consumer Toolbox**
 - » DLT Booth
 - » Dataspace Connector



Implementation: 1st iteration - Use Case Scenarios



Minimum Viable Intelligence (MVI)

- Data Processing Orchestration
- AI Model Orchestration
- UI

Minimum Viable Marketplace (MVM)

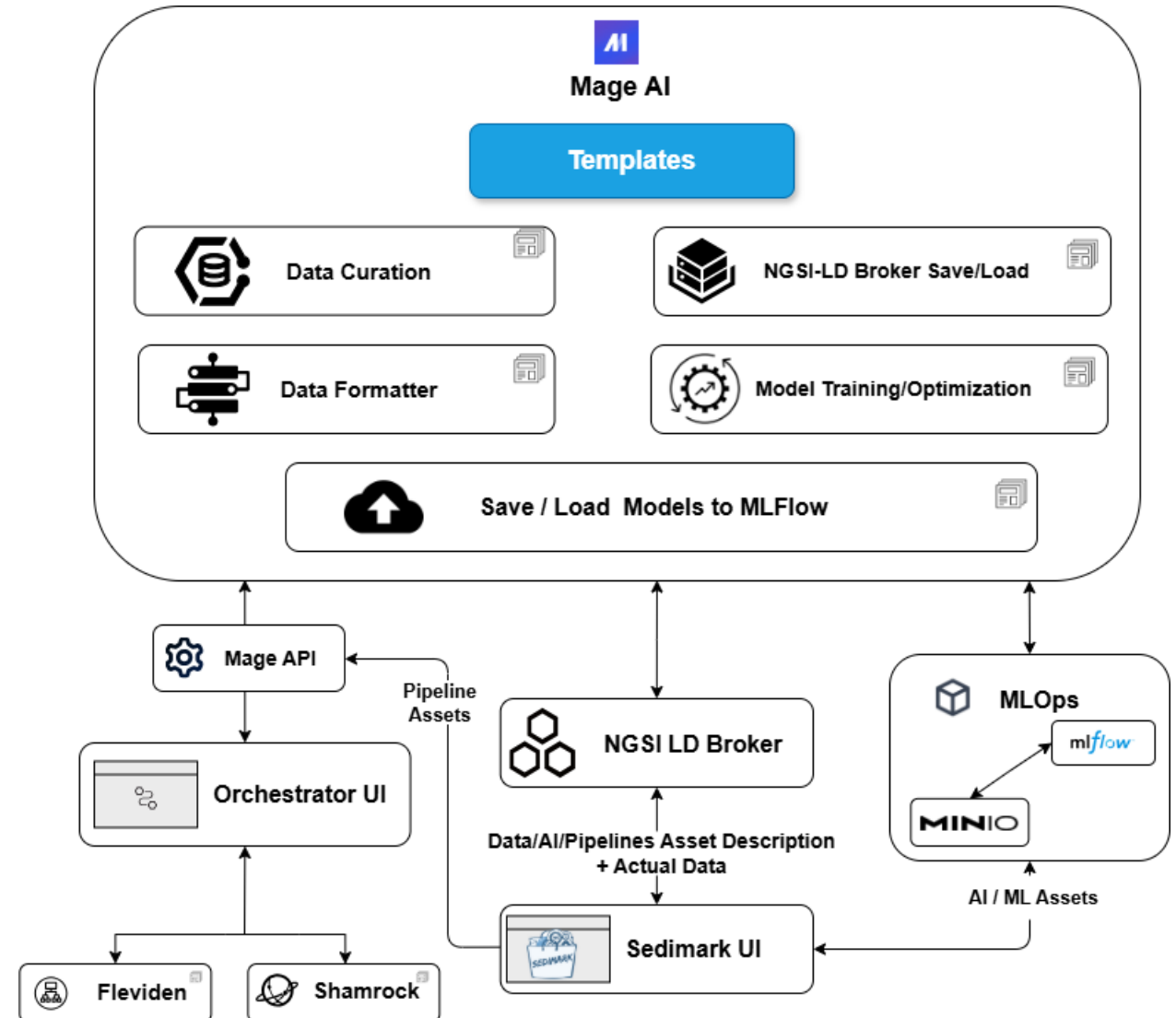
- Onboarding
- Offering Management
- Asset Exchange
- UI

Platform

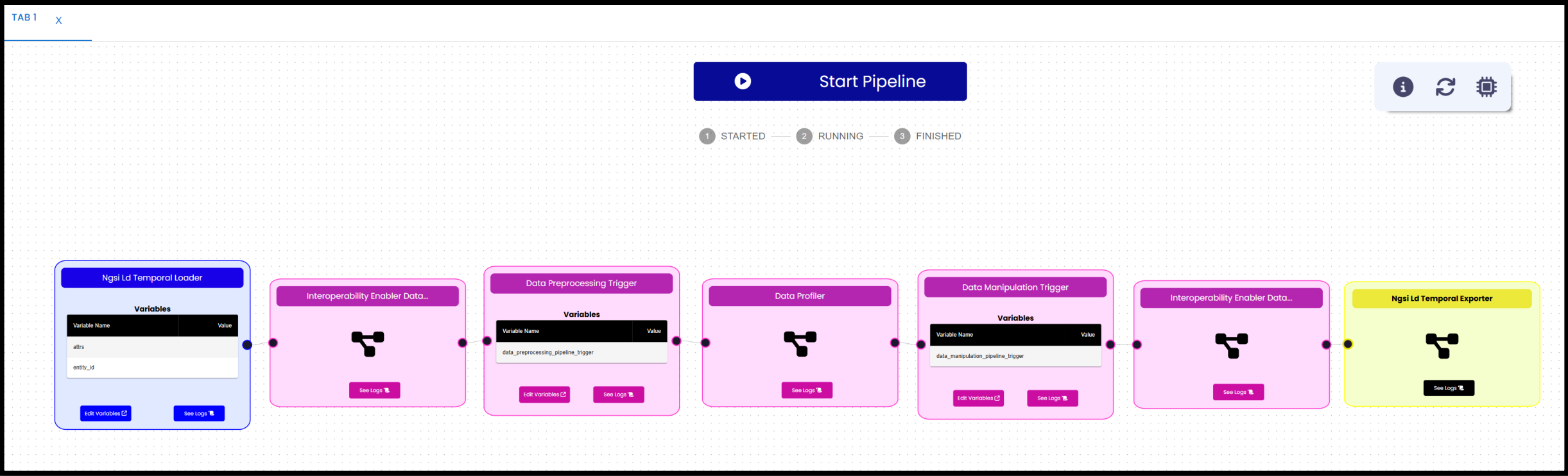
- MVM
- MVI

❖ Data Processing and AI Model Orchestration

- » MageAI
 - › Core Workflow Management.
- » MageAPI
 - › Secure interface layer that controls access to data processing resources
- » Stellio NGSI-LD Broker
 - › Storage for Data Assets
- » MLflow and MinIO
 - › Comprehensive AI models assets and workflows curation and storage capabilities
- » Fleviden and deFlight
 - › Federated Learning (FL) service assets system configuration framework
- » Orchestrator UI
 - › End user interface designed to deliver intuitive experience and ease of use

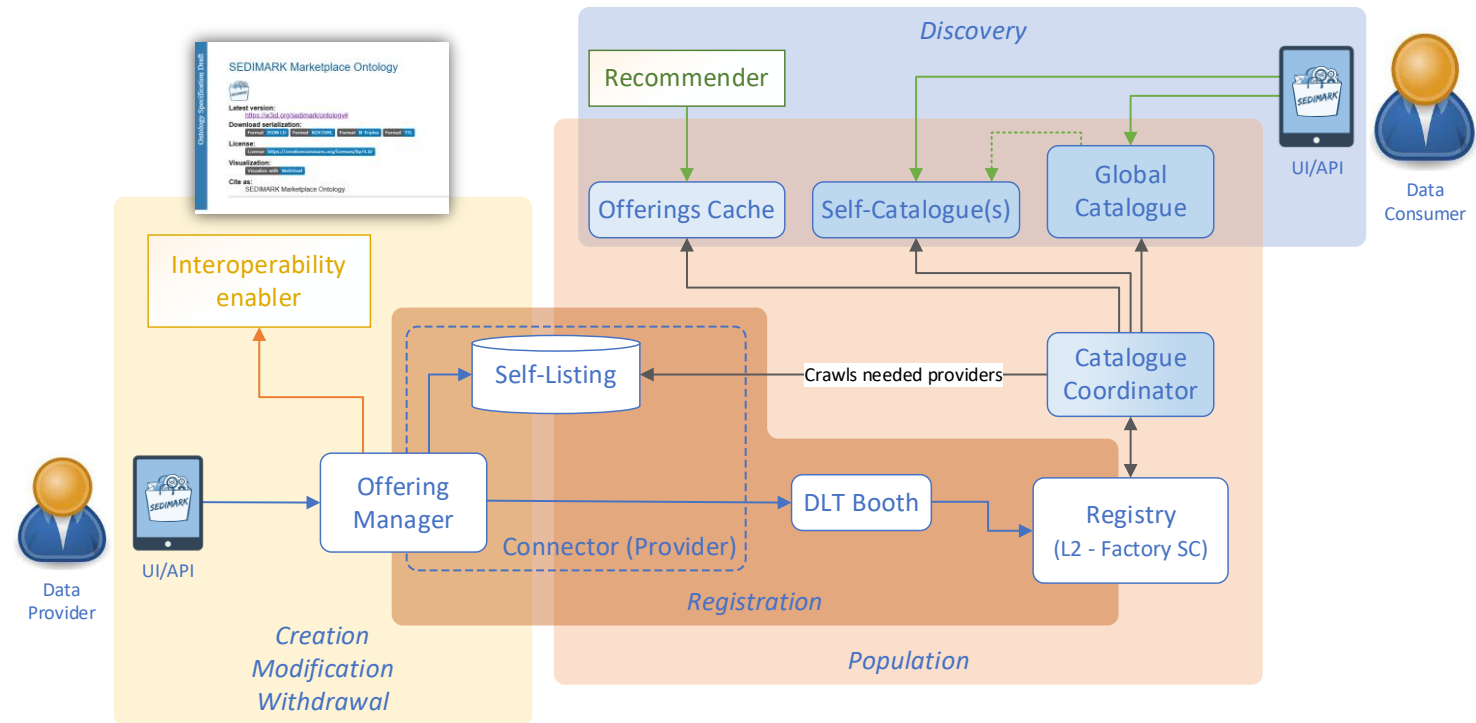


Minimum Viable Intelligence (MVI) – Orchestrator UI

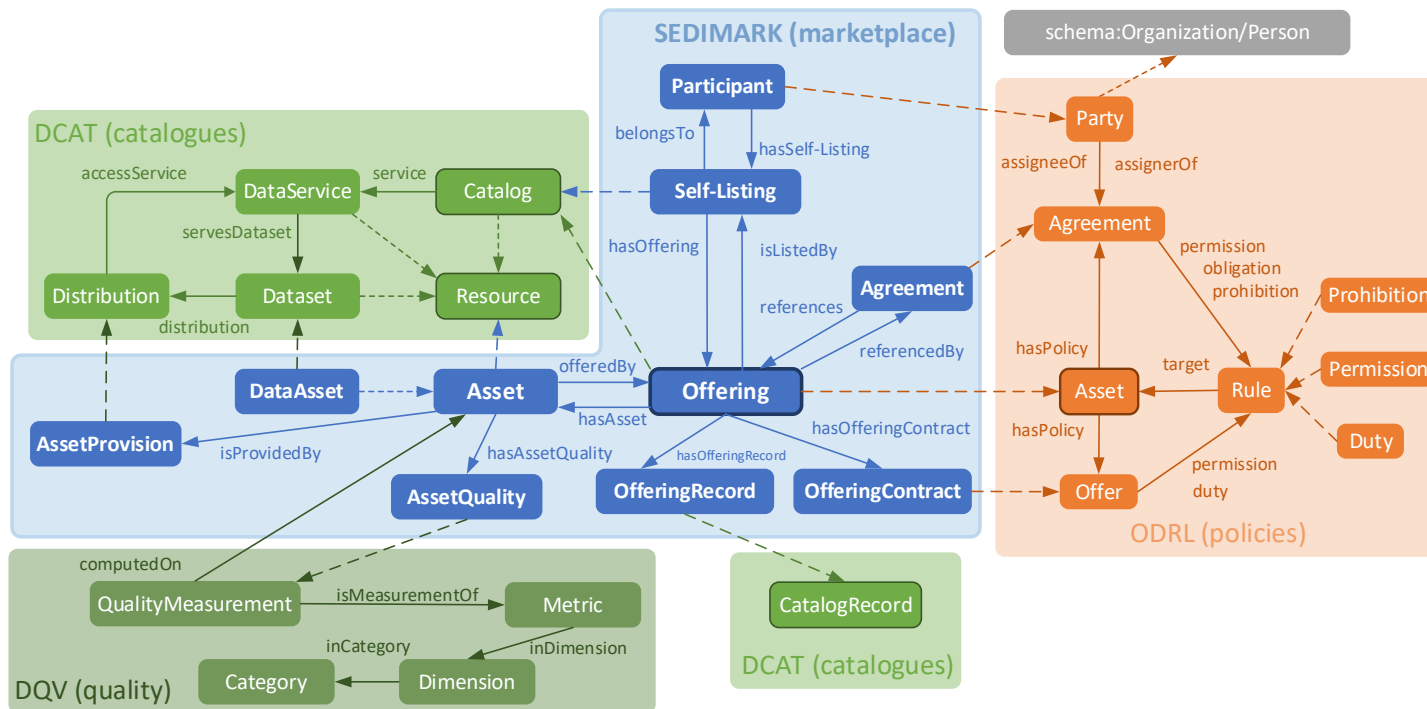


❖ Offering Tokenisation

1. Provider publishes an Offering
 - » Via Offering Manager
2. The Offering Manager registers it
 - » Via DLT Booth API
 - » Hash is stored in Registry
 - » Full Offering is stored in the *Provider's Connector*
3. Tokenisation is achieved via Smart Contracts
 - » An NFT is minted, owned by *Provider's* identity
 - » Plus a set of associated Fungible Tokens (Data Tokens)
4. Catalogue updates; the Coordinator is subscribed to the DLT events



- ❖ Models Marketplace Concepts
- ❖ Ontology, Taxonomy and Vocabulary
- ❖ Available online
 - » Documentation -> <https://w3id.org/sedimark/ontology#>
 - » Source -> <https://github.com/Sedimark/ontology>



SEDIMARK Marketplace Information Model



Modified on: 2025-04-01

Latest version:

<https://w3id.org/sedimark/ontology>

Revision:

0.7

Issued on:

2023-12-31

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Extended Ontologies:

<http://www.w3.org/ns/dcat#>

<http://www.w3.org/ns/dqv#>

<http://www.w3.org/ns/odrl/2/>

Funding:

<https://cordis.europa.eu/project/id/101070074>

<https://gtr.ukri.org/projects?ref=10043699>

Download serialization:

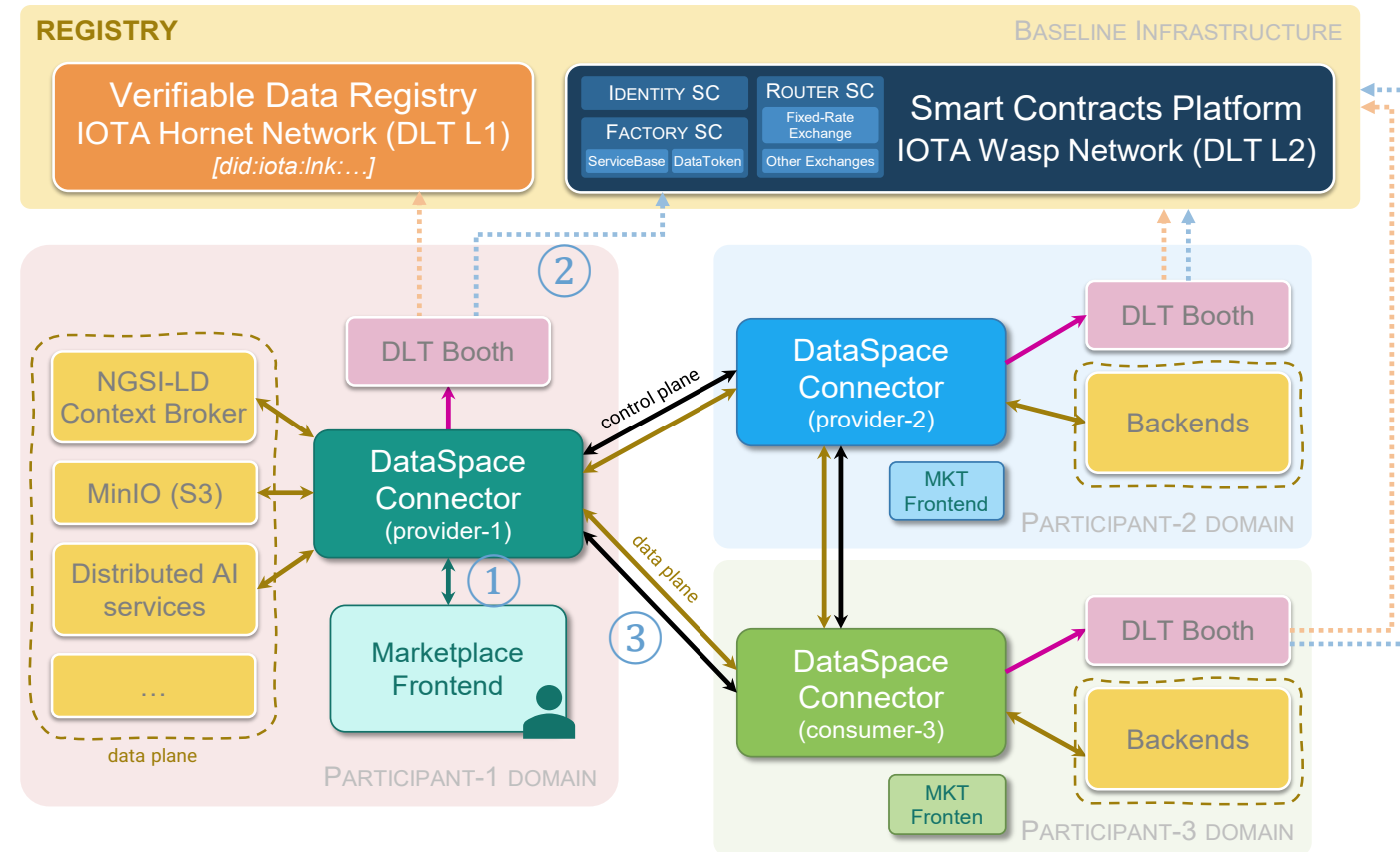
Format [JSON LD](#) Format [RDF/XML](#) Format [N Triples](#) Format [TTL](#)

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❖ Offering Negotiation and Agreement Tokenisation

1. Consumer initiates a negotiation
 - » Through Data Space Connector
 - » Connectors use Data Space Protocol
2. Data Token is purchased
 - » The consumer spends the price determined by the *Provider*
- 3A. Negotiation is **finalised**
 - » The *Consumer* presents the DT as a verifiable proof of purchase
 - » The provider verifies its ownership
- 3B. Negotiation is **terminated**
 - » The Data Token acquisition is rolled back



❖ Dockerised

- » MVI
- » MVM
- » Components

Pinned

[Customize pins](#)

 **platform** Public 
Manifests and compose files to deploy the Sedimark platform

 **Sedimark-Toolbox** Public 
Deployment for Sedimark Toolbox to deploy an instance of it and connect to the Sedimark Marketplace
 Shell

 **Sedimark-Orchestration-UI** Public 
 JavaScript

 **marketplace-frontend** Public 
The frontend of the Sedimark marketplace
 JavaScript

 **santander-mobility-dashboard** Public 
This project is a web dashboard for visualizing and analyzing mobility data in Santander, focused on bicycle usage, stations, and routes.
 Vue

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Find us on GitHub: <https://github.com/Sedimark/>

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