



# Digital heritage as social network

STLAB 3/6/21

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dutch digital  
heritage  
network

# digital information in heritage institutions

On a basic level, institutions succeed in organising themselves in a decentralized fashion

Each manages own collections and exposes data with varying degrees of automation and in-house know-how

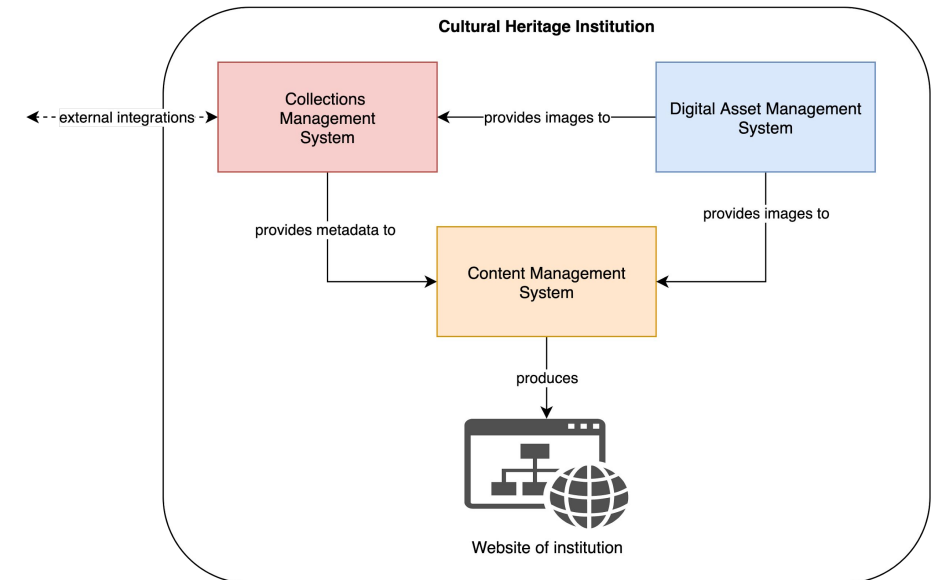
Common setup is a combination of

Collections Management System (metadata)

Digital Asset Management System (media)

Content management System (dissemination website)

Exchange data with other institutions, service provider (eg. archive) or applications (eg. portals) → network



# Upscaling leads to intermediate layers

Institutions often need to scale-up their operations

- exposing collection data together
- approach new audiences or new forms of dissemination

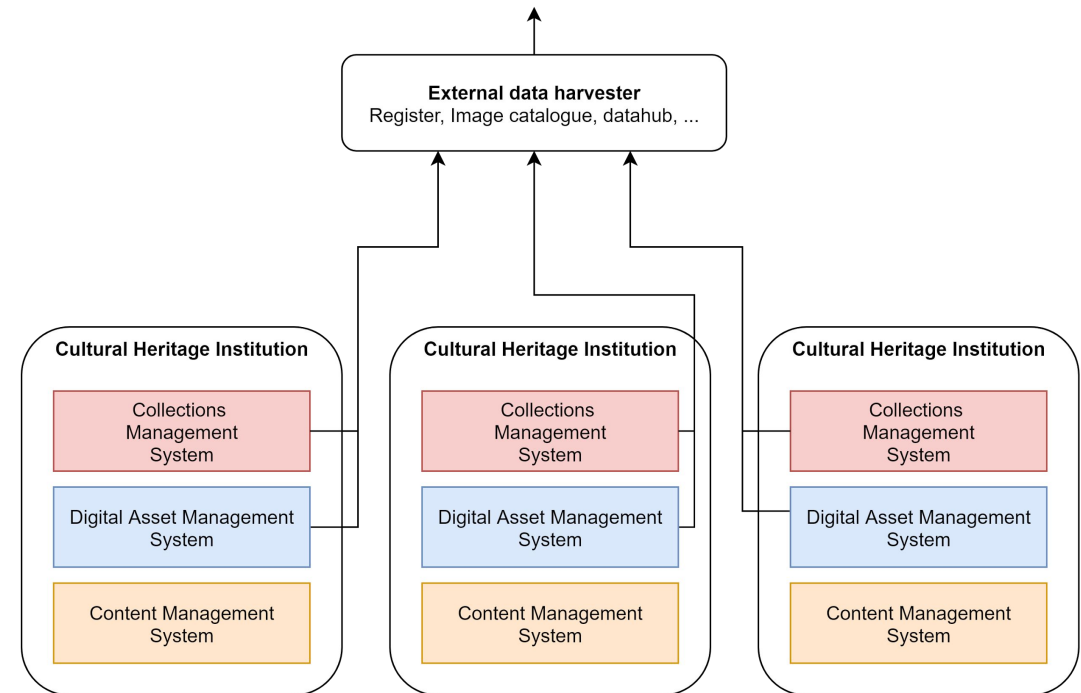
This is not steered by technology, but rather by politics (in the broad sense)

short-term regional, thematic, or project-based efforts

Integrations are short-lived

eg. budget ends, know-how disappears, or change in strategy

For technology,  
the question is **not how to stop the constant reorientation** of collection data, but how to **support it**



# Choice of technology facilitates reorientation

The technical solution's role is introducing flexibility

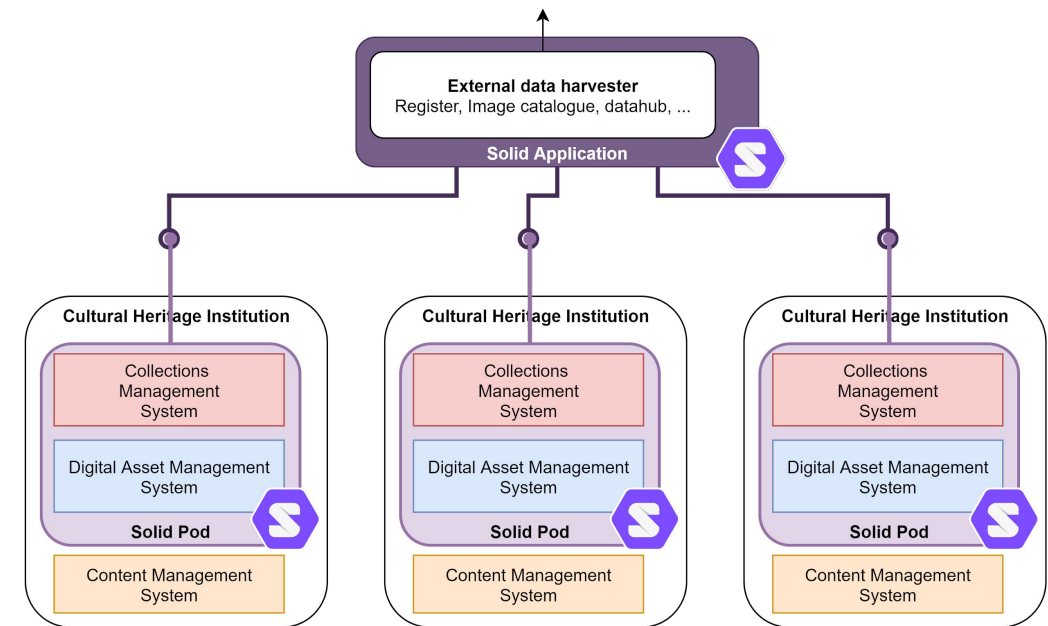
Facilitate a fast reorientation of institutions towards new integrations or networks

P2P integrations are a common, but costly solution

- each institution/harvester has a different system/data model
- custom integration to a central data harvester or aggregator
- more or less rebuild from scratch every time

Solid can possibly make a difference

integrate systems & data in a loose-coupled interoperable network



# Digital heritage as social network

**Solid as basis for flexible cultural heritage data exchange**

The Dutch Digital Heritage Network

Solid and a Decentralized Web

Building blocks for a decentralized  
heritage network



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**Solid as basis for flexible cultural heritage data exchange**

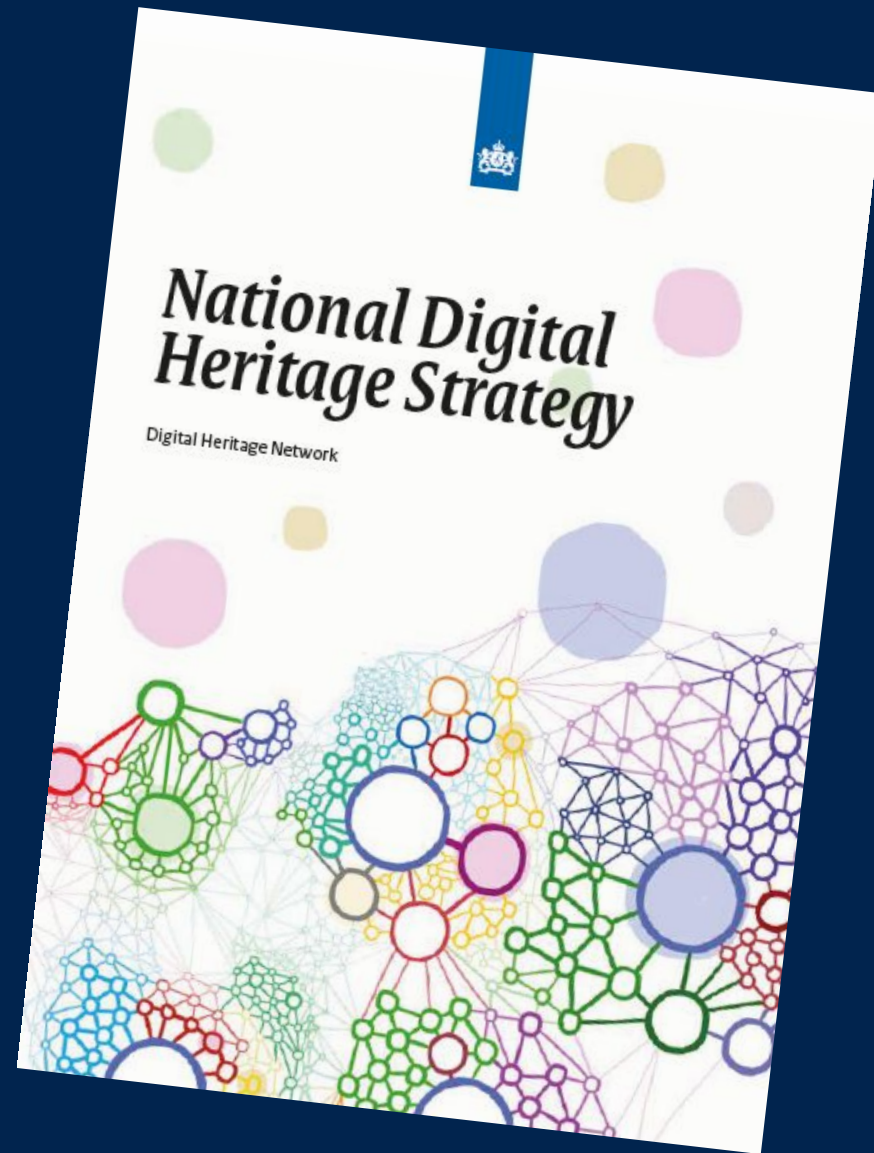
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# The Dutch Digital Heritage (NDE) Programme





# Bridging networks

Seeking cooperation between:

- about 1500 organizations
- libraries, archives, museums, other institutions
- national, regional, local networks
- using different IT environments
- many different goals and funding schemes

Aligning digital activities

- improving digital visibility
- publication and reuse of digital information
- exchanging knowledge and information





# Overview of the NDE programme

## Visible

Service providers



Usage profiles



Campagne & channel



Rights & Usage

## Usable

Infrastructure providers



Data & Terminology Sources (LOD)



Registries



Aggregators



Knowledge Graph

## Sustainable

Source providers



PID



Preservation Policy & Certification



Cost model Preservation



Index Preservation Services

## OVERALL



Supporting Network



Training & Education



Body of Knowledge



Services Toolbox



Service implementation & management

For detailed information: [www.netwerkdigitaalerfgoed.nl](http://www.netwerkdigitaalerfgoed.nl) (also in English)



Focus on  
users

They start at  
Google...

but many  
(long tail)  
topics do not  
show up...

**Fijai savarape - Google Search - Mozilla Firefox**

Google search results for "Fijai savarape". The search did not match any documents.

**NMWW-collectie - Mozilla Firefox**

Search results for "Fijai savarape" on the NMWW-collectie website.

**Oorlogspijl met rieten schacht en houten punt - Fijai**

**Cultuur :** Savarape

**Herkomst :** Zuidoost-Azië: Insulair / Indonesië / Papua (Indonesië) / Papua (pro Noordelijk Papua / Noordoost-Papua

voor 1963

circa 168cm (66 1/8in.)

**Inventarisnummer :** TM-3210-152

**Materiaal :** Bewerking van plantaardige materialen  
hars  
hout  
houtbewerken en houtbewerkingsprocedés  
omwinden  
pyrografie  
rotan

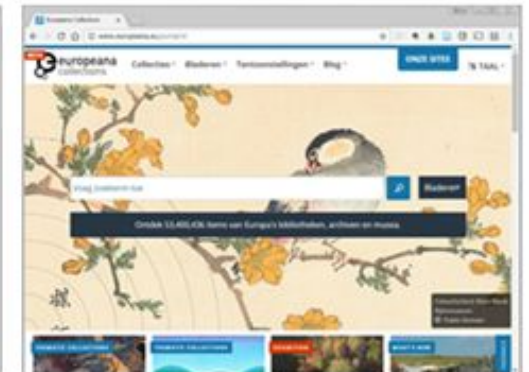
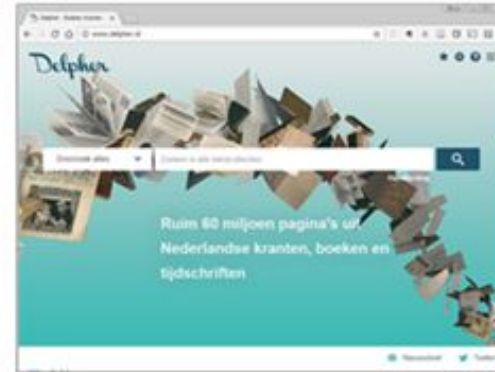
riet  
schilderen op organisch materiaal  
vlechten

**Deelcollectie en trefwoorden :**  
Voorwerpen  
werpwapens, projectielen, vuurwapens en accessoires

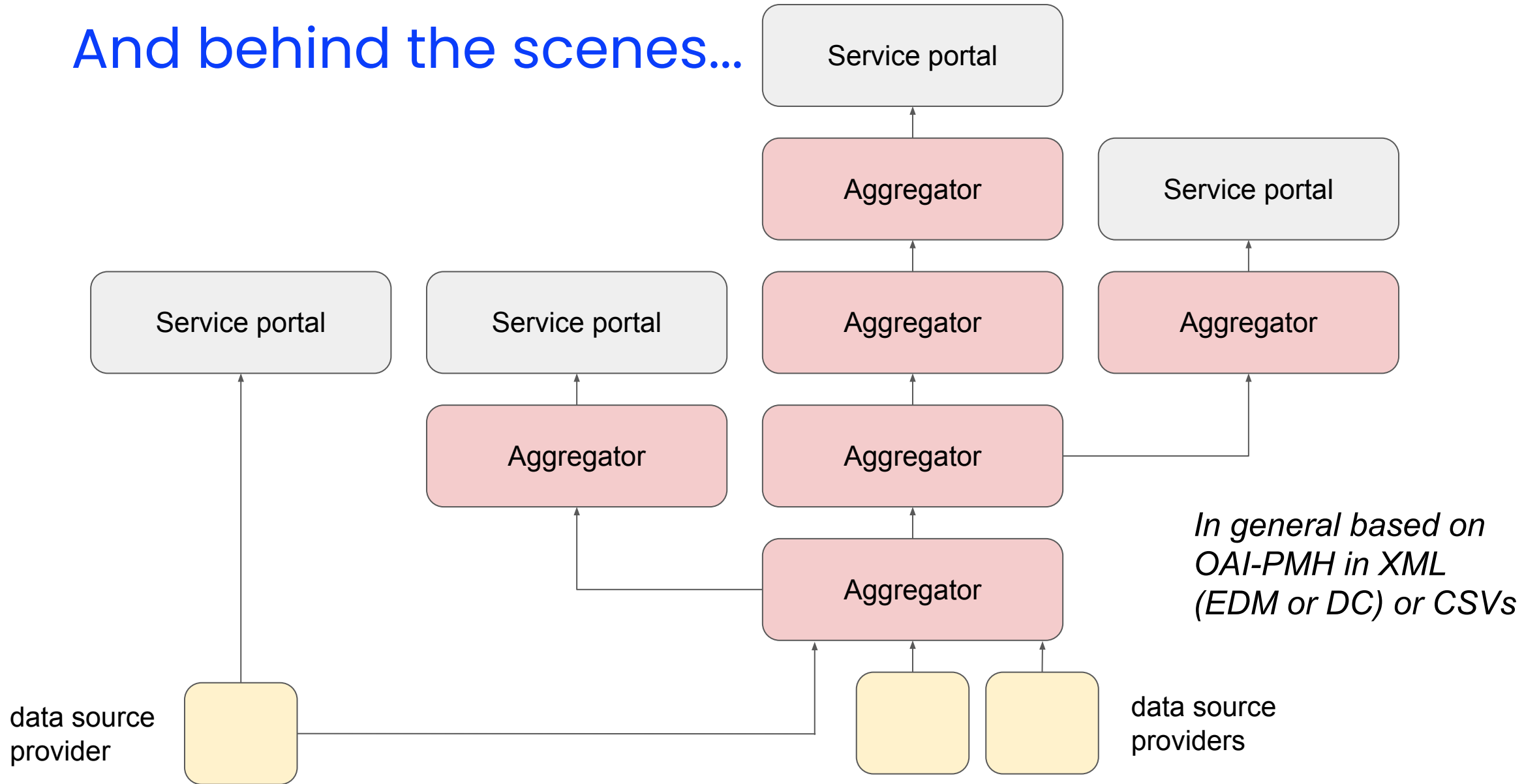
# So we have many portals!

but:

- which one to choose?
- can I browse from one portal to another?

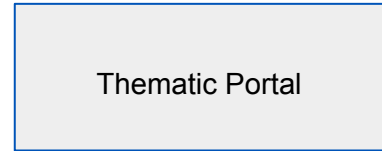


And behind the scenes...



# Rebuilding the network step-by-step

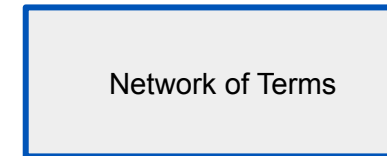
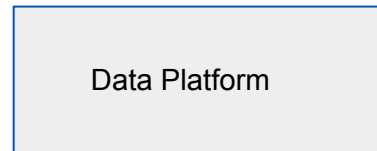
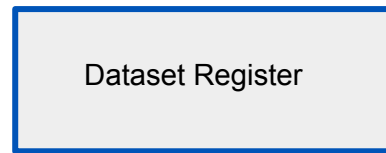
*Services*



*Networks*

“select what is relevant”

“from aggregation to  
federation”

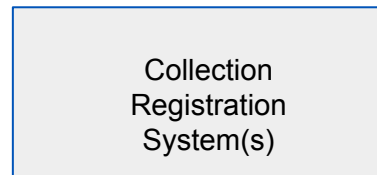


*Sources*

“advertise your data”

“be visible on  
the web”

“use things not strings”



# Decentralized Web as implementation strategy?

**ErfgoodPOD project – NDE & meemoo & Ghent University – 2020 / 2023**

*Are the principles of a decentralized social network - actors announcing, sharing & following their own information - a good basis for implementing a sustainable digital heritage network?*

Feasibility study on the applicability of Solid to digital heritage use cases

- not people, but institutions, service providers and applications
- not personal data, but metadata about collections
- provide missing building blocks: protocols, architecture & component blueprints
- support the Dutch (Digital Heritage Network) and the Flemish context



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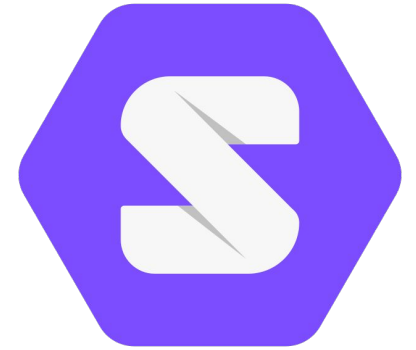


# Solid (Socially Aware Cloud Storage)

Started as **alternative vision at MIT** for the growing dominance of personal data on the Web by a limited number of big players (Facebook, Google, Twitter, etc.).

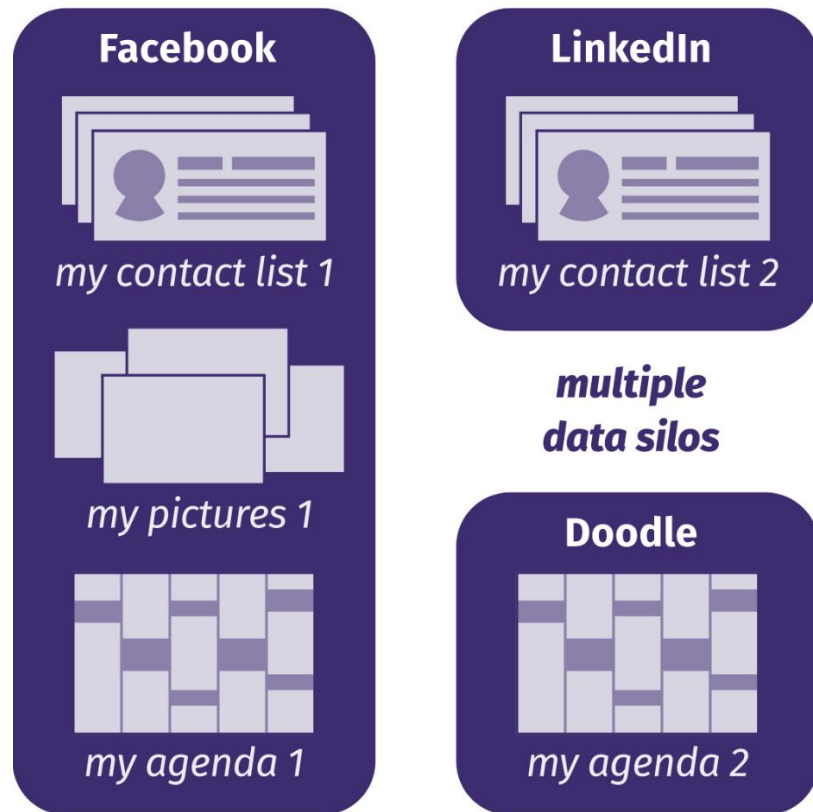
Builds the necessary principles, best practices, standards, and software components to **redcentralize data and services**.

Starts from a personal data pod from which users **manage and control their own data**, and grant applications selective access to the contents of the pod.

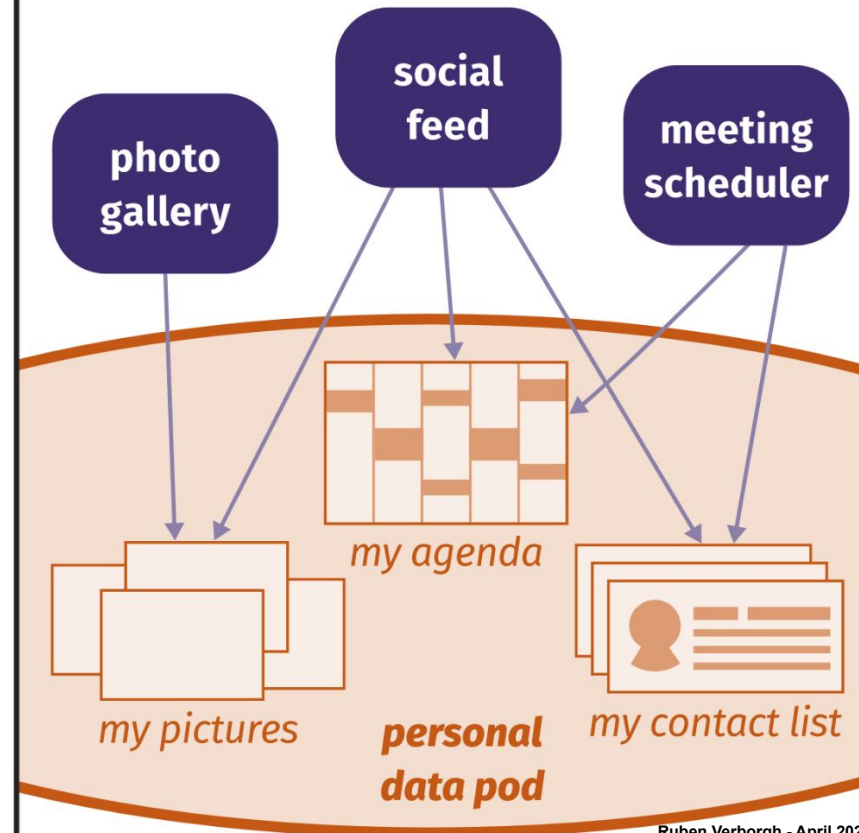


# Data is hosted in a (personal) data pod

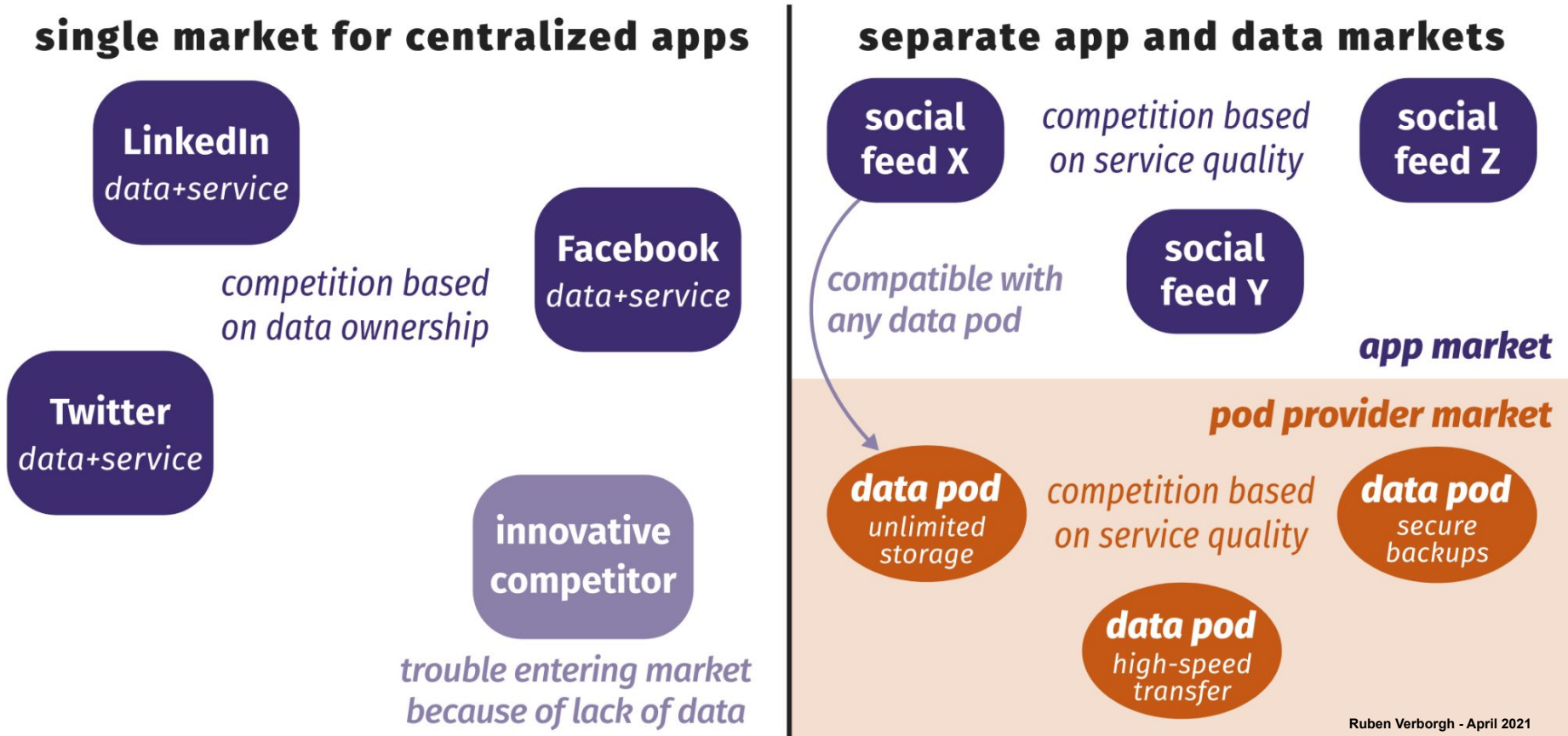
## centralized Web applications



## decentralized Web applications



# Separating app and storage competition drives innovation and increases mobility.



# Solid technical reports

Output of the Solid Community Group (CG): <https://solidproject.org/TR/>

- open protocols to establish Solid/Decentralized Web networks
- based on w3c standards: HTTP, Linked Data, LDP, LDN, OpenID, ...

<a href="#"><u>Solid Ecosystem</u></a>	Definition of data pods and application + interfaces & communication	<a href="https://github.com/solid/specification"><u>https://github.com/solid/specification</u></a>
<a href="#"><u>Solid Protocol</u></a>		<a href="https://github.com/solid/specification"><u>https://github.com/solid/specification</u></a>
<a href="#"><u>Solid OIDC</u></a>	Authentication	<a href="https://github.com/solid/authentication-panel"><u>https://github.com/solid/authentication-panel</u></a>
<a href="#"><u>Web Access Control</u></a>	Authorization	<a href="https://github.com/solid/web-access-control-spec"><u>https://github.com/solid/web-access-control-spec/</u></a>
<a href="#"><u>Solid Application Interoperability</u></a>	Possible interop models	<a href="https://github.com/solid/data-interoperability-panel"><u>https://github.com/solid/data-interoperability-panel</u></a>
<a href="#"><u>Shape Trees</u></a>	Data structures in the data pod	<a href="https://github.com/shapetrees/specification"><u>https://github.com/shapetrees/specification</u></a>
<a href="#"><u>Solid DID Method</u></a>	Decentralized identity provider	<a href="https://github.com/solid/did-method-solid"><u>https://github.com/solid/did-method-solid</u></a>

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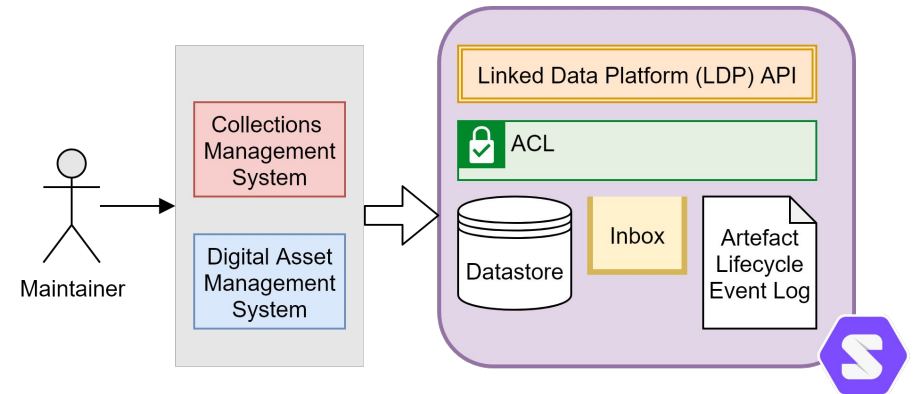


# Data Pod as main metadata exchange hub

Cultural Heritage Pod:

Collection metadata is stored in a Solid Data Pod

- Linked Data Platform API to access resources
- Inbox to receive notifications
- ACL layer to manage access control
- (new) immutable log resource that records all events related to artefacts known to the pod



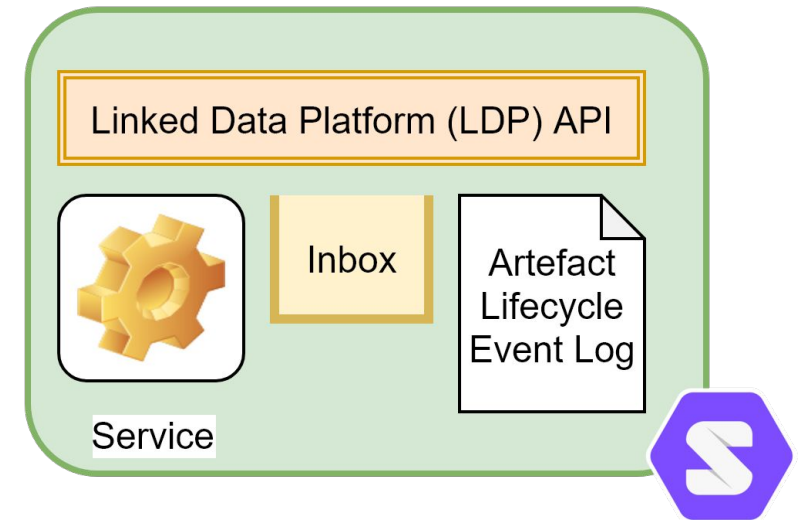
Institutions grant external services (registers, archives, indexes ...) & other institutions selective access to artefacts, metadata about artefacts or other resources.

# Services as provided through Service Hubs

Service Hubs encapsulate services, which are considered black boxes

But they have a minimal interface to participate in the Solid network

- Inbox to receive notifications (exposed through Linked Data Platform API)
- immutable log resource that records all events related to artefacts processed by the service

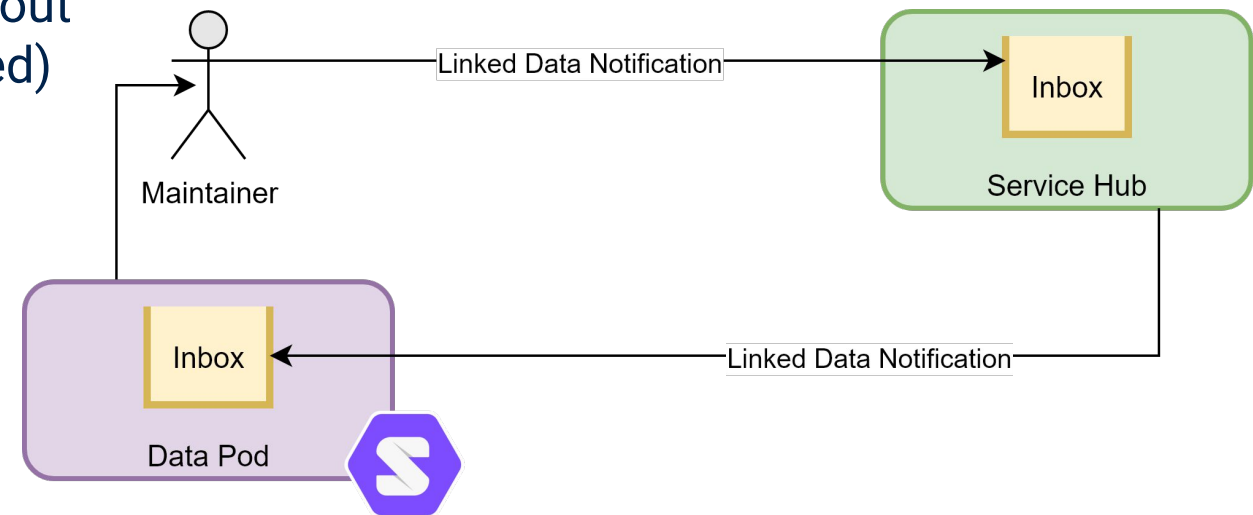


# Communication through notifications

Actors communicate by notifying other actors about artefact lifecycle events (eg. Dataset was created)

Non-committal interaction to ensure loose coupling and scalability

Service Hubs pick up relevant notification and process its contents



## Linked Data Notifications and Activity Streams

- working on a more concrete profile to provide guarantees
- testing decentralized social networking protocol ActivityPub

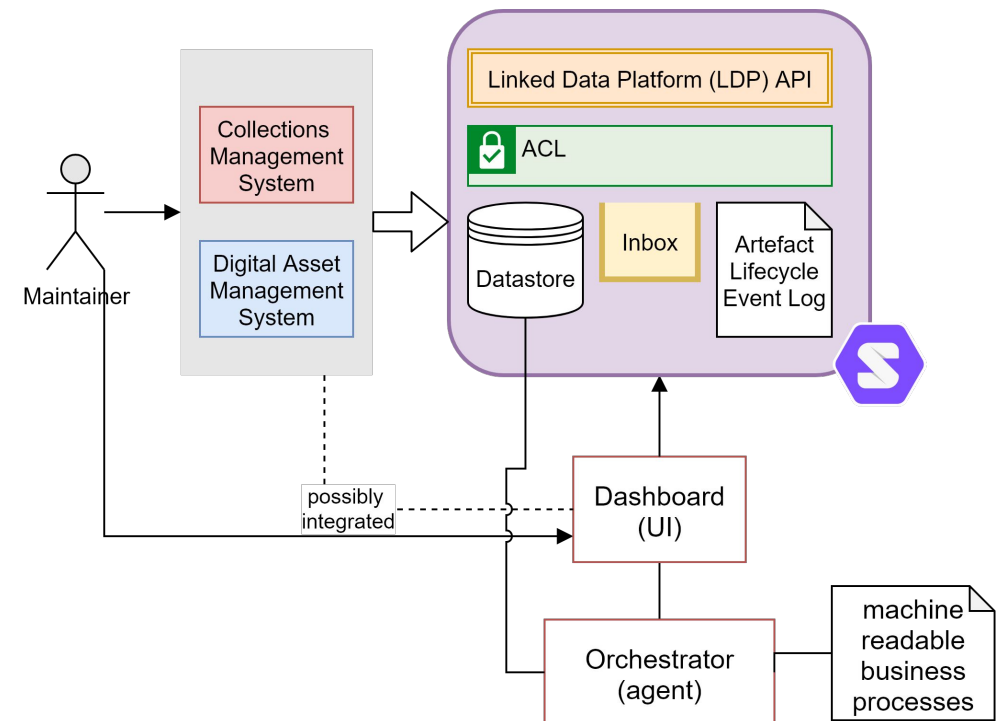
# Orchestration of business processes

A Maintainer can use a **Dashboard** to manually and actively interact with the network (eg. do actions and create notifications)

An **Orchestrator** can interact with the network on behalf of the Maintainer + Data Pod

- operates autonomously
- responds to trigger (eg. notifications)
- driven by machine-readable business processes

Business process policies consolidate personal preference, institution policy and ecosystem policy



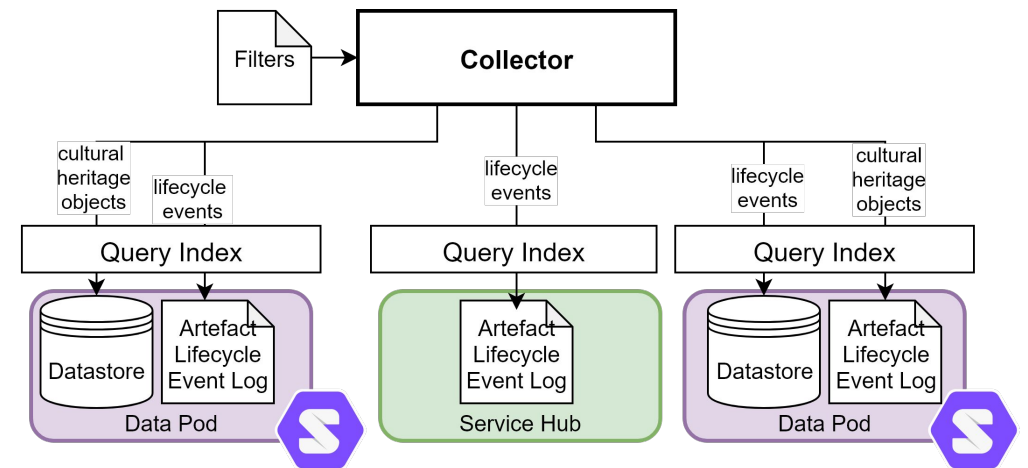
# Collecting distributed information

The Collector collects information about an specific artefact from distributed sources in a async manner  
→ targeted crawling

- lifecycle reconstruction (“what happened to ...”)
- object discovery (“artworks using oilpaint”)

How ensure integrity of information?

- focus on practical, best-effort solutions
- create redundancy in the distributed Artefact Lifecycle Event Logs
- sign individual events or notifications (eg. Linked Data signatures)



# Apply building blocks to the NDE design

## Services

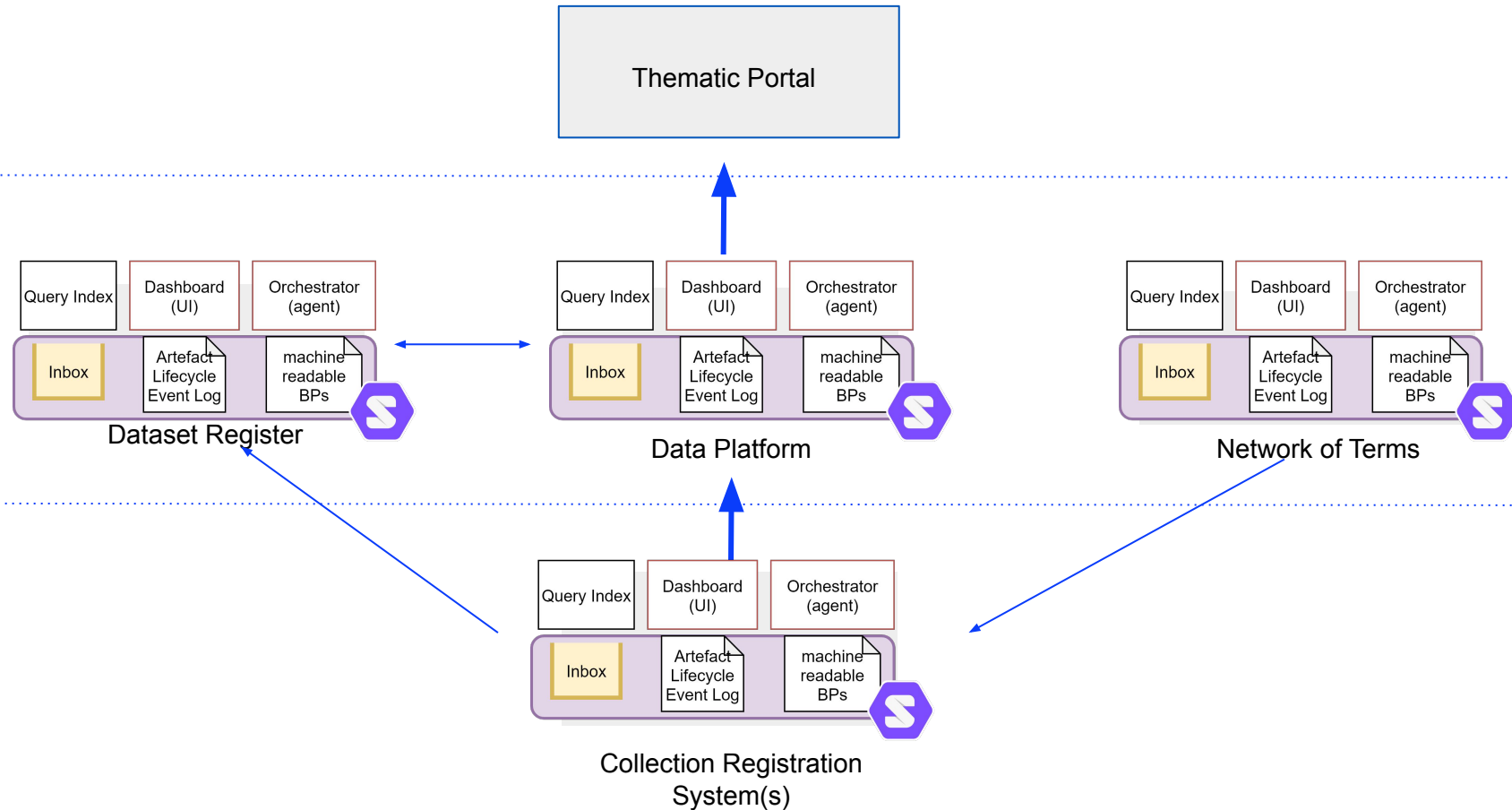
*Service Hub*  
*+ Solid App*

## Networks

*Service Hub +*  
*Solid Data Pod*

## Sources

*Solid Data Pod*





# Project structure

Collaboration of three projects

a shared generic foundation and output: protocols, architecture & components

individual use cases: business processes & profiles

Digital Heritage  
(ErfgoedPod project)

Scientific communication  
(ResearcherPod project)

Building construction  
(PhD scholarship)

Protocols and components for  
generic decentralized artefact exchange networks

# Specifications and deliverables

## ErfgoedPod

<u>Common setups</u>	Common software setups in Cultural Heritage institutions to set baseline
<u>Use cases</u>	Reference business processes in the digital heritage domain
<u>Architecture</u>	Implementation specification of a decentralized digital heritage network

## Shared

<u>Orchestrator</u>	Specification of the Orchestrator component.
<u>Data Pod</u>	Implementation guidelines and additional requirements for Solid data pods.
<u>Rule language</u>	Specification of the rule language to create executable business processes.
<u>Artefact Lifecycle Event Log</u>	Implementation requirements for the Artefact Lifecycle Event Log.
<u>Notifications</u>	Specification of the possible notifications that can be used in the network.

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 @miel\_vds



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