



Solid as foundation for Digital Heritage Networks

**Solid Amsterdam Meetup
6 Oktober 2022**

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**dutch digital
heritage
network**

Contents

1. National Digital Heritage Strategy and Useable program architecture
2. Collection registration with Solid
3. Digital heritage as Value-Adding Network
4. Lessons learned



National Digital Heritage Strategy

The Dutch Digital Heritage Network (NDE) aims at **increasing the social value of the cultural heritage information** maintained by libraries, archives, museums and other cultural institutions.

The NDE strategy starts from the **end user perspective** and encourages institutions to provide digital heritage information that is more **visible, usable and sustainable**.

The NDE program is about building strong **cross sector networks** on the level of **expertise and information**. **Linked Data** is regarded as one of the enabling technologies.



Roadmap for the NDE discovery infrastructure

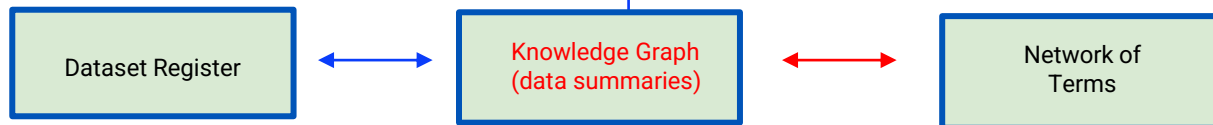
Services

$n = 2029$



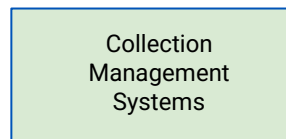
Network

$n = 41$



Sources

$n = 1560$



"advertise your data"

*"improve the visibility on
the web"*

"use things not strings"

"discover relevant datasets"

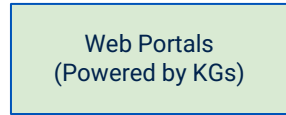
"smarter, more dynamic services"



Is Solid a suitable implementation layer?

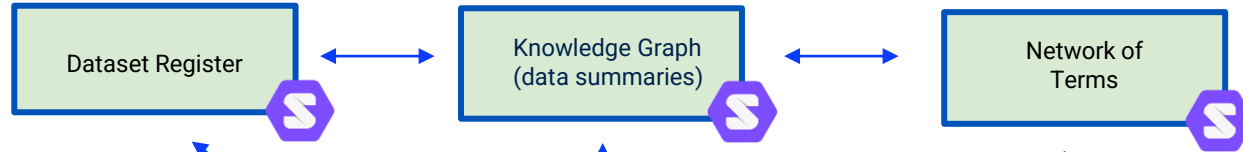
Services

$n = 2029$



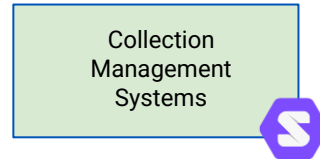
Network

$n = 41$



Sources

$n = 1560$



Is Solid a suitable implementation layer?

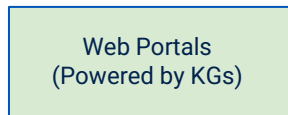
- Linked Data at the core - based on the Linked Data Platform specification
- Fits well in our decentralised view on the digital heritage network
- Lowers barriers for publishing data
- Comes with authentication (for identifying network participants)
- Has integrated communication techniques (notifications)
- It could enable new forms of cooperation such as:
 - sharing data between organisations (collection sharing)
 - co-creating with users (feedback, corrections, additions)
 - enabling the development of third-party apps
 - interoperability and enhanced choice in third-party (data) services



Solid as implementation layer: SolidCRS

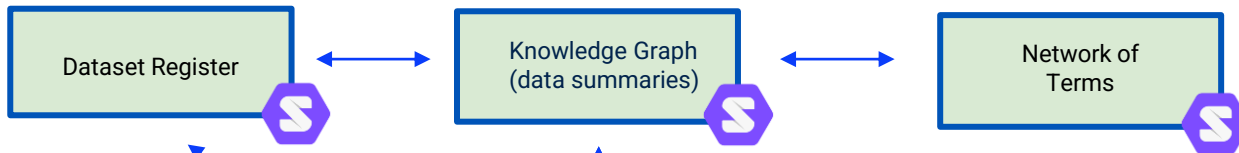
Services

$n = 2029$



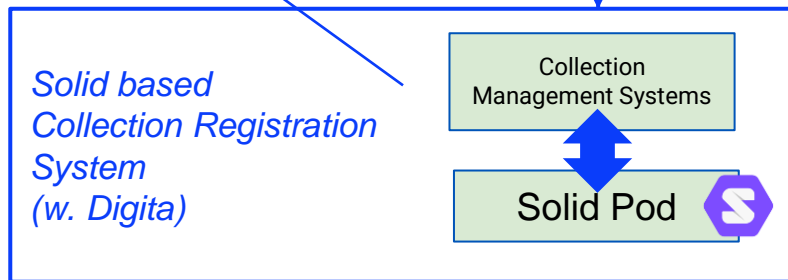
Network

$n = 41$



Sources

$n = 1560$



Miel Vander Sande

Zoeken

Bruikleen

Collecties +

Nieuwe collectie

Nieuwe collectie



Erfgoedobjecten

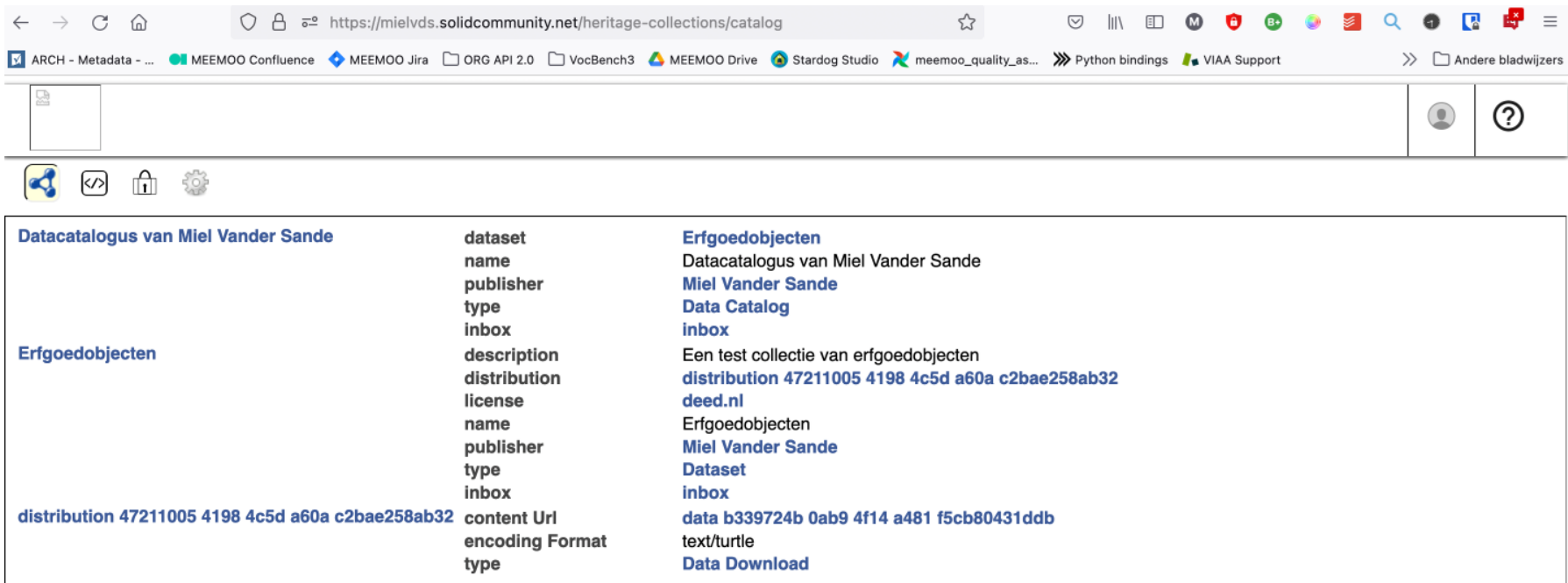
Een test collectie van erfgoedobjecten



Maak je eerste object aan

[Object aanmaken](#)

Collection descriptions are stored in Solid Pod



The screenshot shows a web browser window with the URL <https://mielvds.solidcommunity.net/heritage-collections/catalog>. The browser's taskbar at the top lists several applications: ARCH - Metadata, MEEMOO Confluence, MEEMOO Jira, ORG API 2.0, VocBench3, MEEMOO Drive, Stardog Studio, meemoo_quality_as..., Python bindings, and VIAA Support. Below the browser window, there are four icons: a share icon, a code icon, a lock icon, and a gear icon.

Datacatalogus van Miel Vander Sande	dataset	Erfgoedobjecten
	name	Datacatalogus van Miel Vander Sande
	publisher	Miel Vander Sande
	type	Data Catalog
	inbox	inbox
Erfgoedobjecten	description	Een test collectie van erfgoedobjecten
	distribution	distribution 47211005 4198 4c5d a60a c2bae258ab32
	license	deed.nl
	name	Erfgoedobjecten
	publisher	Miel Vander Sande
	type	Dataset
	inbox	inbox
distribution 47211005 4198 4c5d a60a c2bae258ab32	content Url	data b339724b 0ab9 4f14 a481 f5cb80431ddb
	encoding Format	text/turtle
	type	Data Download



Creating objects

← → ↻ 🏠 🔒 📄 https://solid-crs.netwerkdigitaal erfgoed.nl/object/https%3A%2F%2Fmfielvds.solidcom... 📧 📄 📄 📄 📄 📄 🔍 📄 📄 📄 📄

🔄 Miel Vander Sande

Zoeken

🔍

Bruikleen

Collecties ⊕

Erfgoedobjecten

📁 Zonnebloemen

Zonnebloemen is een serie stillevens gemaakt door de bekende Nederlandse kunstschilder Vincent van Gogh. Van de serie zc

✕ 📄 🗑️

Onderdelen

Beeldmateriaal

Identificatie

Vervaardiging

Voorstelling

Afmetingen

Bruikleen

📄 Identificatie

De identificatie van dit object.

Objectnummer

Dit veld is verplicht.

Type

Dit veld is verplicht.

Titel

De naam van het object. Bijvoorbeeld 'De Nachtwacht'.

Korte beschrijving



Integration with Network of Terms

The screenshot shows a web browser window with the URL <https://solid-crs.netwerkdigitaalergoed.nl/object/https%3A%2F%2Fmielvds.solid.com>. The page title is 'Zonnebloemen' and the description is 'Zonnebloemen is een serie stillevens gemaakt door de bekende Nederlandse kunstschilder Vincent van Gogh. Van de serie zonnebl'. The interface is divided into several sections:

- Left sidebar:** Contains navigation options: 'Miel Vander Sande', 'Zoeken' (with a search input field), 'Bruikleen', 'Collecties', and 'Erfgoedobjecten' (highlighted).
- Top right:** Contains 'Onderdelen' and 'Type' sections.
- Center:** A search input field with 'Schilderij' entered, and a list of terminology sources with checkboxes. The 'Art & Architecture Thesaurus' is selected.
- Right side:** Contains 'Bevestig' and 'Annuleren' buttons, and a preview area showing a 'Zonneluik' (sun panel) with a metal frame and a sun-shaped painting.

Realtime search in terminology sources from SolidCRS



<https://termennetwerk.netwerkdigitaalergoed.nl>



Store links between object and terms

The screenshot shows a web browser window with the URL <https://solid-crs.netwerkdigitaal erfgoed.nl/object/https%3A%2F%2Fmielvds.solid.com>. The page title is 'Zonnebloemen' and the description is 'Zonnebloemen is een serie stilleven's gemaakt door de bekende Nederlandse kunstschilder Vincent van Gogh. Van de st...'. The page is divided into a sidebar and a main content area.

Sidebar:

- Miel Vander Sande
- Zoeken
- Bruikleen
- Collecties
- Erfgoedobjecten

Main Content Area:

Zonnebloemen
Zonnebloemen is een serie stilleven's gemaakt door de bekende Nederlandse kunstschilder Vincent van Gogh. Van de st...

Onderdelen

- Beeldmateriaal
- Identificatie
- Vervaardiging**
- Voorstelling
- Afmetingen
- Bruikleen

Vervaardiging
De vervaardiging van dit object.

Vervaardiger

Gogh, Vincent van (1853-1890)

De persoon die het object heeft vervaardigd. Bijvoorbeeld 'Peter Paul Rubens' of 'Vincent van Gogh'. Dit veld kan meerdere vervaardigers bevatten.

Plaats

Amsterdam (NL)

De plaats waar het object is vervaardigd. Bijvoorbeeld 'Amsterdam' of 'Leuven'. Dit veld kan meerdere plaatsen bevatten.

Materiaal

olieverf op doek

Het materiaal dat is gebruikt bij de vervaardiging van het object. Bijvoorbeeld 'karton', 'olieverf' of 'papier'. Dit veld kan meerdere materialen bevatten.

Datum



Object descriptions are stored in Solid Pod

The screenshot shows a web browser displaying a Solid Pod. The address bar shows the URL: `https://mielvds.solidcommunity.net/heritage-collections/catalog#collection-eb789e99`. The page content is as follows:

Description: Een test collectie van erfgoedobjecten

Distribution: **distribution 47211005 4198 4c5d a60a c2bae258ab32**

Content Url: **data b339724b 0ab9 4f14 a481 f5cb80431ddb**

Gogh, Vincent van (1853-1890)	name	Gogh, Vincent van (1853-1890)
ezelstukken	name	ezelstukken
olieverf op doek	name	olieverf op doek
Zonnebloemen	additional Type	ezelstukken
	creator	Gogh, Vincent van (1853-1890)
	description	Zonnebloemen is een serie stillevens gemaakt door de bekende Nederlandse kunstschilder Vincent van Gogh. Van de serie zonnebloemen bestaan er drie schilderijen met vijftien zonnebloemen in een vaas en twee schilderijen met twaalf zonnebloemen in een vaas.
	Identifier	1
	is Part Of	Erfgoedobjecten
	location Created	Amsterdam (NL)
	main Entity Of Page	object 39d86ce5 48ed 4d92 80eb 210f25295e5e digital
	maintainer	Miel Vander Sande
	material	olieverf op doek
	name	Zonnebloemen
	type	Creative Work
object 39d86ce5 48ed 4d92 80eb 210f25295e5e digital	content Url	Sunflowers.jpg
	license	deed.nl
	main Entity	Zonnebloemen
	type	Image Object
Amsterdam (NL)	name	Amsterdam (NL)

Encoding Format: text/turtle

Type: [Data Download](#)



Solid as implementation layer: ErfgoedPod

Services

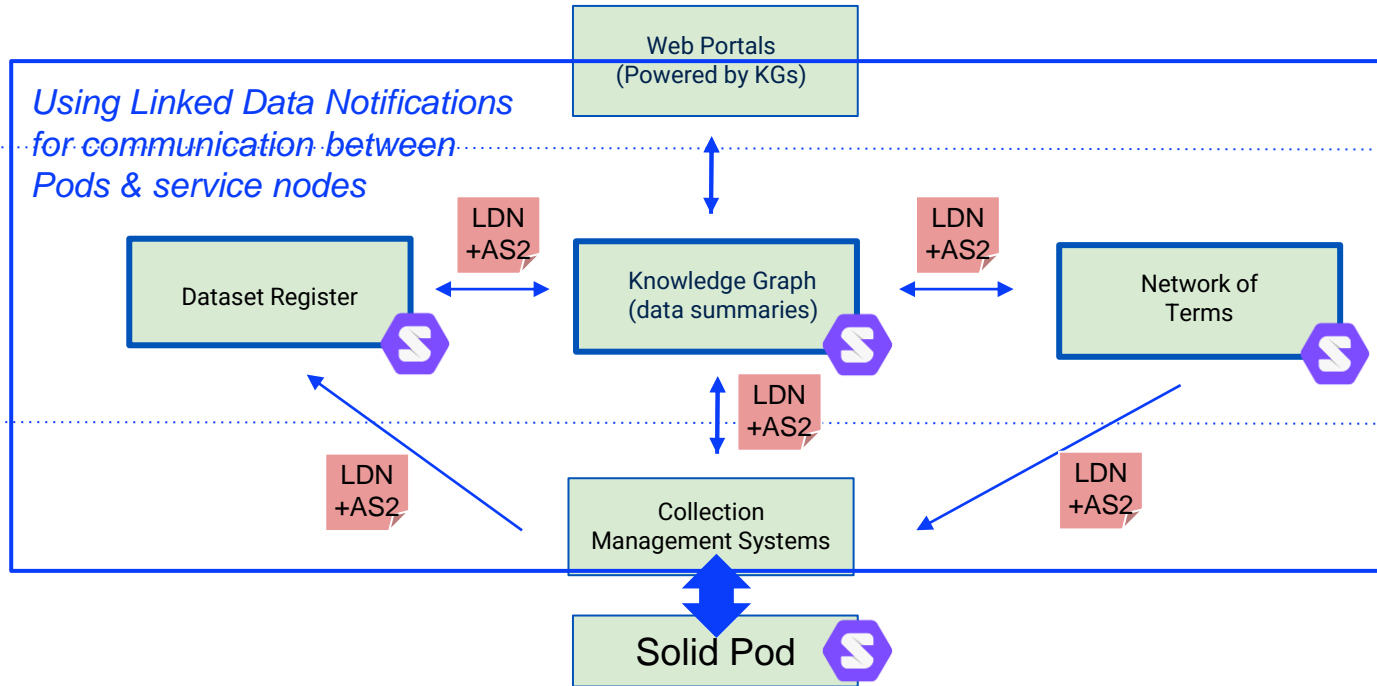
$n = 2029$

Network

$n = 41$

Sources

$n = 1560$



Event Notifications in Value-Adding Networks

- 1 Introduction
- 2 Conformance
- 3 Document Conventions
- 4 Network entities
 - 4.1 Agent
 - 4.2 Artifact
 - 4.3 Data Node
 - 4.4 Service Node
 - 4.5 Service Result
- 5 Properties in LDN+AS2 Notifications
 - 5.1 JSON-LD id
 - 5.2 JSON-LD type
 - 5.3 AS2 object
 - 5.4 AS2 actor, AS2 origin, and AS2 target
 - 5.5 AS2 context
 - 5.6 AS2 inReplyTo
- 6 Network communication patterns
 - 6.1 One-way communication patterns
 - 6.1.1 Data Node to Service Node

Event Notifications in Value-Adding Networks

Living Document, 23 September 2022

This version:

<https://www.eventnotifications.net>

Latest published version:

<https://www.eventnotifications.net>

Previous Versions:

<https://www.eventnotifications.net/0.1/>

Issue Tracking:

[GitHub](#)

[Inline In Spec](#)

Editors:

[Patrick Hochstenbach](#) (Ghent University Library)


[Miel Vander Sande](#) (meemoo - Flemish Institute for Archives)

[Ruben Dedecker](#) (IDLab - Ghent University)

[Paul Walk](#) (Antleaf)

[Martin Klein](#) (Los Alamos National Laboratory)

[Herbert Van de Sompe!](#) (IDLab - Ghent University)

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<https://www.eventnotifications.net>



Digital heritage as Value-Adding Network

Output of collaboration with mellon foundation research project ResearcherPod

Decentralized “Value-Adding” network:

- Artifacts (Web resources) made available by nodes
- Nodes add ‘value’ to Artifacts (= events), eg. register, archive, loan, review
- value & service is determined by the domain (= dutch digital heritage network)
- communicate about value using push-based notifications

Linked Data Notifications with ActivityStreams 2.0 payload (JSON-LD preferred)

Solid is not required, but is a very suitable implementation layer



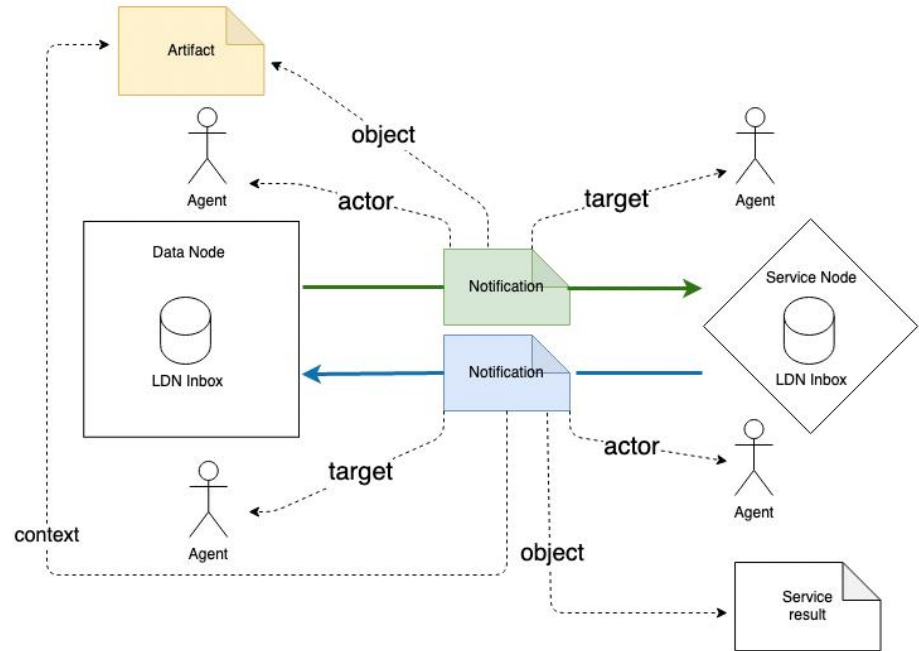
Network Entities

Artifact: resource; primary focus of interaction (e.g. dataset, heritage object, document)

Data Node: host artifacts; inbox

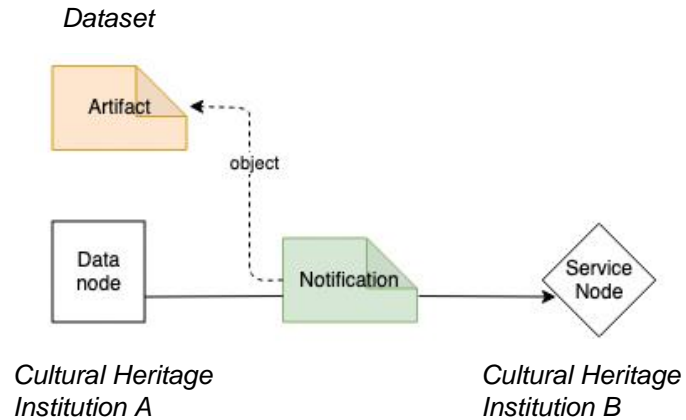
Service Node: provides a service (which adds value to the artifact)

Agent: administrator; addressable via WebID



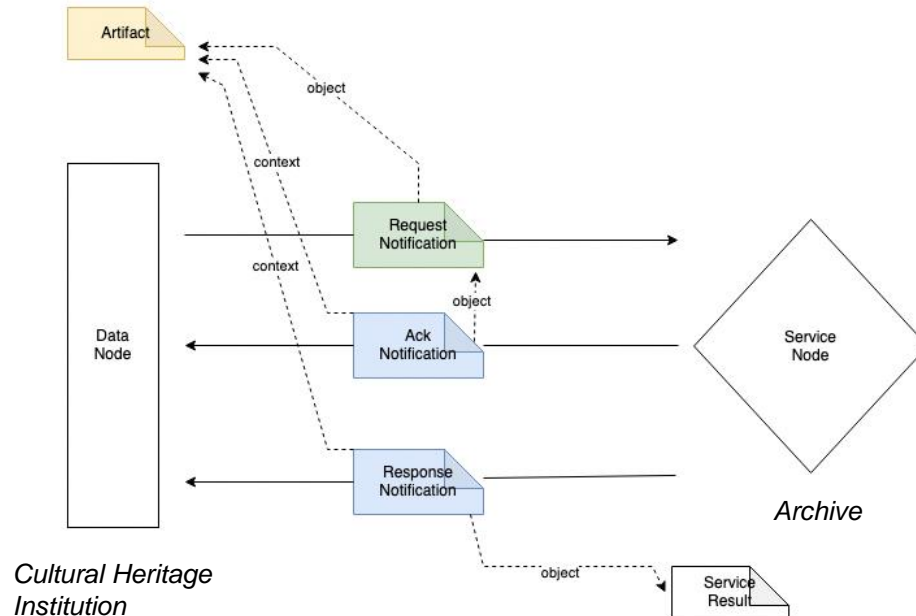
One-way pattern

“I performed this activity on an Artifact” - Informative; no response/result expected



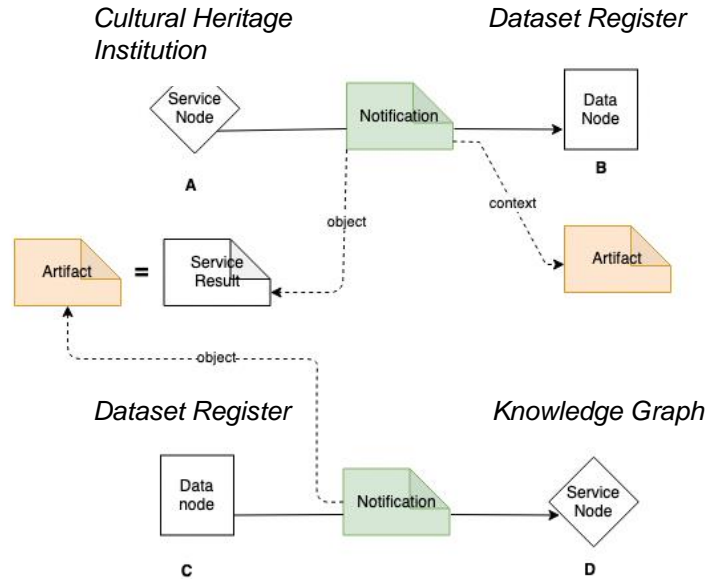
Request-response pattern

Provisioning of value-added service; more elaborate back and forth
initiator expects response (but not instant)

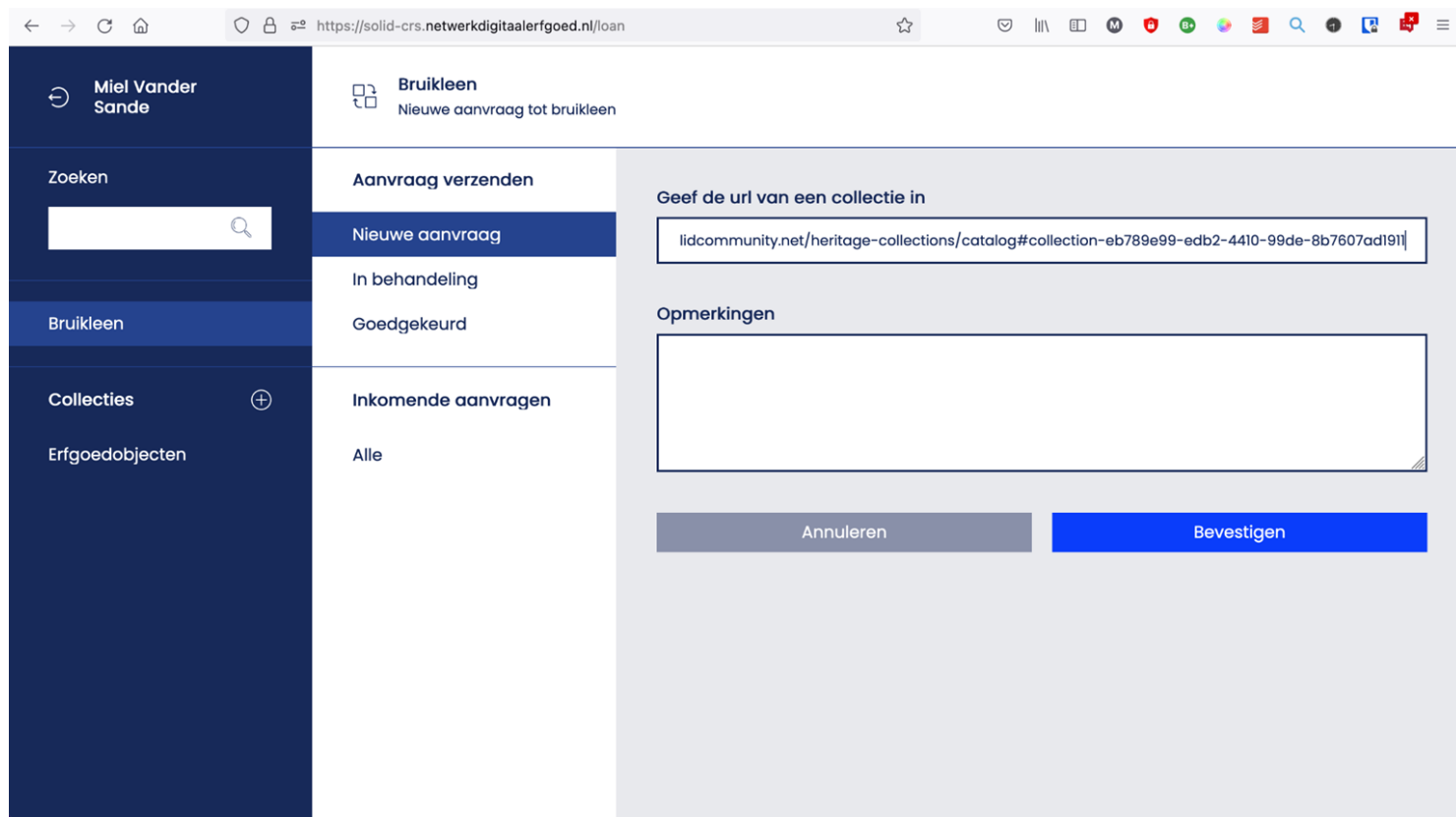


Chained pattern

More complex workflows; chain of actions through the network



Collection loan - extension to SolidCRS



← → ↻ 🏠 🔒 https://solid-crs.netwerkdigitaalergoed.nl/loan ☆ 📧 📄 📅 📁 📧 📧 📧 📧 🔍 📱 📧 ☰

↶ Miel Vander Sande

Bruikleen
Nieuwe aanvraag tot bruikleen

Zoeken

Bruikleen

Collecties ⊕

Erfgoedobjecten

Aanvraag verzenden

Nieuwe aanvraag

In behandeling

Goedgekeurd

Inkomende aanvragen

Alle

Geef de url van een collectie in

Opmerkingen

Annuleren Bevestigen



Notification is delivered to LDN Inbox



The screenshot shows a web browser window with the address bar containing the URL `https://mielvds.solidcommunity.net/heritage-collections/inbox/`. Below the address bar, there is a navigation bar with icons for home, back, forward, and refresh. The main content area displays a notification for the file `d9e15c2b 6550 45b9 9328 0c86289d0ab2.ttl`. The notification details are as follows:

<code>d9e15c2b 6550 45b9 9328 0c86289d0ab2</code>	type	Offer
	actor	Miel Vander Sande
	object	Erfgoedobjecten
	origin	collectiebeheersysteem
	summary	Bruikleen aanvraag
	target	Miel Vander Sande

A green plus sign is visible in the bottom left corner of the browser window.



Lessons Learned (so far...)

- Linked Data in the core is very powerful
- Separate POD Provider + Identity Provider + Client application = complexity
- Authentication (WebIDs) can still be a barrier for adoption?
- Strong dependency on external parties / infrastructure / toolkits
- Working with Solid requires a different mindset
- Challenges wrt. semantic data modelling and integration remain



Lessons Learned (so far...)

- Real-world use cases are needed to mature the Solid ecosystem
- Some existing protocols are 'too generic' (LDN, AS2) for direct real-world use
- Creating data nodes is pretty easy using Solid pods
 - trivial to setup an LDN Inbox + authorization + APIs
- A few message types and patterns can cover most essential communication in a digital heritage network
 - A test implementation using Solid indicates scalability
- Funds like “Innovatiebudget Digitale Overheid”, especially in combination with largere research funds like Mellon, are important enablers



Thanks for your attention!

Please contact us tech@netwerkdigitaalergoed.nl for any additional information!

