



Building business applications with Solid

Bridging the gap between theory and practice



Nice to meet you




Michael
Schoenmaekers
CTO & Architect

2 years hands on experience with
Solid Protocol, event sourcing &
CQRS

michael@lemon.be



LinkedIn

 **Lemon** your **digital partner** with business **impact**



www.lemon.be

Cutting edge vs bleeding edge

/ No Stack Overflow to the rescue

/ Start-up context + bleeding edge forces you to make pragmatic decisions

/ Use it when it make business sense

The screenshot shows the Stack Overflow interface. The top navigation bar includes the Stack Overflow logo, a search bar, and a 'Products' link. The left sidebar contains navigation links for Home, Questions, Tags, Saves, Users, and Companies, along with a 'LABS' section. The main content area is titled 'Tags' and includes a search bar with the text 'webidl'. Below the search bar, there are three tag cards for 'sap-web-ide', 'web-ide', and 'webidl', each showing the number of questions and the number asked this year. A second screenshot below shows search results for 'solid'. The search bar contains 'solid' and there are tabs for 'Popular', 'Name', and 'New'. The results are displayed in a grid of tag cards, each showing the tag name, the total number of questions, and the number of questions asked in the current year or month.

Tag	Questions	Asked This Year
sap-web-ide	197	7
web-ide	60	1
webidl	26	1

Tag	Questions	Asked This Year
solid	80	21
solidity	6650	12 (this week), 60 (this month)
solid-principles	1172	5 (this week), 11 (this month)
solidworks	416	45
solid-js	265	5 (this month), 126 (this year)
solid-state-drive	254	16
consolidation	160	7
solidus	92	5
solidworksapi	61	26
nsolid	26	1
solidcolorbrush	22	2
solidworkspdmapi	13	8
solid-start	10	9
ibm-soliddb	8	
solid-bodies	2	
solid-queue	1	



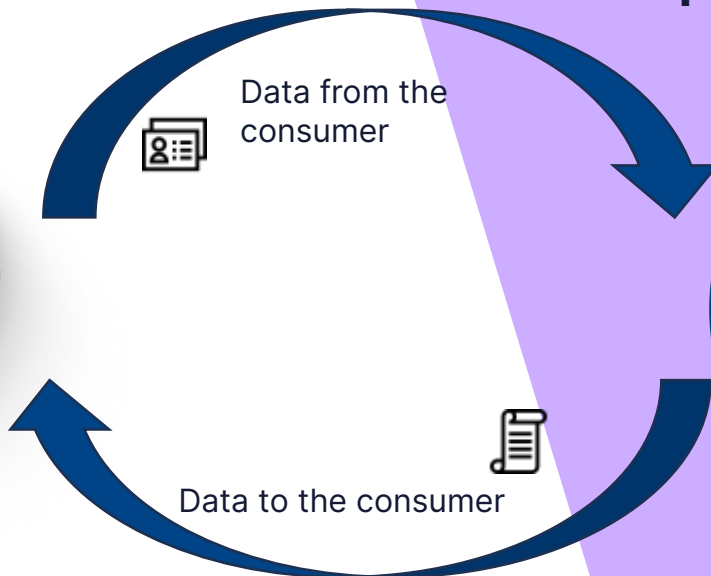
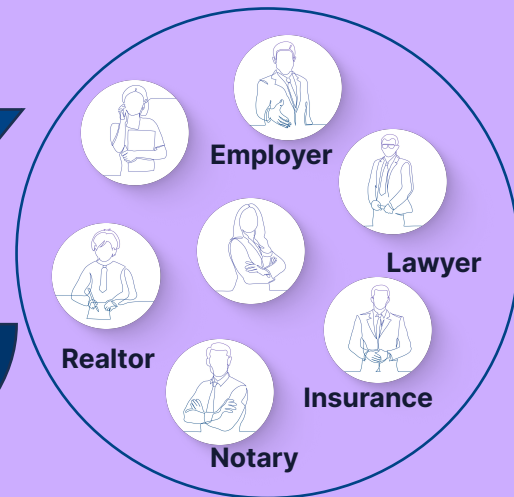
Linckr

Why make it difficult, when you can use Linckr?

Consumers



Providers

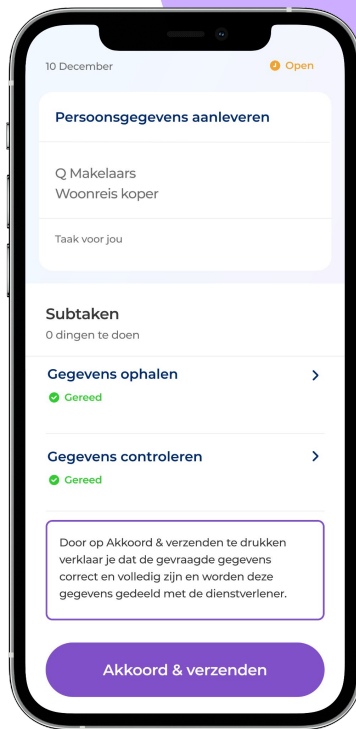


Linckr

Why make it difficult, when you can use Linckr?

Consumers

- / Fetch authentic data with one click
- / **One app** to **share data** with all their **service providers**
- / All your data in your own **personal data vault**
- / No re-entry of data necessary, but **re-use of data**
- / Process guidance across various service providers
- / **Control** and **transparency of shared data**



Providers

- / **Verified** customer identity (EIDHAS high)
- / **Verified data** from authentic sources
- / Better & safer communication with their customers
- / **Compliance** (KYC, AML, GDPR) at less cost
- / **Operational savings** - no manual data capture
- / **Digital import**
- / Better **data quality**

Business requirements

Privacy of consumer

Personal data vault
of choice

Always in control and
consent required

Can cut the
line any time

Reuse and
interoperability of
data

Improve user
experience

Data standards across
industries

Taxonomies

Auditability &
traceability

Every user action

Stored forever

Immutable &
provenance

Process guidance

Tailored

Customer journeys

Configurable

Solid Protocol supports the business

Privacy of consumer

Solid protocol



Consent flows

Reuse and interoperability of data

Linked Data

Zorgeloos Vastgoed

Purchase agreement taxonomy

Auditability & traceability

Event Sourcing

AxonIQ

Verifiable credentials

Process guidance

Case Management Engine

Caffeine

Configurable

Learnings

- 1 \ Don't store all your data in Solid pods
- 2 \ Linked data is not a must
- 3 \ Not completely following the specification
- 4 \ Copying data can be acceptable
- 5 \ Embed consent flow for user experience
- 6 \ Expose WebId only when it makes sense



01

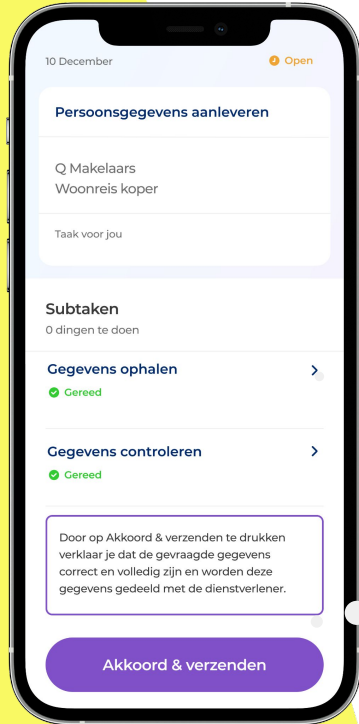
Don't store all your data in Solid Pods

Although Solid aims to make data independent of applications

What type of data to store where?

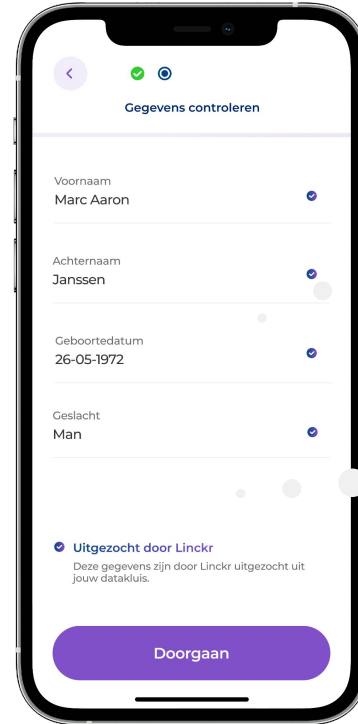


What type of data to store where?



Stored in event store
(json)

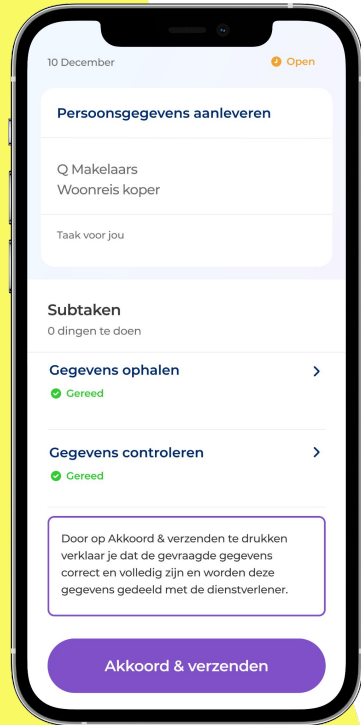
CustomerJourneyStarted by
John and ConsentGiven to
share birthdate



Personal data vault
Linked data

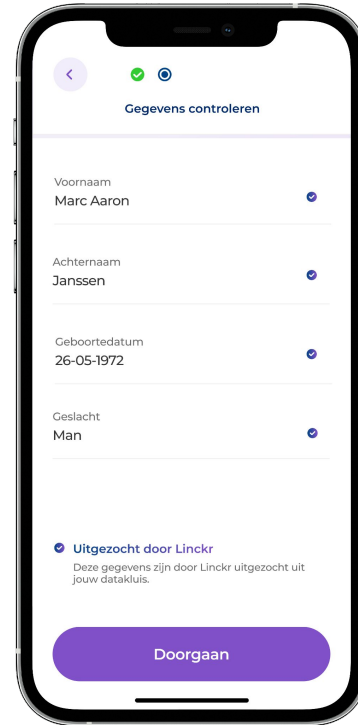
John Snow, born in Antwerp
on 1994 2nd of January

It's all about tradeoffs



Companies can still choose for business reasons to own & lock data:

- Compliance
- Unique capability/process
- No value to share



User Data Experience, a new discipline that researches what data makes sense from a value perspective to share & reuse in other contexts

Ecosystem thinking also can thrive the decision to store data in an interoperable fashion

Data vault vs lock (sluis)

02

Linked data is not a must when using Solid,
(but advised)

Linked data is not a must

Pro's

- / Linked data is self describing (ontologies, schema.org)
- / Linked data fosters machine reasoning and inference
- / Prevents data duplication
- / Makes sense when persisted in graph database, this allows fine grained querying



Con's

- / Developer experience is not good (yet), lack of training resources
- / Solid persists data in a file storage, not in a graph db!!!
- / Granularity of access control on file level, not on triple
- / What with unstructured data (photo's, pdf's, songs)
- / Alternatives like JSON Schema also allow to create contracts that foster interoperability and are more common and easy to understand by our integrators
- / Making ontologies and taxonomies is expensive in terms of stakeholder management & governance

Linked data is advised, if you

/ can build on top of existing taxonomies
(zorgeloosvastgoed, Oslo standards, OTL)

/ are a dominant leader in your ecosystem

Linckr is now leveraging
the Zorgeloos Vastgoed
Taxonomy



03

The specification is not ready

Make sure to make Solid a replaceable component in your architecture



Not using the fine grained access control mechanisms of Solid Servers

Abstract away Solid
in your software

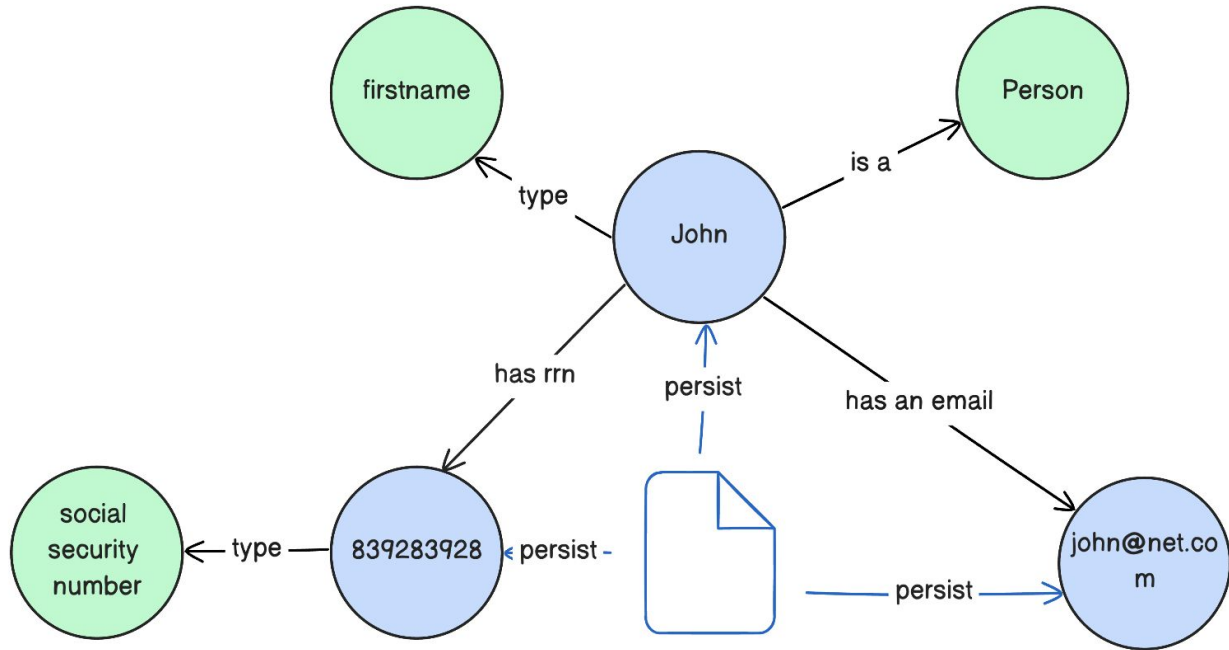
/ Solid specification standardizes data vaults & sharing data with consent, BUT the specification is not finished and does not cover all use cases!

/ For example fine grained access control on attribute level

/ Solid is bleeding edge, so make sure that you can replace it, when it does not work out



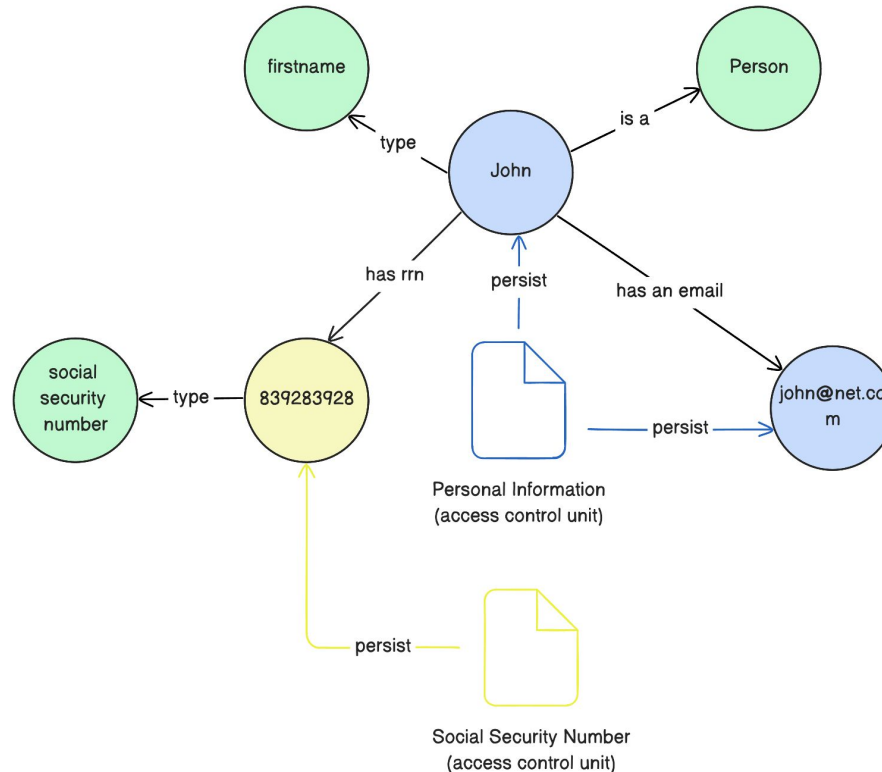
File based storage creates coupling with the application that writes first



What if this can't be shared with another application?

Personal Information (access control unit)

File based storage does not allow for granular access control



Decided to be the fine grained access gate keeper until solid comes with a mature solution

04

Copying data can be acceptable

Verifiable attestation is more important

Why?

- / Hard to constrain from a technical perspective
- / Performance and uptime dependencies with downstream
- / The business value is in the trustworthiness of the data
- / Verifiable attestation is more important
- / Ex. purchase agreement in PDF (printed)

Copying data can
be acceptable

05

Embed consent flow for user experience

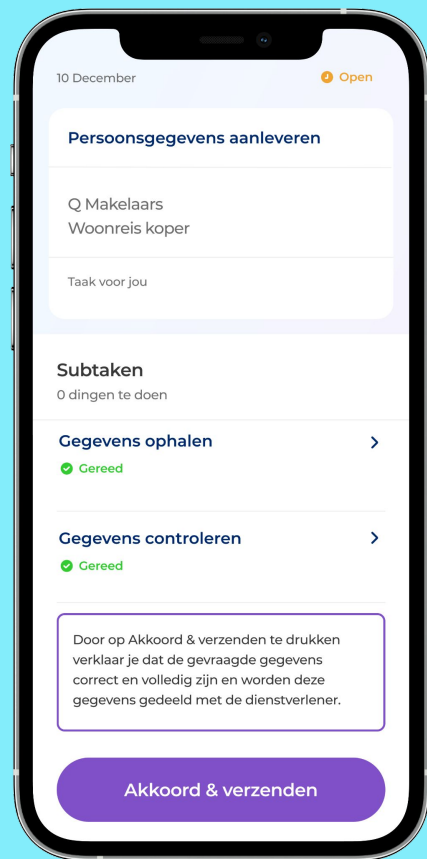
Embed consent flow for user experience

/ Solid envisions that consent is handled by an independent Solid application, specification not ready yet

/ **Decided not to use it for smooth user experience**

/ **Not using Solid Data Grants yet**

/ Linckr manages the access control in a dedicated part of the Solid Pod



06

Expose webId only when it makes sense

Why?

- / Hard to explain to end users
- / For consumers we speak about a username for their vault
- / For service providers we don't mention it all, it scares them



Expose WebId only when it makes sense



Questions




**Michael
Schoenmaekers**
CTO & Architect

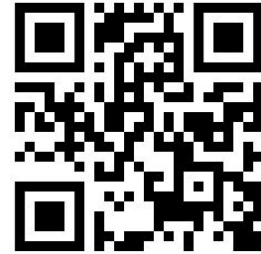
2 years hands on experience with
Solid Protocol, event sourcing &
CQRS

michael@lemon.be



LinkedIn

 **Lemon** your **digital
partner** with business
impact



www.lemon.be