Your data on the Web

Solid & Linked Data

Ruben Dedecker

Your data on the Web

Solid & Linked Data

Vague but exciting ...

CERN DD/OC

Tim Berners-Lee, CERN/DD

Information Management: A Proposal

March 1989

Information Management: A Proposal

Abstract

This proposal concerns the management of general information about accelerators and experiments at CERN. It discusses the problems of loss of information about complex evolving systems and derives a

Before the Web

Exchanging information was hard

 different hardware

 different software

Innovation was hard

 For which machines do we build?

 For which operating systems do we build?

3/13/23, 10:05

The Web strives to be *universal* through independence of many factors.

Anyone can use the Web, regardless of:

hardware: desktop, phone, tablet, watch, …

software: operating system, browser, app, …

Developers are free to innovate.

Build for the Web.

Standards provide interoperability.

*__Individual links are allowed to break
so the entire Web does not__*

—Tim Berners-Lee

Released royalty-free in 1993

The Web brings *permissionless innovation* at a global scale

Anyone can build anything for any reason

The technologies are open

You don't need anyone's permission to join the Web and launch a new idea

The Web brings *freedom of expression* to everyone across the world

"Anyone can say anything about anything"

**We can *link* to opinions of others
to discuss about them**

**The "Web 2.0" ideas transition users
from consumers to *prosumers***

The Web enabled unprecedented creativity

Your data on the Web

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The Web and universality
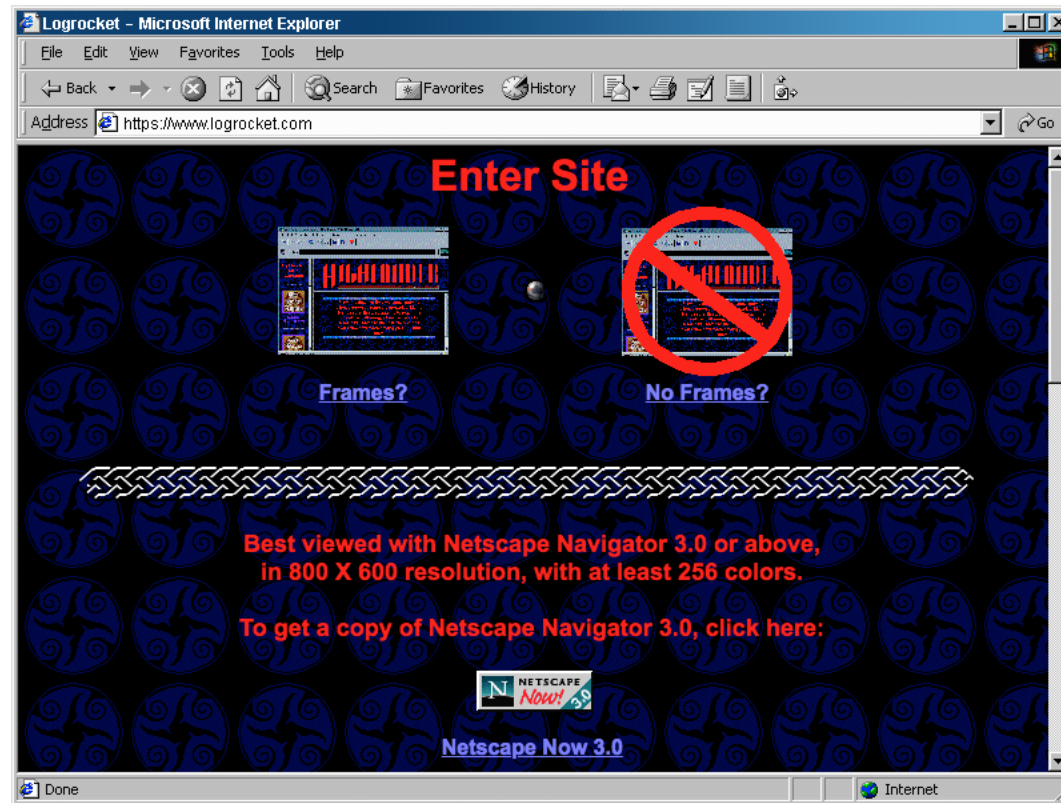
Origins and aims

Threats to universality

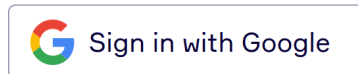*The Solid project*

Separating applications and data

The Solid Pod

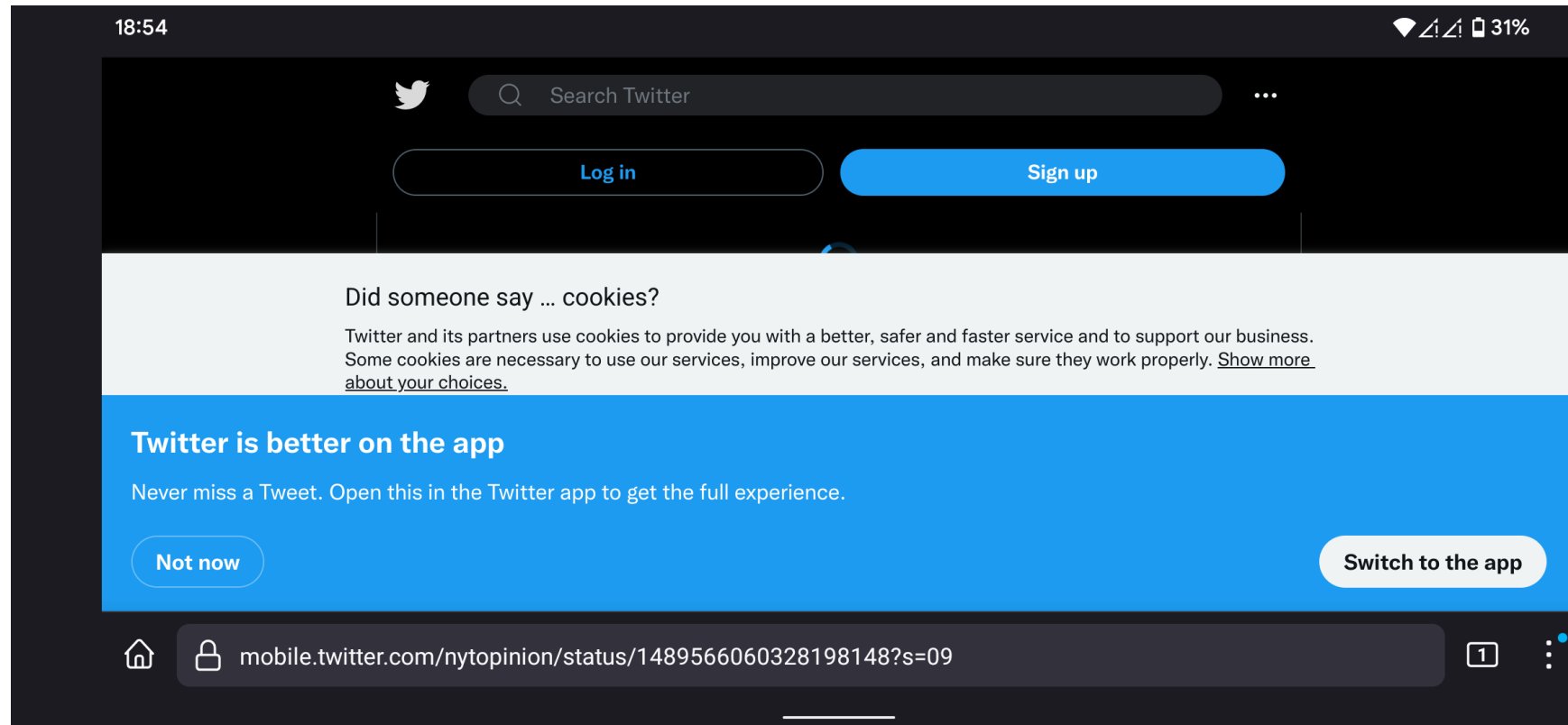*A Linked Data Web*

The browser wars

register an account

Sign in

G Sign in with Google

or use your email to sign in:

✉ Work email

🔒 Password

I forgot my password

Sign in

Sign in with Single Sign On

best viewed with
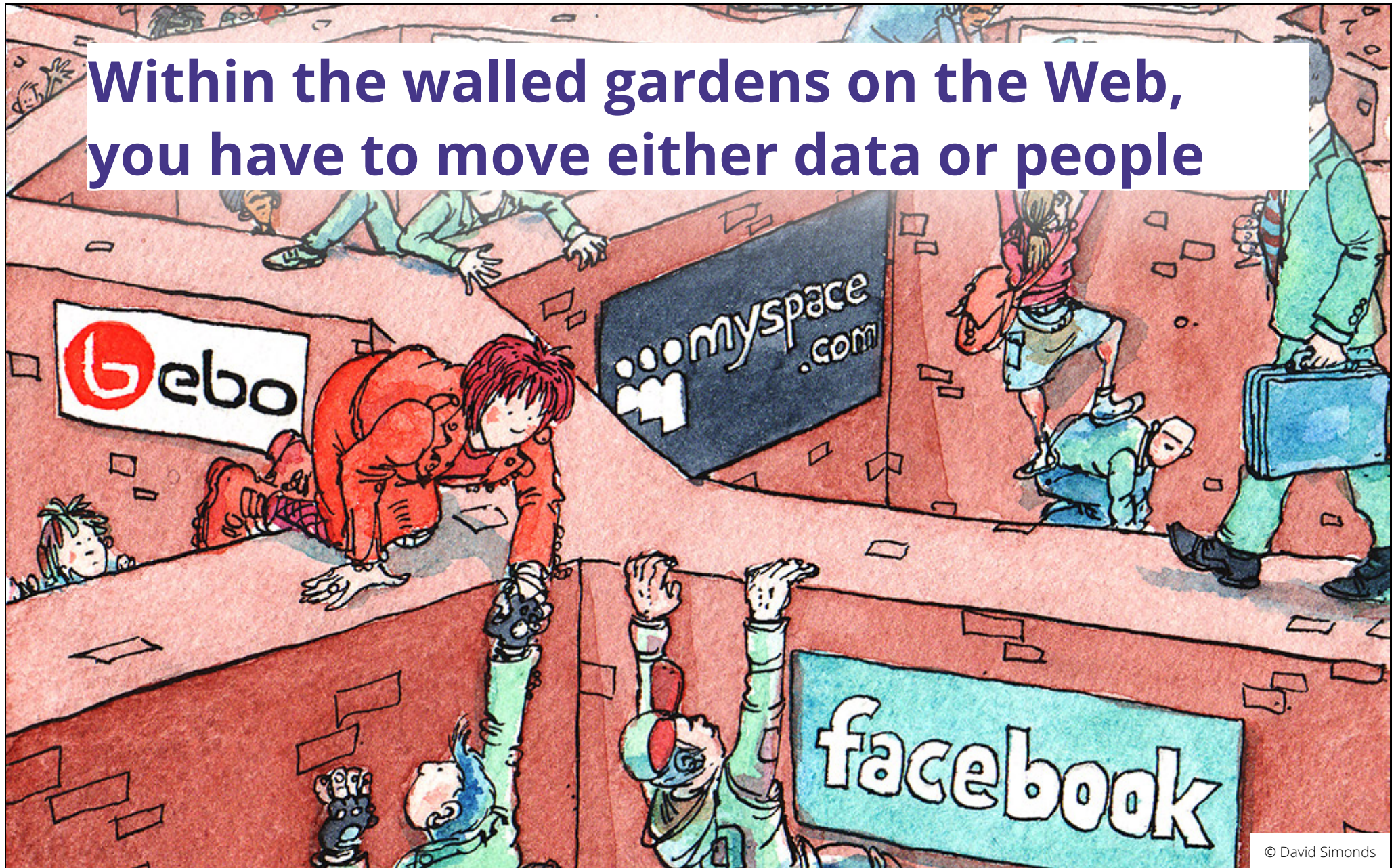
Our data has become stuck

**Former personal blogs
are now on Facebook and Twitter**

     great user experience

     but we lost control

     and the Web lost its data

Data became stuck in silos

     not centered around the users that create it

     but centered on the platforms that use it

**Within the walled gardens on the Web, you have to move either data or people**

© David Simonds

Ironically, permissionless innovation even allows platforms that prevent it.

The Facebook founder has no intention of allowing anyone to build anything on his platform that does not have his express approval.

Having profited mightily from the Web's openness, he has kicked away the ladder that elevated him to his current eminence.

—John Naughton, The Guardian

© Vinayak Shankar Rao
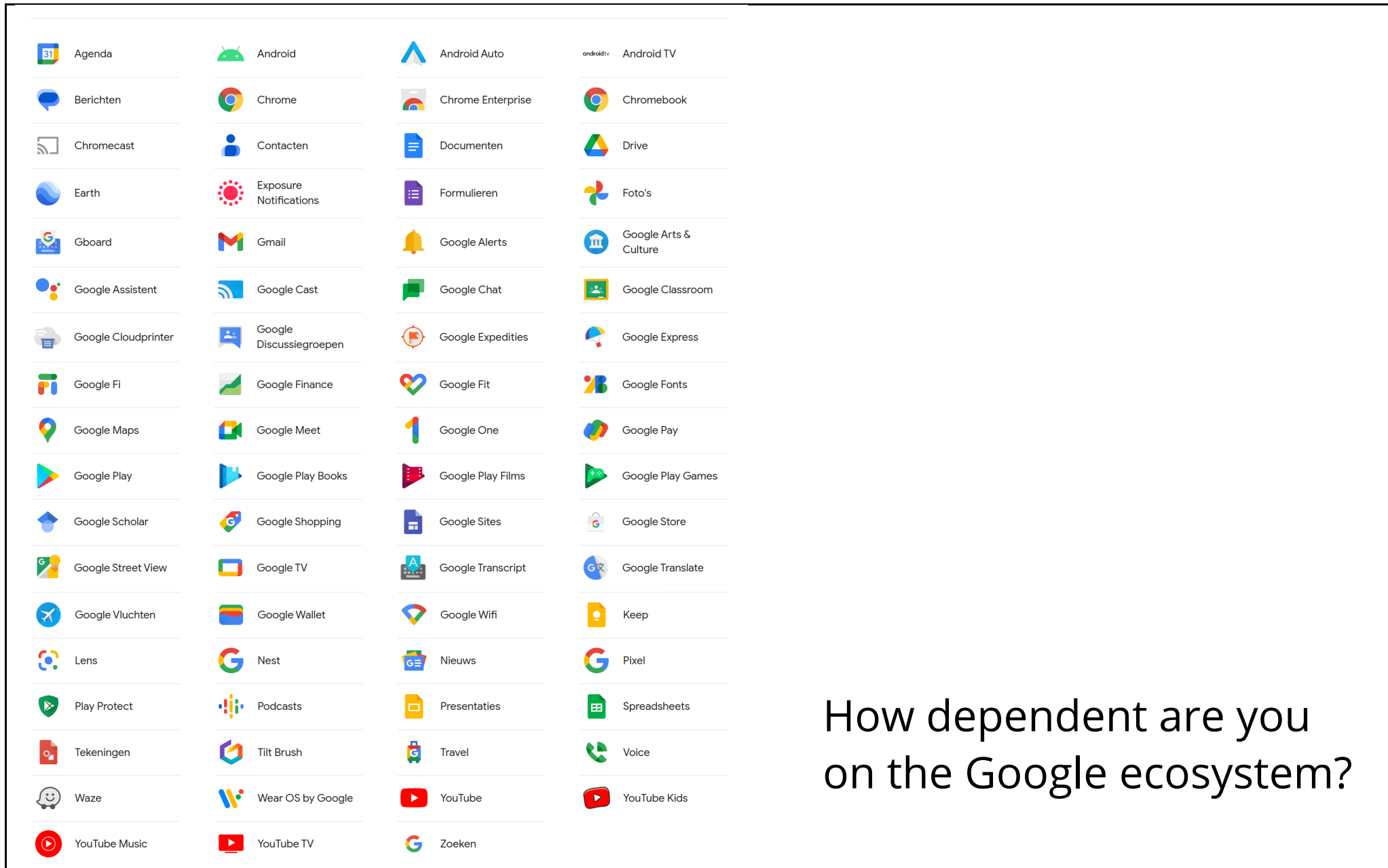
How dependent are you on the Google ecosystem?

The Guardian this weekend

"Rule One for any online venture is
to acquire large numbers of users quickly
so that you can harness the power
of network effects to keep them
inside your walled garden.

these systems are not interoperable:
you can't easily take your "social graph"
(your network of contacts) with you.

—John Naughton, The Guardian

Elon Musk banned interoperable software at Twitter and took other measures that made it harder for users to leave. Photograph: Britta Pedersen/AFP/Getty Images

© Britta Pedersen

Your data on the Web

Solid & Linked Data

The Web and universality

> *Origins and aims*
>
> *Threats to universality*

The Solid project

> *Separating applications and data*
>
> *The Solid Pod*

A Linked Data Web

The Solid project

**Spearheaded by Tim Berners-Lee
as a way to take back control**

**Solid provides a way of building Web apps
that let people keep control of their data**

Solid builds on existing W3C standards
It is not a new Web:
it builds on top of the existing Web.

Your data on the Web

Solid & Linked Data

The Web and universality
      Origins and aims
      Threats to universality

The Solid project
      Separating applications and data
      The Solid Pod

A Linked Data Web

Separating applications and data

**Typical platforms nowadays store data
inseparably from an application.**

If we need to access the data, we cannot choose our app.
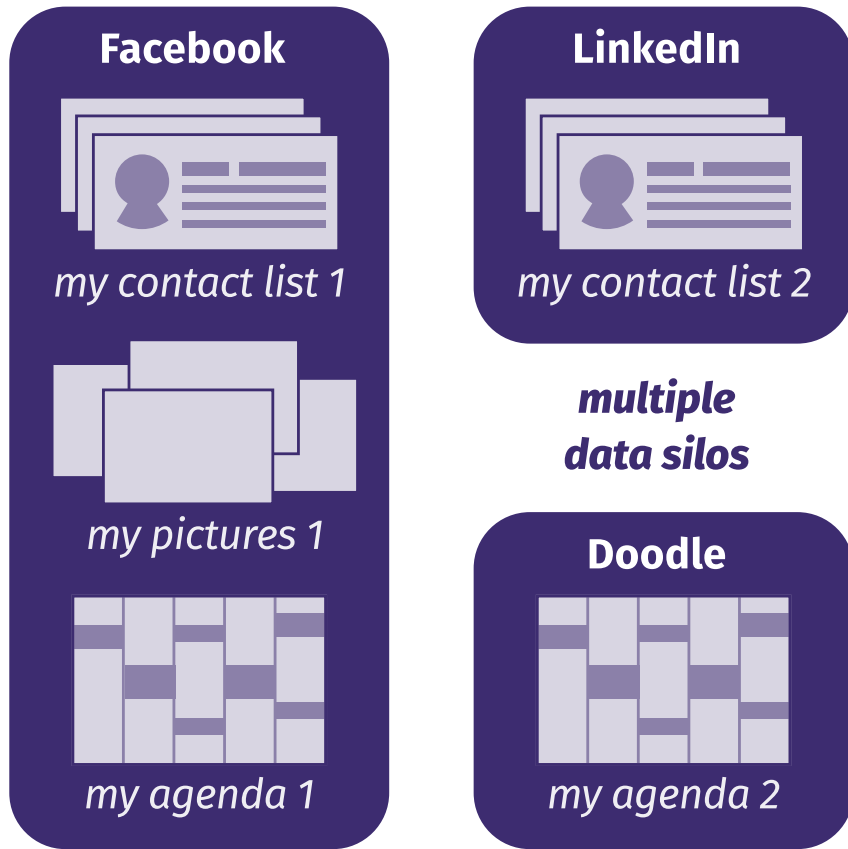
If we need to use the app, we can't choose our data source.

**By separating data from apps,
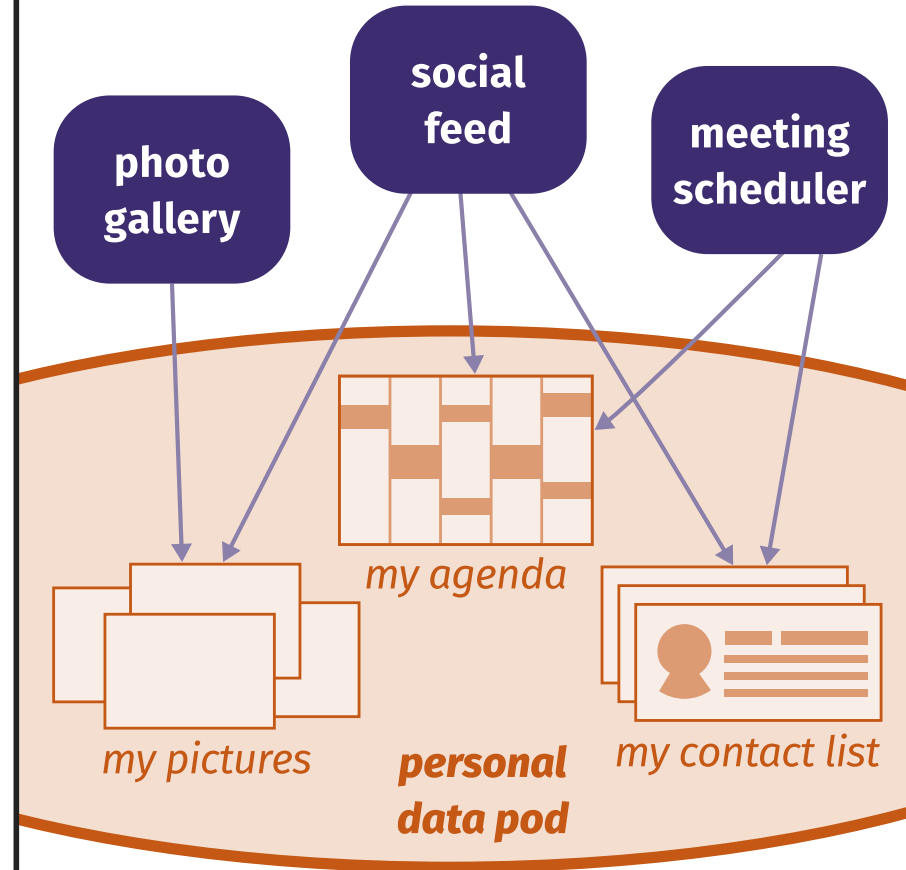we create independent choices.**

We can give data the portability

that the Web enables for our documents

User perspective:
we can *control* and *share* our data
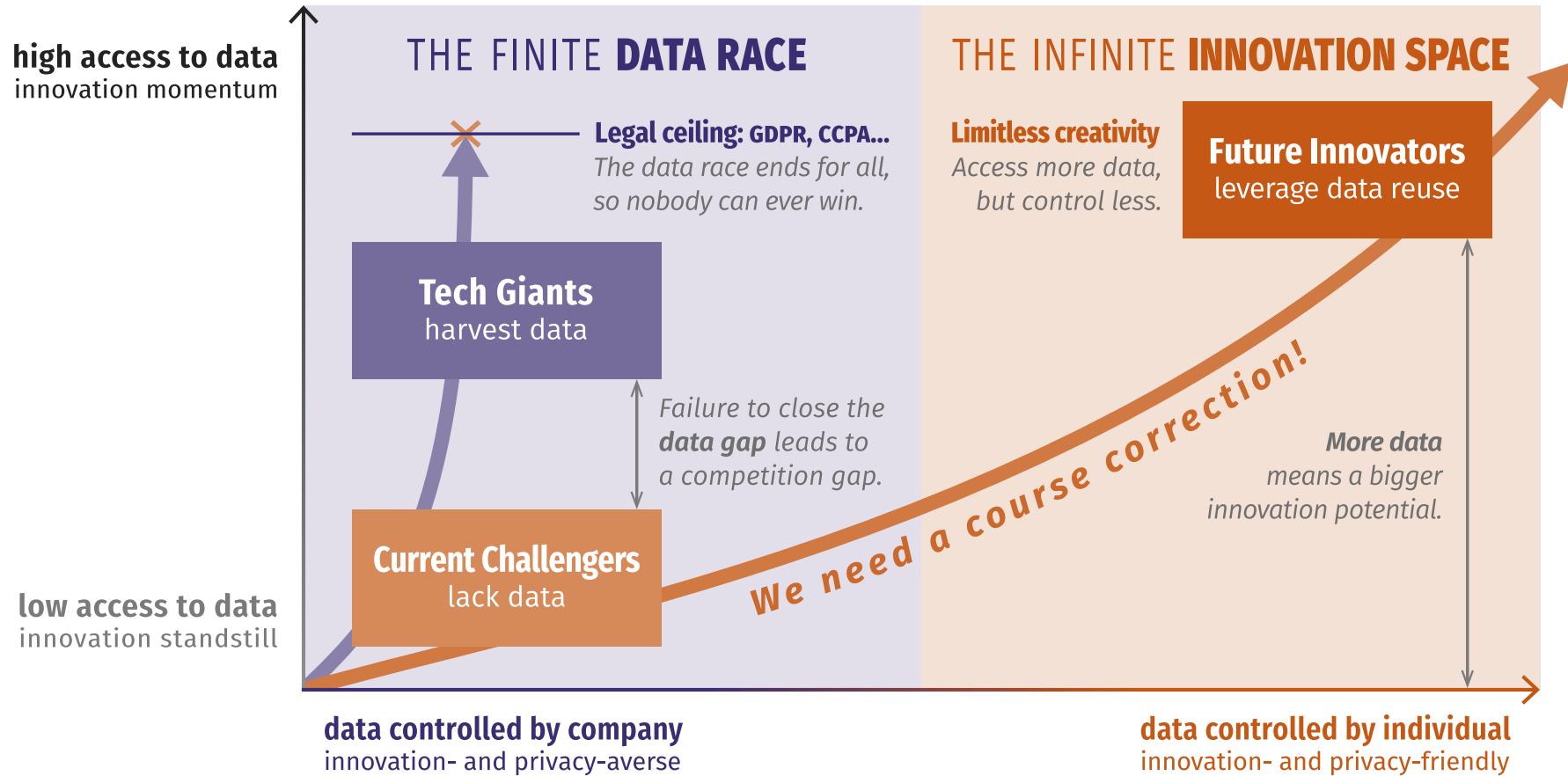
centralized Web applications

decentralized Web applications

Facebook

my contact list 1

my pictures 1

my agenda 1

LinkedIn

my contact list 2

multiple data silos

Doodle

my agenda 2

photo gallery

social feed

meeting scheduler

my agenda

my pictures

my contact list

personal data pod

Application perspective: Innovation on a Web scale

Your data on the Web

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The Web and universality

　　　Origins and aims

　　　Threats to universality

The Solid project

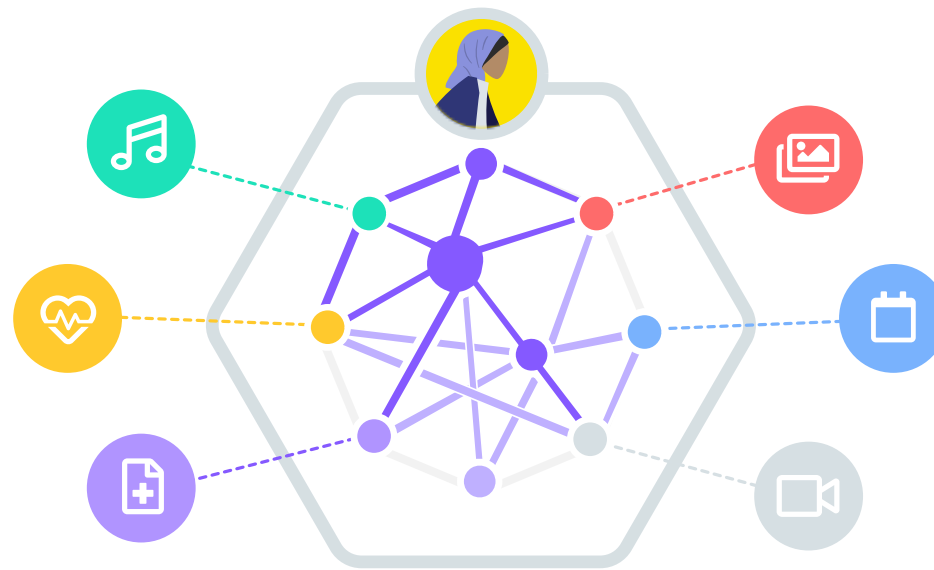　　　*Separating applications and data*

　　　The Solid Pod

A Linked Data Web

Where does this data go?

To separate applications and data ...

the user must have a space on the Web

The Solid Pod

© solidproject

Interoperability between Solid Pods is enabled through standardization

Solid builds on existing Web standards

The standards cover:

> data pods
>
> applications or services
>
> identity

Standards enable the interactions between data, apps, and identities

Your data pod can contain any data you create online

profile 👤

media 🖼️

comments 🗣️

likes 👍

... ✨

You control which applications can interact with your pod

You can give read and/or write permissions for specific pieces of data to:

      applications

      other people

      automated agents

Applications deliver an integrated experience

      They can integrate your data,

      with other sources from all over the Web

Any app you can envision, you can build with Solid

calendar 📅

social feed 👥

photo sharing 📸

conference organization system 🎤

... ✨

# Applications can integrate data from many sources

Author's name and latest profile picture
stored in author's personal data pod

Work-related opinion about an article
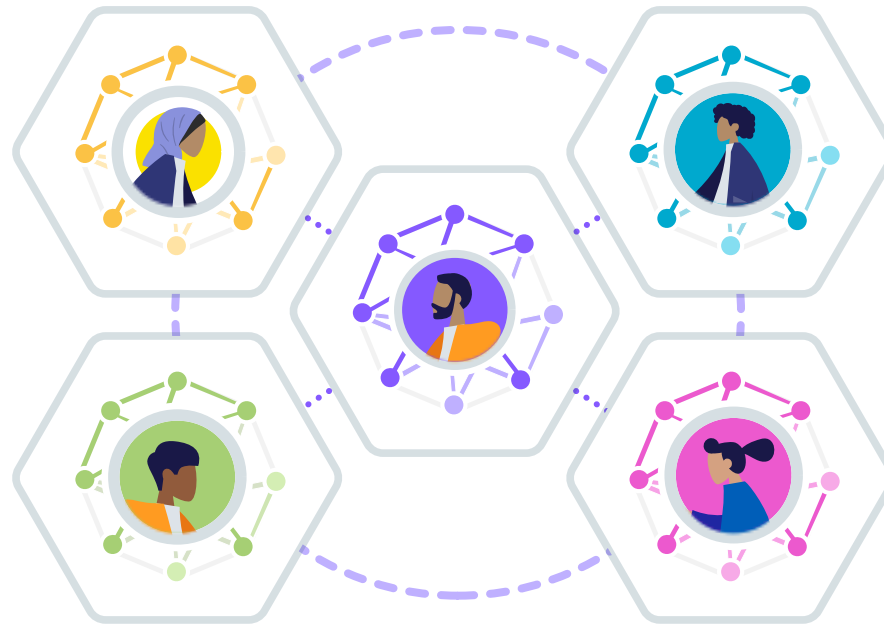*stored in data pod of author's company*

Discussed article title and photo
stored in news website's data pod

Likes on this post
each one in different individuals' data pods

Comments on this post
each one in different individuals' data pods
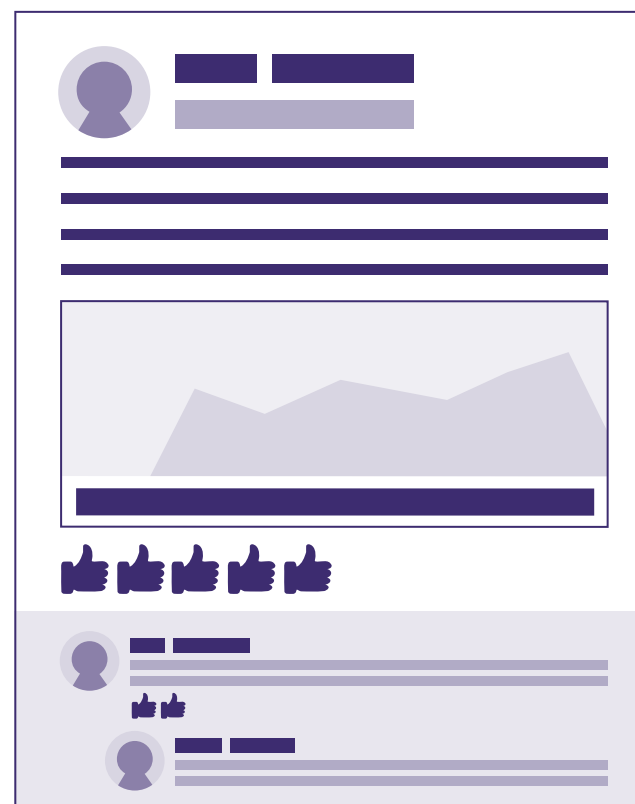
Interconnectivity is key

© solidproject

A point about *trust*

Trust requires provenance of data

Apps can keep track of the source of data

Apps can allow you to ignore untrusted data

Verification enables trust in data

There is value in providing data verification

Signatures provide trust in provenance

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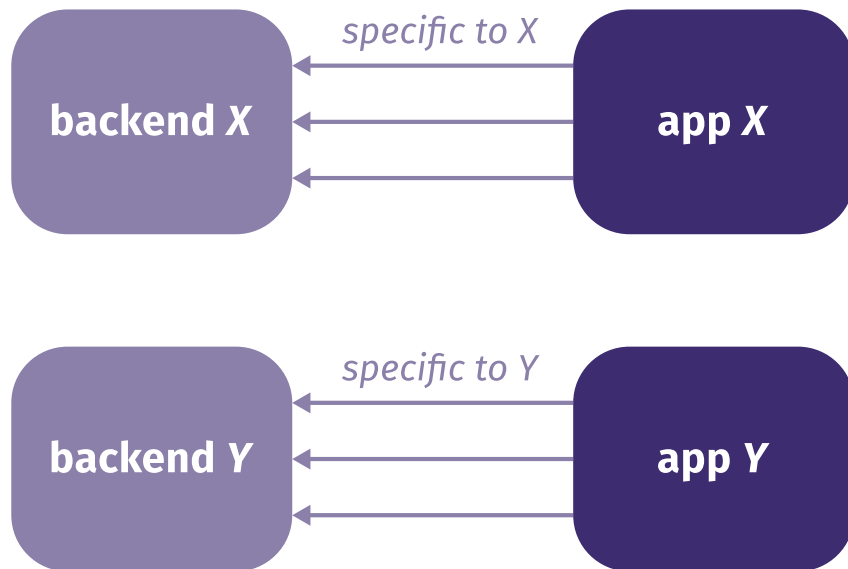
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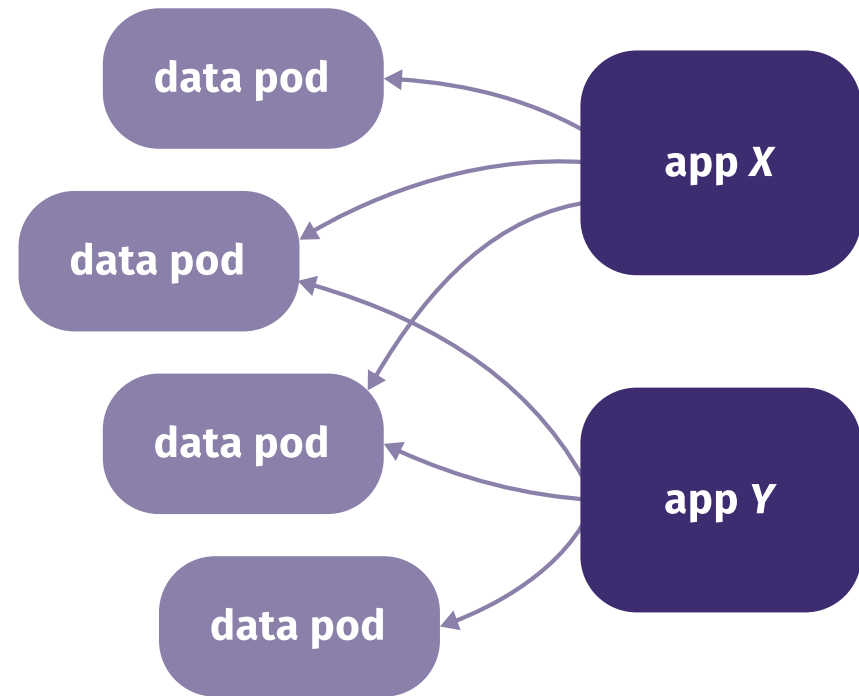
Separating applications and data

The Solid Pod

A Linked Data Web

Our data needs to scale to the Web!

centralized: single app & back-end

decentralized: multiple apps & back-ends

Interoperability challenges in Solid are solved through Linked Data.

**If we all store our own data,
how do we connect it to others' data?**

**How can apps share data,
without too many prior agreements?**

**How do we integrate data
from multiple data pods?**

I want to like a blog!

On Facebook?

On Twitter?

On Tumblr?

On the Web!

If I like your blog, I need a way
to *connect* my like to your blog.

```
{
    "@context":  "https://www.w3.org/ns/activitystreams",
    "id":        "#ruben-likes-blog",
    "type":      "Like",
    "actor":     "https://pod.rubendedecker.be/profile/card#me",
    "object":    "https://ruben.verborgh.org/blog/",
    "published": "2019-04-25T08:00:00Z"
}
```

My like needs a *univeral meaning* so different apps can reuse it

```
{
    "@context":  "https://www.w3.org/ns/activitystreams",
    "id":        "#ruben-likes-blog",
    "type":      "Like",
    "actor":     "https://pod.rubendedecker.be/profile/card#me",
    "object":    "https://ruben.verborgh.org/blog/",
    "published": "2019-04-25T08:00:00Z"
}
```

Data from different sources can be easily be *combined*.

```json
{ "@context":  "https://www.w3.org/ns/activitystreams",
  "@graph": [{
    "type":       "Like",
    "actor":      "https://pod.rubendedecker.be/profile/card#me",
    "object":     "https://ruben.verborgh.org/blog/",
    "published": "2023-01-22T08:00:00Z"
  },{
    "type":       "Like",
    "actor":      "https://example.org/people/patrick#me",
    "object":     "https://ruben.verborgh.org/blog/",
    "published": "2023-02-21T09:05:00Z"
  }]
}
```
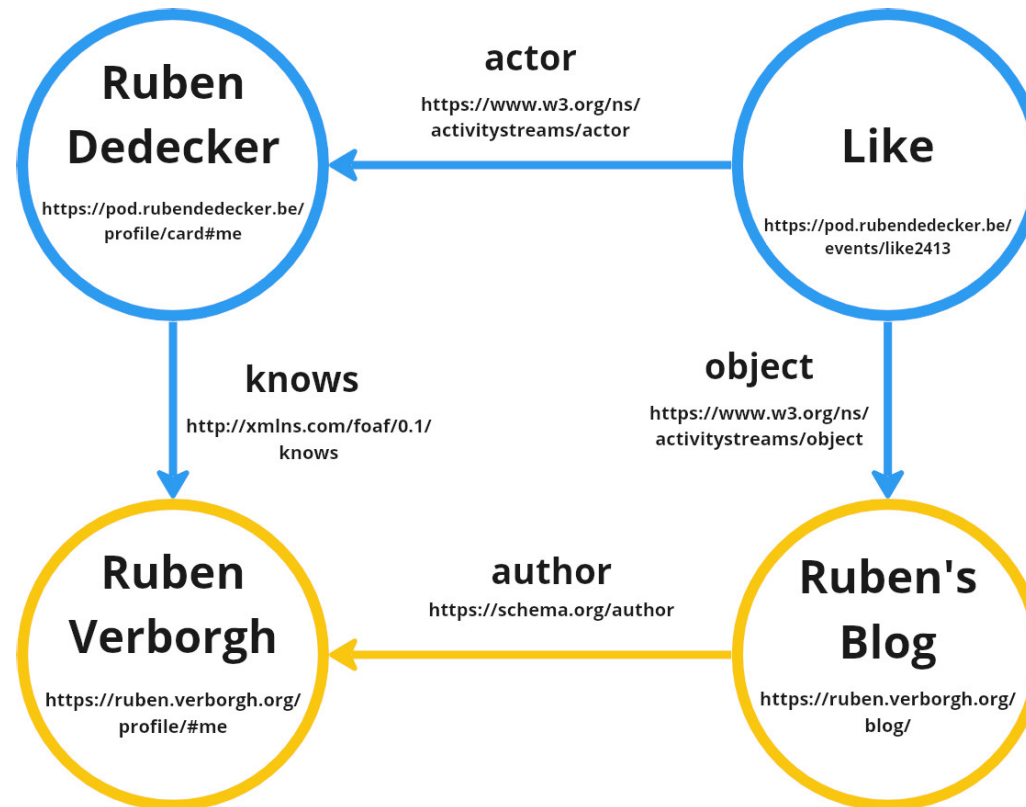
My data forms a graph on the Web
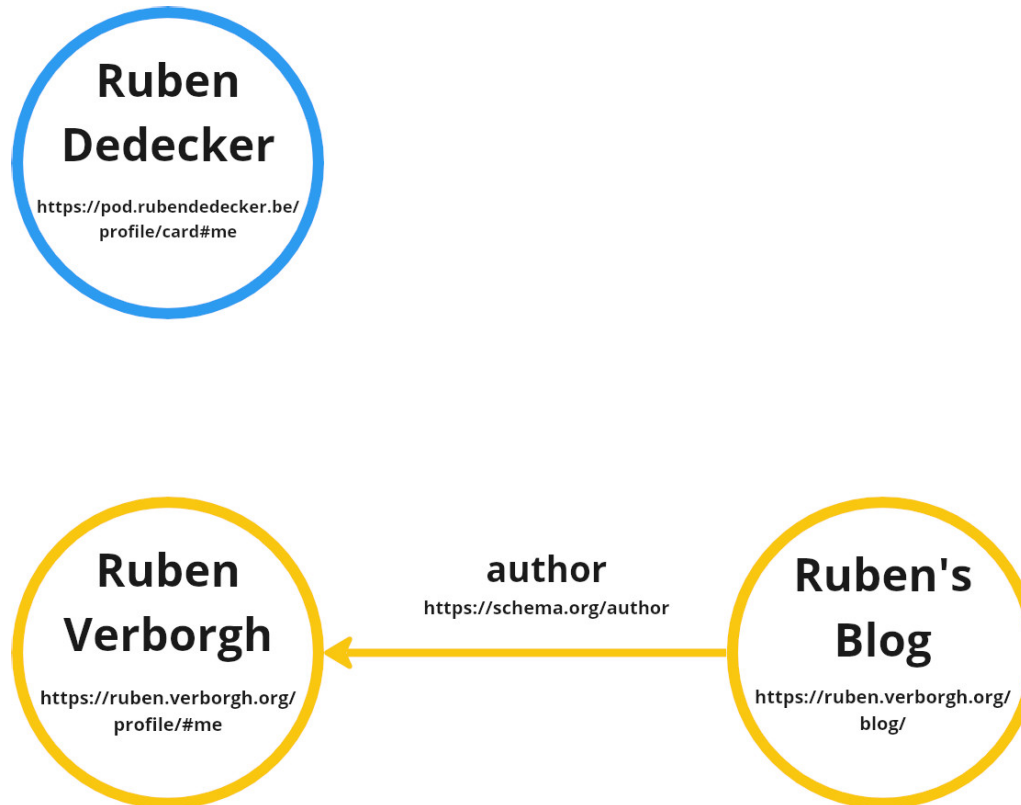
Interactions create new connections
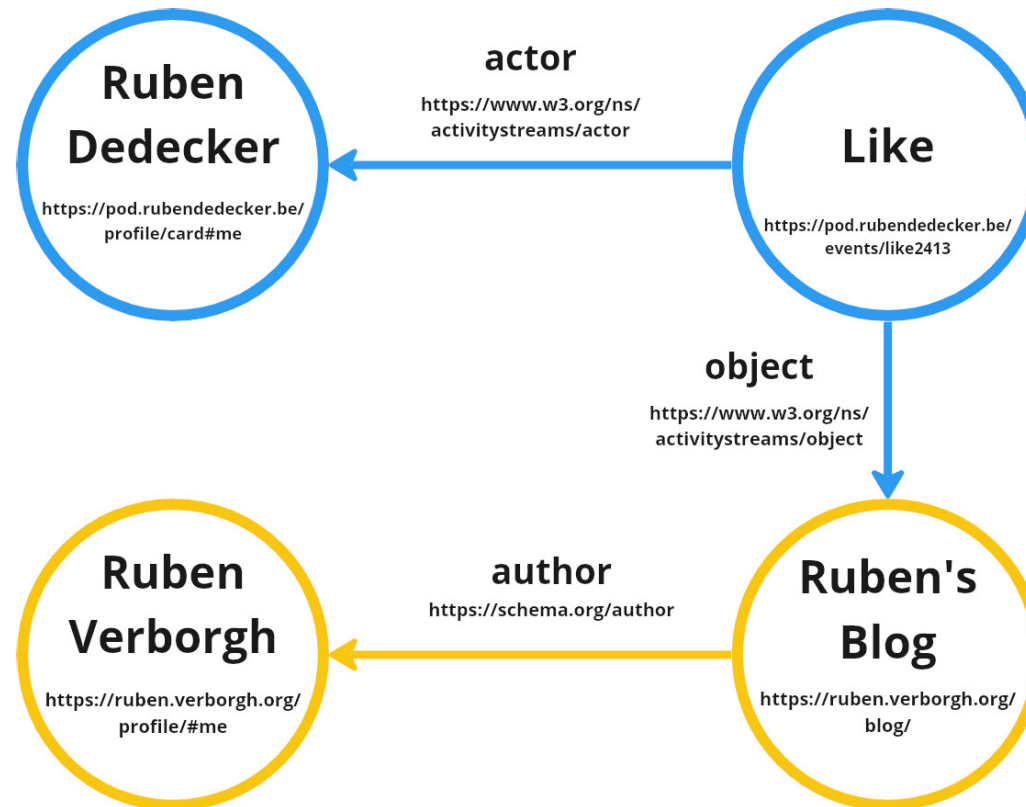
An ever expanding graph of data

Take advantage of the Web!

You can take part!

Ruben Dedecker

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in Ruben Dedecker　G Google Scholar　ⓘ 0000-0002-3257-3394

Education

Now

Not authorized

Skills

Programming Languages

Not authorized

Languages

Not authorized

Host your documents from your Pod

Community Solid Server

Contents of presentations

pod.rubendedecker.be > scholar > presentations

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Empower your data on a Web scale

How does your data empower you?