Timea Turdean

Computer Science & MBA

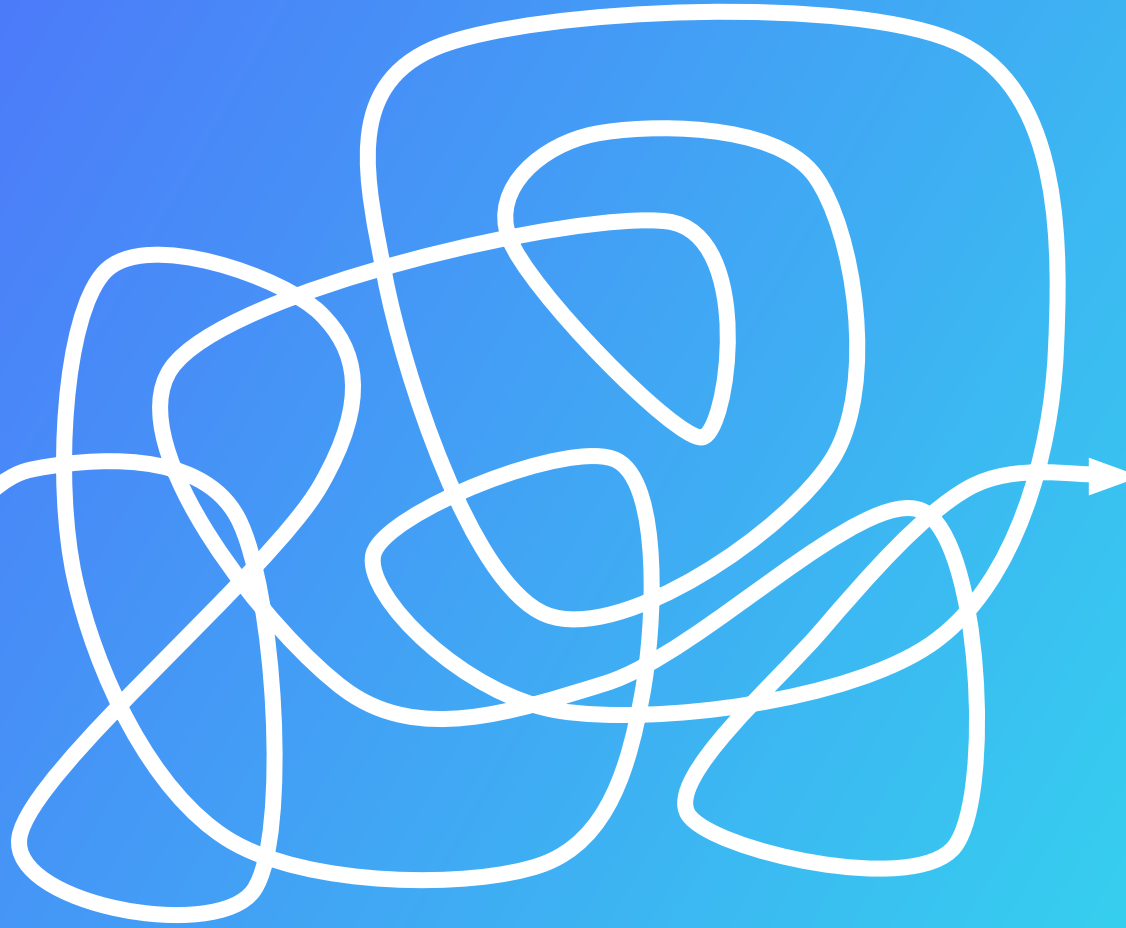
Innovative topics: Semantic Web, Solid

GDG, WomenTechmakers, DevFest, meetups…

Java Software Engineer @Inrupt

JSUG Vienna, 15.05.2023

where the web went wrong



data tracking
targeted advertising
fake news
privacy
cybercrime
censorship
data silos
data mining
intellectual property rights
compatibility
digital divide
security
user tracking

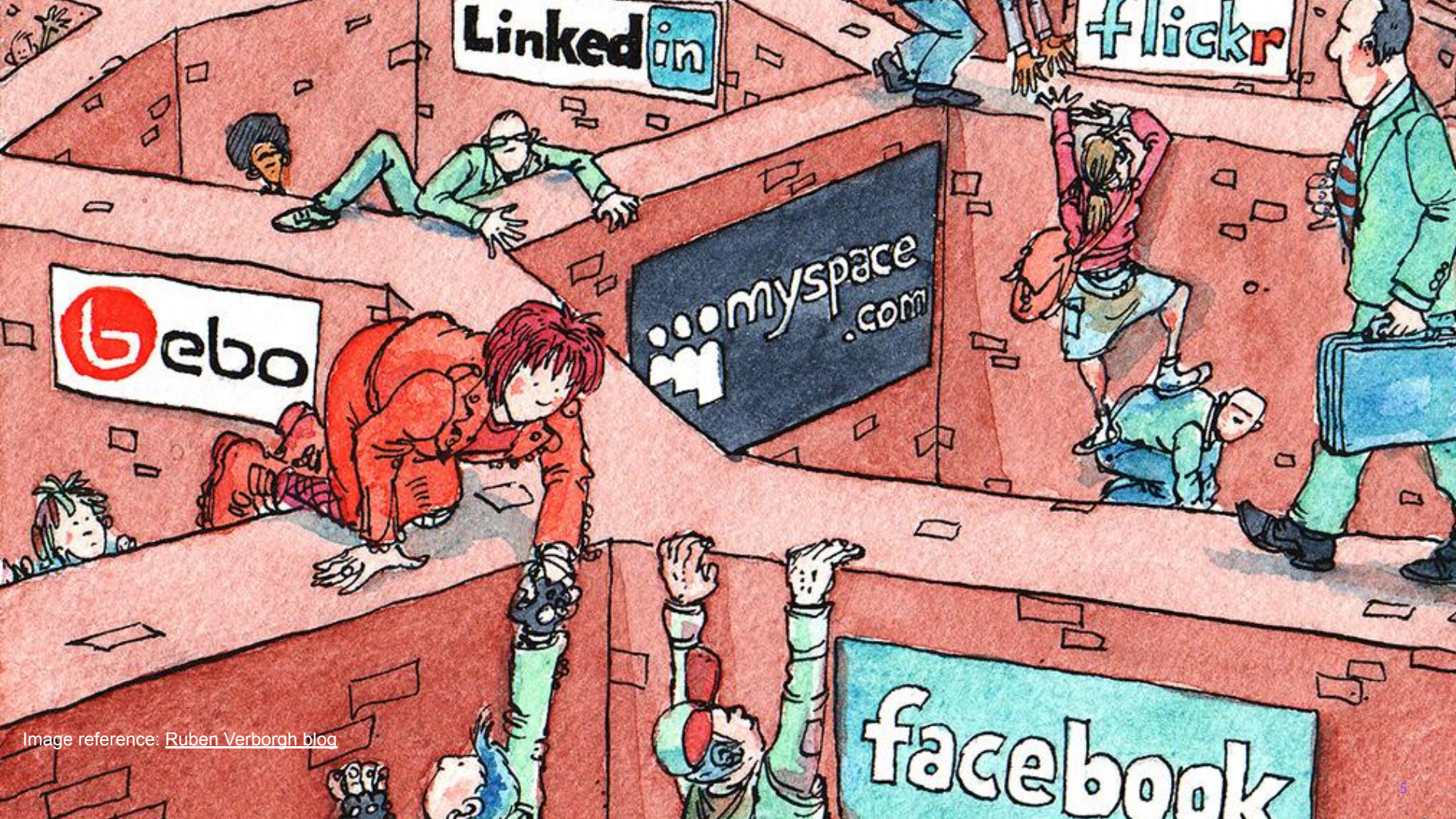
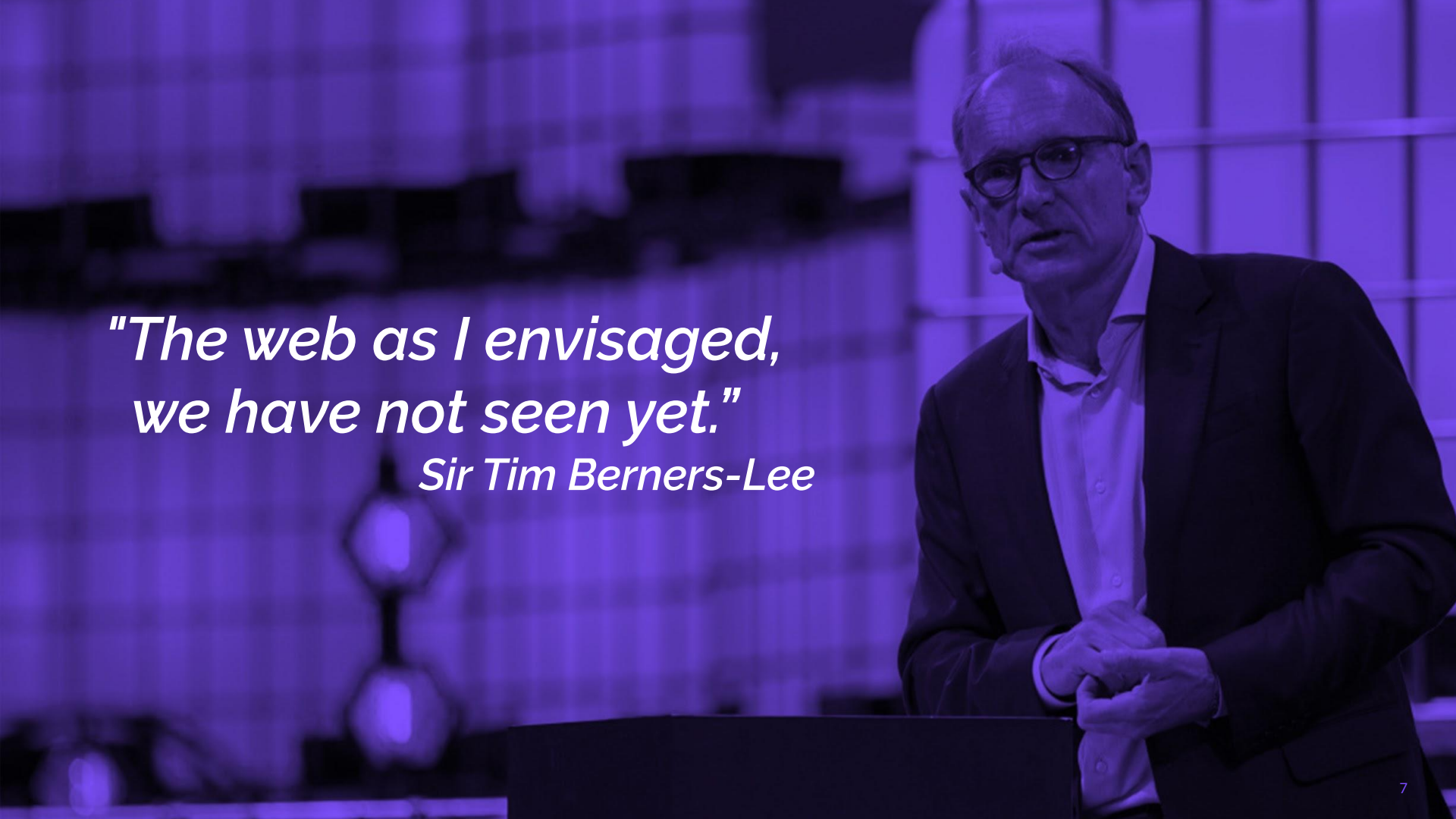


Image reference: Ruben Verborgh blog

Who has heard about Decentralized Web?



"The web as I envisaged, we have not seen yet."

Sir Tim Berners-Lee

Solid:
A foundation of Web 3.0 for Java Developers

JSUG Vienna, 15.05.2023
Timea Turdean

Content

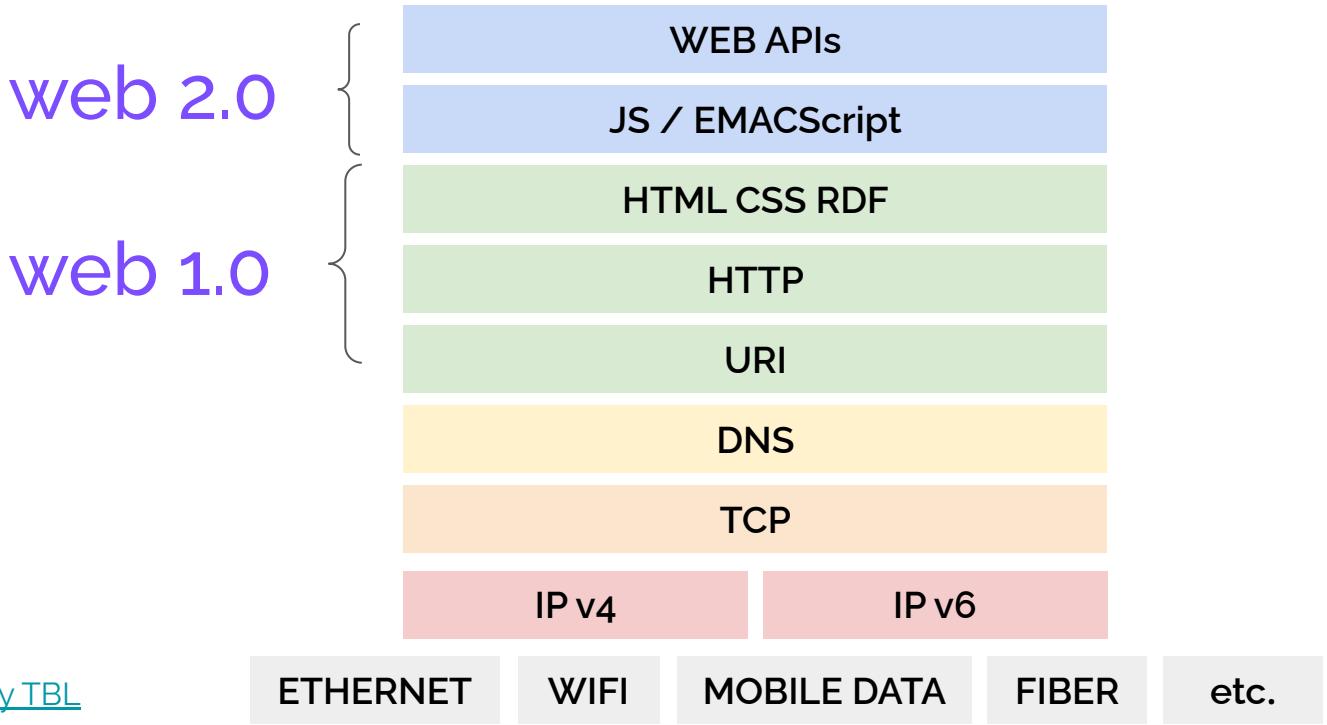
What is Solid?

What can I do with Solid?

The 3 pillars of Solid

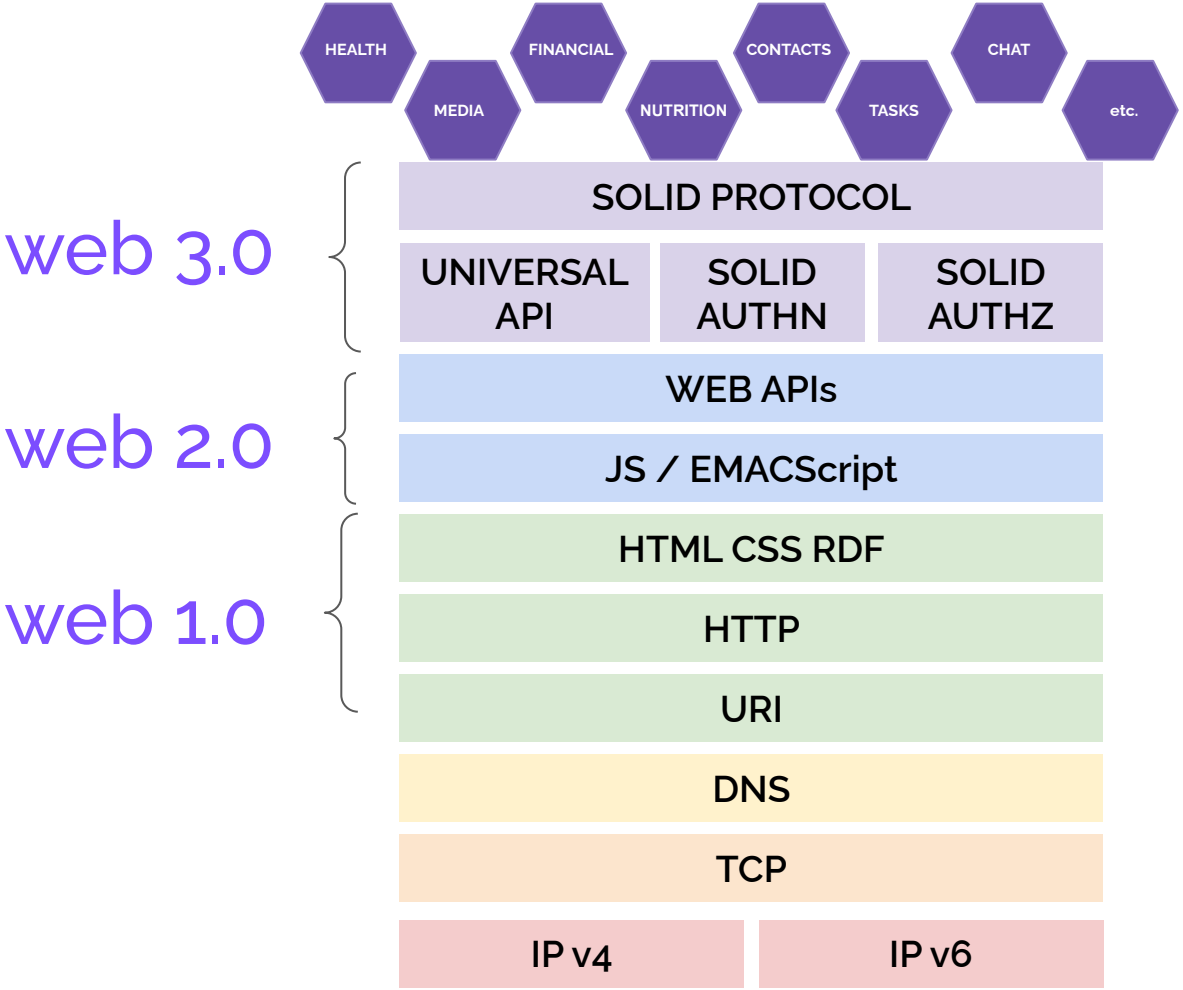
- Digital identity
- Data model
- Authentication and control

World Wide Web architecture



Reference: [Design Issues by TBL]

Solid

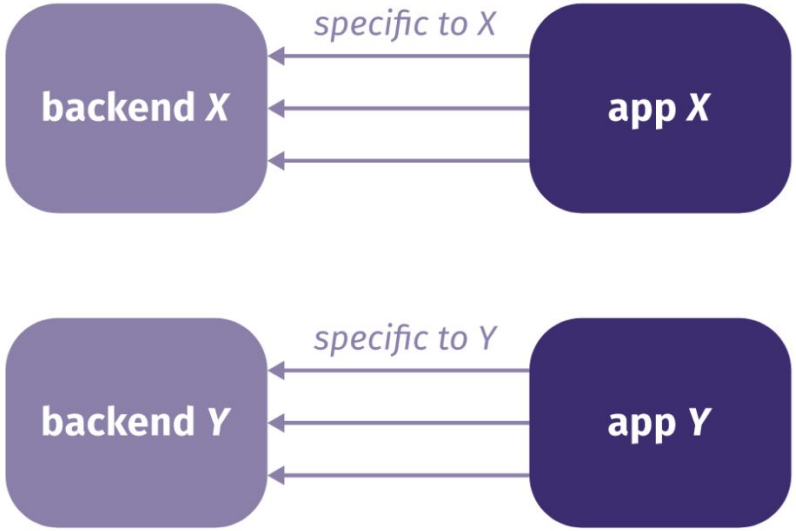


Reference: [Design Issues by TBL]

What can I do with Solid?

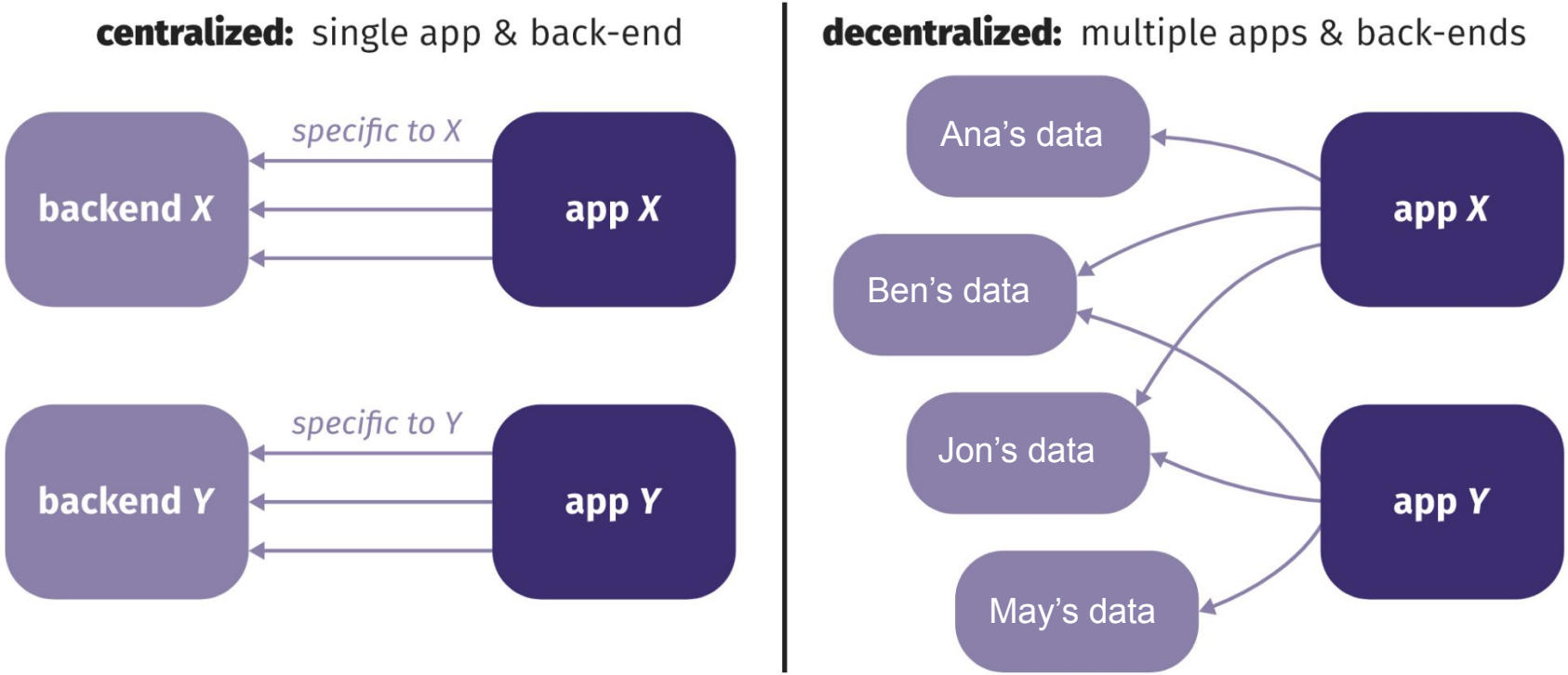
Centralized Apps

centralized: single app & back-end



Reference: [Ruben Verborgh blog]

Decentralized Apps



Reference: [Ruben Verborgh blog]

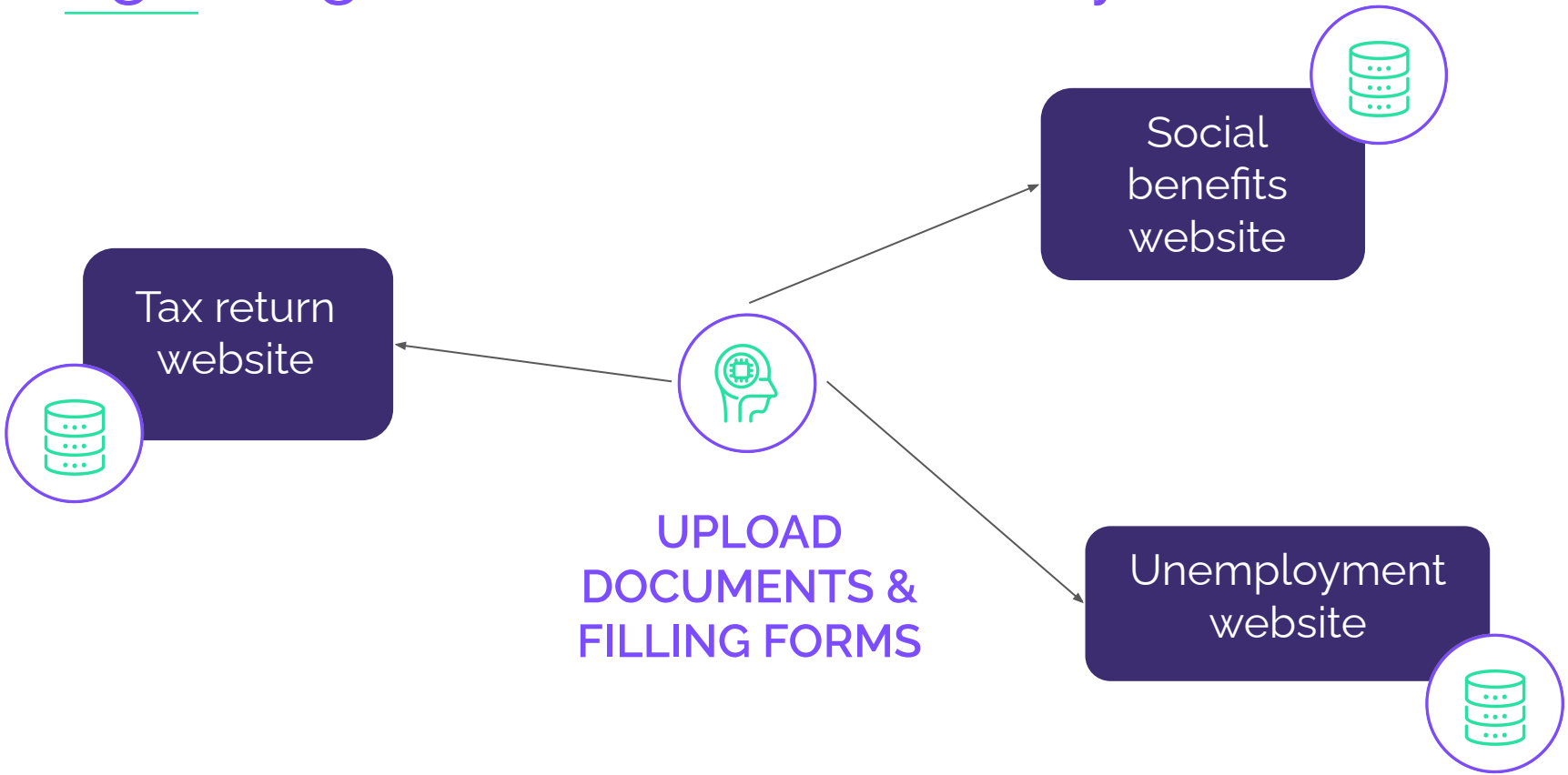
Against government bureaucracy

Social benefits website

Tax return website

Unemployment website

Against government bureaucracy



Against government bureaucracy

Tax return website

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Unemployment website

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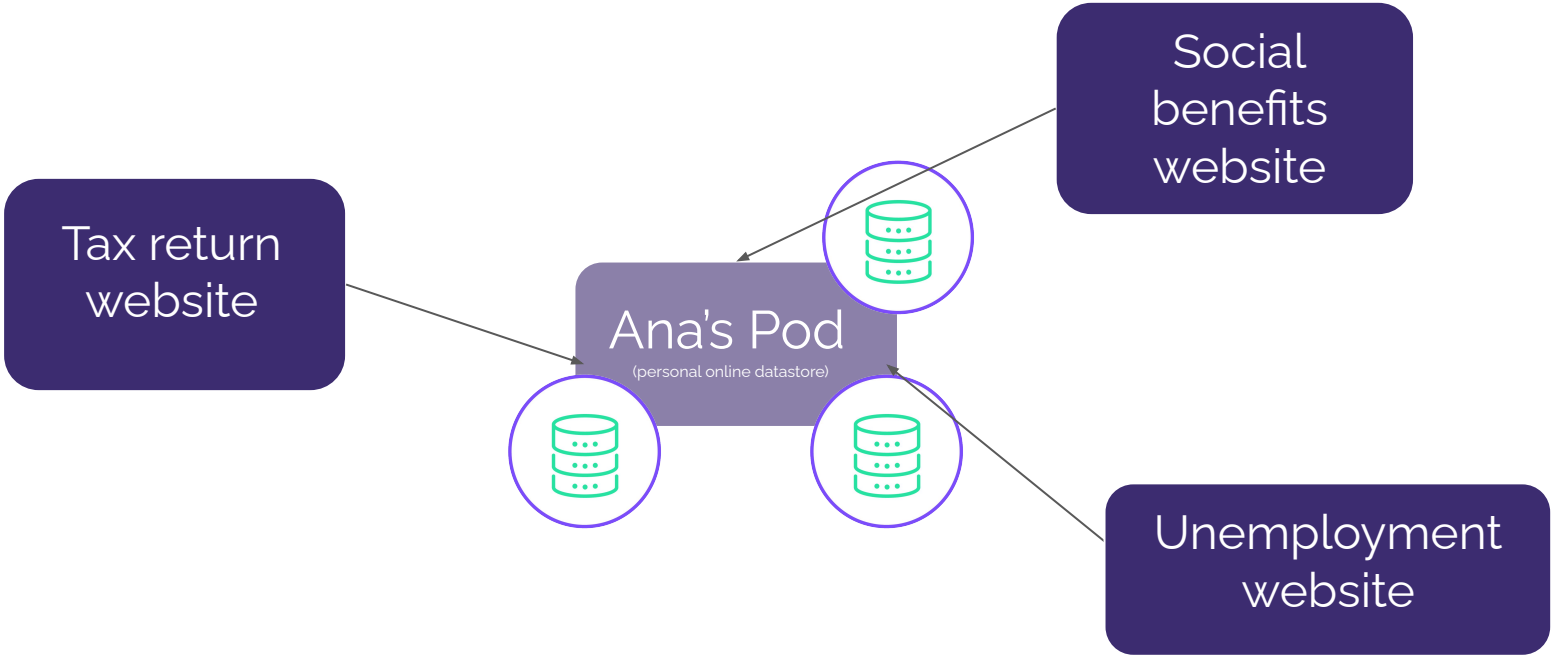
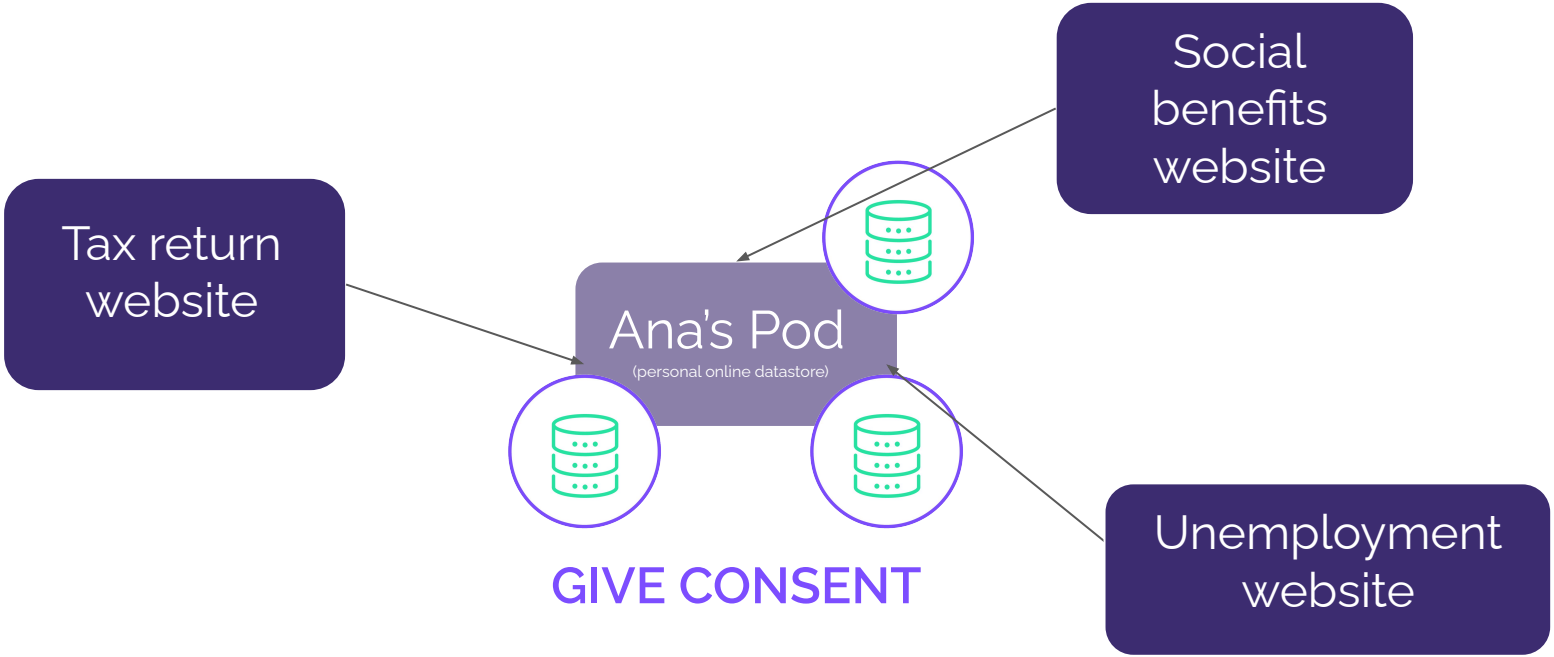


Against government bureaucracy



Show and tell

3 pillars of Solid

1. Universally unique web identities & Pods
2. Interconnected data
3. Build on open authentication and authorization standards

3 pillars of Solid

1. **Universally unique web identities & Pods**

Universal unique web identifier

My LinkedIN:
https://www.linkedin.com/in/timeaturdean/

My GitHub:
https://github.com/timea-solid

My email:
timea.turdean@gmail.com

Universal unique web identifier - my WebIDs

My LinkedIN:
https://www.linkedin.com/in/timeaturdean/

My community WebID:
https://timea.solidcommunity.net/profile/card#me

My GitHub:
https://github.com/timea-solid

My company WebID:
https://id.inrupt.com/timea

My email:
timea.turdean@gmail.com

Other WebIDs:
https://solidweb.me/timeacss/

WebIDs and Pods

Provider	Infrastructure provider	Hosting location
solidcommunity.net	Digital Ocean	UK
solidweb.org	Hosteurope	Germany
Inrupt Pod Spaces	Amazon	Germany
use.id	Digital Ocean	EU
Trinpod	Amazon	USA

Reference: solidproject.org

My Pod https://timea.solidcommunity.net/

- Solid Hello Worlds
  - data
    - hello World.ttl
    - snapshots
    - Solid Hello World Ontology.ttl
    - +
  - index.html
  - lib
  - src
  - static
    - images
      - solid emblem.svg

3 pillars of Solid

1. Universally unique web identities & Pods
2. **Interconnected data**

My WebID data https://timea.solidcommunity.net/profile/card#me

Timea Turdean	type	Person
	fn	Timea Turdean
	knows Language	id1635929591644
		id1646414710220
		id1644420692100
		id1655232957134
	Address	id1651218114290

My WebID data https://timea.solidcommunity.net/profile/card#me

Timea Turdean

type	Person
fn	Timea Turdean
knows Language	id1635929591644
	id1646414710220
	id1644420692100
	id1655232957134
Address	id1651218114290

SCHEME or
VOCABULARY

My WebID data - an RDF snippet

```
@prefix : <#>.
@prefix schema: <http://schema.org/>.
@prefix vcard: <http://www.w3.org/2006/vcard/ns#>.

:me
    a schema:Person;
    schema:knowsLanguage
        ( :id1635929591644 :id1646414710220 ),
        ( :id1644420692100 :id1655232957134 );
    vcard:fn "Timea Turdean";
    vcard:hasAddress :id1651218114290;
```

Solid concepts on my Pod https://timea.solidcommunity.net/

- **Solid Hello Worlds**
  - **data**
    - hello World.ttl
    - snapshots
    - Solid Hello World Ontology.ttl

Solid concepts on my Pod https://timea.solidcommunity.net/

- **Solid Hello Worlds** — Solid Container
  - **data** — Solid Container
    - hello World.ttl — Solid Resource
    - snapshots
    - Solid Hello World Ontology.ttl

Solid concepts on my Pod https://timea.solidcommunity.net/

- **Solid Hello Worlds**
  - **data**
    - hello World.ttl
    - snapshots
    - Solid Hello World Ontology.ttl

Solid Container: https://timea.solidcommunity.net/HelloWorld/

Solid Container: https://timea.solidcommunity.net/HelloWorld/data/

Solid Resource: https://timea.solidcommunity.net/HelloWorld/data/helloWorld.ttl

How to code with Solid

Inrupt Java Client Libraries

Use cases

Authentication

Acces Grants & Authorization

CRUD operations on Pods

Technical details

Open Source

Java 11

Modular

DEVELOPER TOOLS

https://github.com/inrupt/solid-client-java

Read a Solid resource: https://timea.solidcommunity.net/MyBookLibrary/bookLibResource.ttl

```
final URI solidResource =
URI.create("https://timea.solidcommunity.net/MyBookLibrary/bookLibResource.ttl");

SolidSyncClient client = SolidSyncClient.getClient();

try (final SolidResource resource = client.read(solidResource, SolidResource.class)) {
            assertEquals(solidResource, resource.getIdentifier());
            String contentType = resource.getMetadata().getContentType();
            Graph allData = resource.getGraph();
}
```

Create, update delete

```
SolidSyncClient client = SolidSyncClient.getClient();
. . .
client.create(solidResource);
client.update(solidResource);
client.delete(solidResource);
```

Create a Book Library object

```
public class BookLibrary extends SolidResource {
   private Node bookLibraryId;
   private IRI contains = rdf.createIRI(Vocabulary.CONTAINS_BOOK);
   public BookLibrary(URI identifier, Dataset dataset, Metadata metadata) {
     super(identifier, dataset, metadata);
     this.bookLibraryId = new Node(rdf.createIRI(identifier.toString()), getGraph());
   }
   public Set<URI> getAllBooks() {
       return bookLibraryId.getAllBooks();
...
}
```

Read data about a Book Library

```
SolidSyncClient client = SolidSyncClient.getClient();

final URI bookLib =
URI.create("https://timea.solidcommunity.net/MyBookLibrary/bookLibResource.ttl");

try (final BookLibrary resource = client.read(bookLib, BookLibrary.class)) {
            assertEquals(bookLib, resource.getIdentifier());
            String contentType = resource.getMetadata().getContentType();
            Set<URI> listOfBooks = resource.getAllBooks();
}
```

3 pillars of Solid

1. Universally unique web identities & Pods
2. Interconnected data
3. **Build on open authentication and authorization standards**

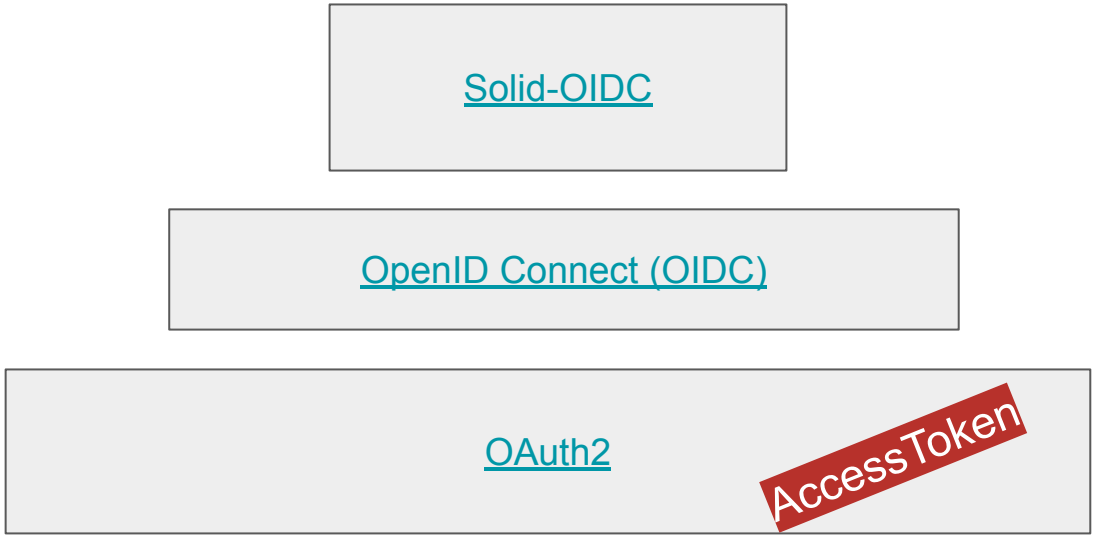
Authentication & authorization

Solid-OIDC

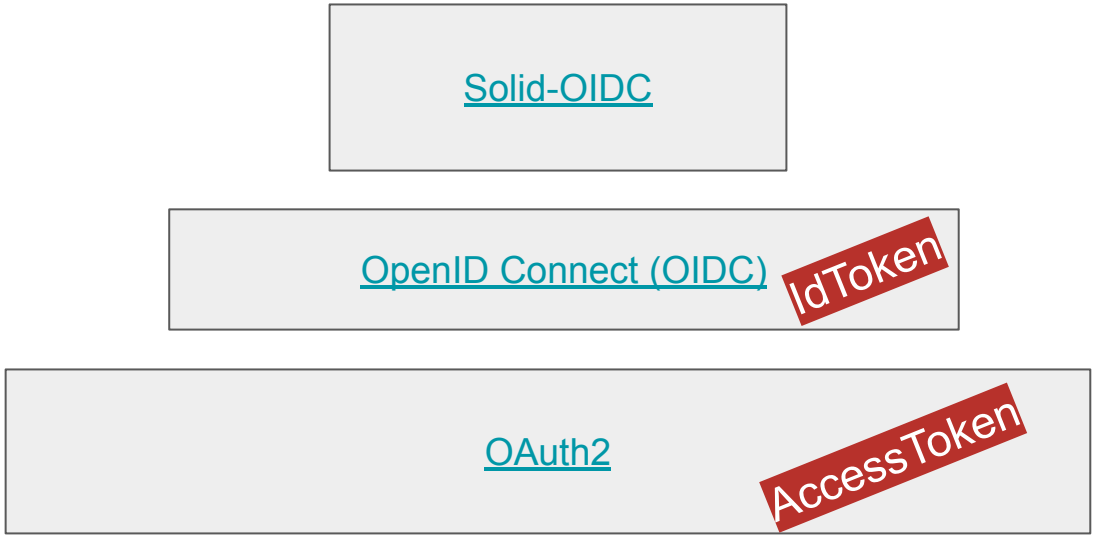
OpenID Connect (OIDC)

OAuth2

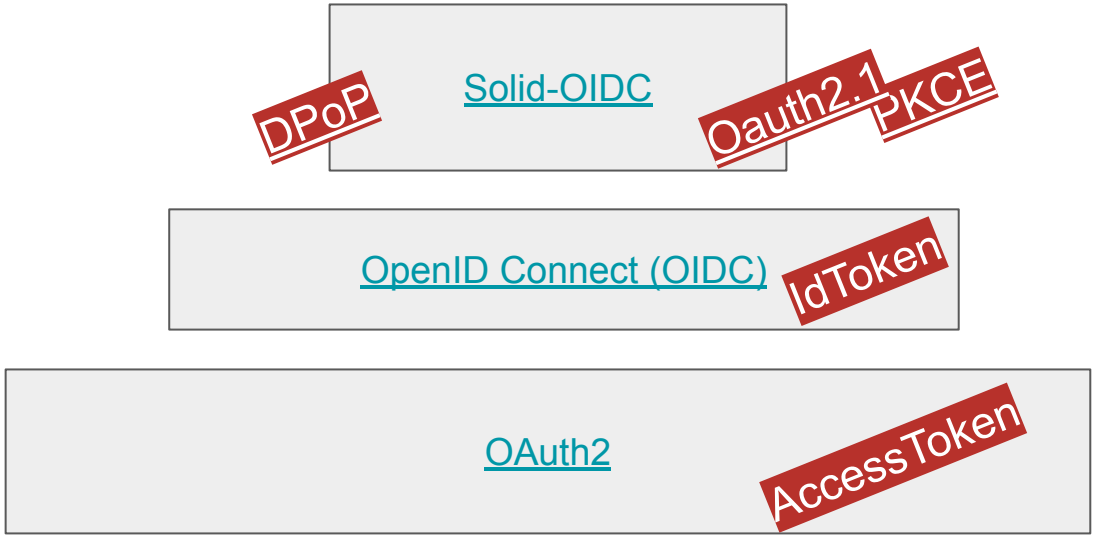
Authentication & authorization



Authentication & authorization



Authentication & authorization



Solid-OIDC configuration in Spring Boot with YAML

```yaml
registration:
    myApp:
      client-id: https://inrupt.github.io/solid-client-java/clients/springboot-testing.jsonld
      provider: inrupt
      scope:
        - openid
        - webid
      client-authentication-method: none
      authorization-grant-type: authorization_code
  provider:
    inrupt:
      issuer-uri: https://login.inrupt.com
```

Reference: [Spring security YAML]

Client-id (inside https://inrupt.github.io/solid-client-java/clients/springboot-testing.jsonld)

```
{
  "@context": "https://www.w3.org/ns/solid/oidc-context.jsonld",
  "client_id": "https://inrupt.github.io/solid-client-java/clients/springboot-testing.jsonld",
  "redirect_uris": [
      "http://localhost:8080/login/oauth2/code/myApp"
  ],
  "post_logout_redirect_uris": [
      "http://localhost:8080",
      "http://localhost:8080/"
  ],
  "client_name": "Spring-Boot Demo App (Not for production use)",
  "id_token_signed_response_alg": "ES256",
  "grant_types": [
      "authorization_code"
  ]
}
```

Authentication

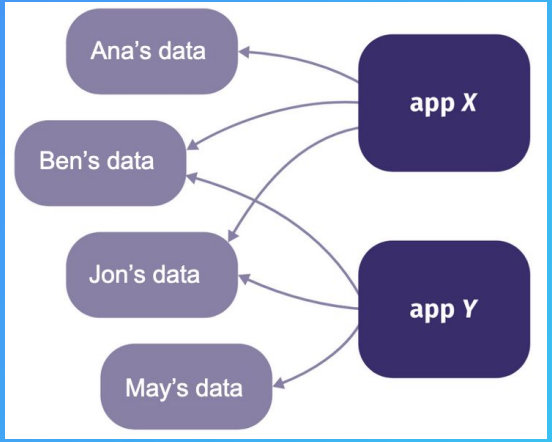
```
SolidSyncClient client = SolidSyncClient.getClient();

final Object principal =
SecurityContextHolder.getContext().getAuthentication().getPrincipal();

if (principal instanceof OidcUser) {
    final OidcUser user = (OidcUser) principal;
    final String token = user.getIdToken().getTokenValue();
    client = client.session(OpenIdSession.ofIdToken(token));
}
```

Takeaways

The data is decoupled from the App

WebID + Pod

Solid is build on the latest open authentication & authorization standards & existing Web standards



Resources

Spring Boot Application

inrupt

A Solid Book Library

Welcome!

Book Library location: https://storage.inrupt.com/0c51f30b-7160-4b33-a6e6-22d6501f0382/MyBookLibrary/bookLibResource.ttl

Load

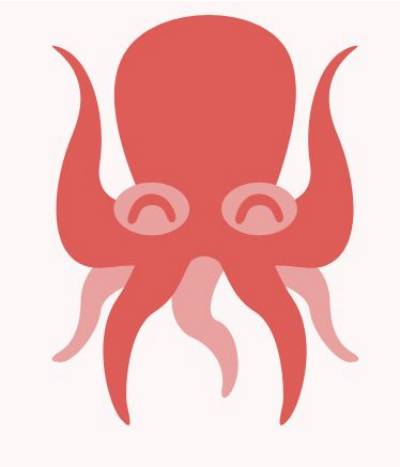
Actions:

- 🚀 List all my books
- 🚀 Get books by 'Bram Stoker'
- 🚀 Get books which contains 'Women' in the title
- 🚀 Login

Code: Spring Boot code example

Use Solid Apps

MEDIA KRAKEN



UMAI RECIPES

うまい

LIQUID CHAT

LiqidChat

Find more apps: https://solidproject.org/apps

SolidProject.org

Solid: Your data, your choice.
Advancing Web standards to empower people.

Get a Pod | Developer Tutorial

Articles about Solid & Solid community links

Articles:

- A prescription for Web3.0
- Inventor of the world wide web wants us to reclaim our data from tech giants
- Inventor of the Web looks to fix internet
- Exploring personal data stores at the BBC
- Sir Tim Berners-Lee is building the web's 'third layer.' Don't call it Web3

Community links:

- Solid meetups
- Solid on GitHub
- Getting started
- Specifications
- Inrupt developer documentation
- Solid innovation team page
- Solidproject.org

Used icons:

- Books icons created by Freepik - Flaticon
- Idea icons created by geotatah - Flaticon

Thank you

Questions?

https://timea.solidcommunity.net

https://github.com/timea-solid

@TimeaTurdean

https://www.linkedin.com/in/timeaturdean/