CERN-Solid Code Investigation
Final Presentation
Jan Schill (IT University Copenhagen)
23rd of June 2021
Overview

1. Introduction
2. Solid
3. Indico
4. Proof of Concept
   - Comments in Indico events
   - Indico Conference Registration from pod data.
5. Challenges, Advantages, Gaps for CERN and Solid
6. Continuation in CERN-Solid Collaboration
7. Conclusion
Introduction

• **Context**: Loss of control over data, loss of innovation
• **Goal**: Investigation of decentralized storage in a centralized system
Solid

- **Social Linked Data**, is a project, a standard, an ecosystem, a movement and a community initiated by Sir Tim Berners-Lee.
- Allows people to control *where* their own data are stored and *who* has access to them.
- It combines existing W3C standards and is built on top of the existing Web.
The Data Pod

A decentralised data store for one’s personal data. A pod is like a secure personal Web server for all kinds of data.

- Data is stored as *Linked Data*, i.e. the resource gets its own HTTP URI on the Web.
- The pod is described by a unique WebID. WebID examples:
  - https://timbl.inrupt.net/profile/card#me
  - https://dimou.solidcommunity.net/profile/card#me
  - https://janschill.net/profile/card#me
The Solid Server

A Web server that stores users’ pods, with support for access control and optionally identity service.
Ideally Solid Is About Escaping From This Situation

Taken from: https://www.w3.org/DesignIssues/CloudStorage.html
Indico

- Open-source tool for event organisation, archival and collaboration
- Resilient and reliable for over 20 years
- No incentive for user data in modules of
  - Conference registration
  - Meeting comments

“Indico is used every day at CERN to manage more than 600,000 events of different complexities and 200 meeting and conference rooms.”
CERN-Solid
CERN-Solid presentation at the December 2020 Solid World
by Jan Schilli (itu.dk), Maria Dimou (CERN)
Thursday 3 Dec 2020, 16:00 → 17:00 Europe/Zurich

Description:
The talk is prepared for the December 2020 Solid World webinar.
This is a monthly event where Solid implementors share their experience.
All material and recording will be linked from the Solid events' index.
The talk is about the reasons and status of the CERN-Solid code investigation project.
Progress is monitored in https://github.com/janschilli/uni-research_project
Indico - what is: https://getindico.io/
Indico - the repo: https://github.com/indico/
Please contact Maria Dimou for further information on the CERN-Solid collaboration.

Contact: maria.dimou@cern.ch
The CERN-Solid Code Investigation Project

1. Review Solid specifications
2. Evaluate Solid implementations
3. **Enrich Indico with Solid principles**
   - *Comments* in Indico events via Solid pod authentication.
   - *Registration* in Indico conferences with personal data taken from the Solid pod.
4. **Make recommendations on Solid adoption in CERN applications**
5. **Document challenges, advantages, gaps**
6. **Continuation of CERN-Solid Collaboration**
Details on the Proof of Concept (PoC)
Comments to Indico Events via Solid Pod Authentication

Thomas Baron · Apr 26
Also I noticed that when I entered comments while I was not logged in Indico, these comments disappeared after a refresh

Thomas Baron · Apr 26
I have delete option on all comments event those not made by me, I guess that is wrong is it?

Thomas Baron · Apr 26
test again

Tim Smith · Apr 20
Thanks for identifying the cause of my disappearing comment :)

Pedro Ferreira · Apr 19
Yay! It works! Well done!

Tim Smith · Apr 15
Excellent, many thanks for giving me the opportunity to comment that I have no comment :)

CERN e-learning · Apr 14
This is another project, which now has a pod and is delighted to contribute to this wonderful app! Bravo Jan!

CERN Slides app · Apr 14
I have several pods. I wonder via which Solid login I am entering this comment now.

Maria Dimou · Apr 6
This is a new comment that I wish to edit on my Solid pod and see it changed there and here. This is the content after edit

Comment is unavailable.
Why is this comment unavailable?

Jan Schill · Apr 1
Welcome to the solid-comment POC. Please write a comment.
What You See in Your Data Pod

- bookmarks
- favicon.ico
- inbox
- private
- profile
- public
- robots.txt
- settings

- solid comment

- indico solid test cern ch 1

- 20210406T085606Z.ttl
- 20210406T085606Z.ttl.acl.txt
- 20210406T150956Z.ttl
Details on the Code for *Comments*

- Client-side developed JavaScript application
- Self-contained, can be re-used in other applications
- Stores one comment in one file on data pod
- Communicates with data pod directly
- Needs authenticated Indico session
- Indico holds the reference to the location of comment
Details on the Code for Comments (continued)

- **Performance**: $n \times 2 + 4$ requests with $n$-comments
  - Not mentioning slow running data pods
- **Availability**: Data pods not reachable
  - Cache the comment
  - or always fetch new?
- **Usability**: Control access in authentication flow suboptimal
- **Data Integrity**: Data can be changed freely on data pod
  - Digital signatures
  - *Verifiable Credentials* (recently announced to collaborate with Solid)
### Indico Conference Registration via Solid Pod

#### Data - Prompt

**Thesis submission: Conference registration autocomplete**

1 June 2021

**Overview**

**Registration**

**Participant List**

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**Document to use for autofilling:** [https://janschill.net/profile/card#me](https://janschill.net/profile/card#me) ✚ Autocomplete

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**Personal Data**

<table>
<thead>
<tr>
<th>Title</th>
<th>– Choose a value –</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Name *</td>
<td>Jan</td>
</tr>
<tr>
<td>Last Name *</td>
<td>Schill</td>
</tr>
<tr>
<td>Email Address *</td>
<td><a href="mailto:schill@hey.com">schill@hey.com</a></td>
</tr>
</tbody>
</table>

*The registration will be associated with your Indico account.*

<table>
<thead>
<tr>
<th>Phone Number</th>
<th>(+41) 123 45 6789</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Affiliation</th>
<th>IT University of Copenhagen</th>
</tr>
</thead>
<tbody>
<tr>
<td>Position</td>
<td>Student</td>
</tr>
<tr>
<td>Address</td>
<td>Rued Langgaards Vej 18</td>
</tr>
<tr>
<td></td>
<td>2300 Copenhagen</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Country</th>
<th>– Select a country –</th>
</tr>
</thead>
</table>

(All the fields marked with * are mandatory)

**Register**
Indico Conference Registration via Solid Pod Data - Linked Data

<table>
<thead>
<tr>
<th>LD: Subject</th>
<th>LD: Predicate</th>
<th>LD: Object</th>
<th>Indico form</th>
</tr>
</thead>
<tbody>
<tr>
<td>#me</td>
<td>ns:fn</td>
<td>“Jan Schill”</td>
<td>name=“first_name”</td>
</tr>
<tr>
<td>#me</td>
<td>ns:fn</td>
<td>“Jan Schill”</td>
<td>name=“last_name”</td>
</tr>
<tr>
<td>#me</td>
<td>ns:hasEmail</td>
<td><a href="mailto:schill@hey.com">mailto:schill@hey.com</a></td>
<td>name=“email”</td>
</tr>
<tr>
<td>#me</td>
<td>ns:gender</td>
<td>“Male”</td>
<td>Label=“Gender”</td>
</tr>
</tbody>
</table>

\[ns = http://www.w3.org/2006/vcard/ns\]
Details on the Code for *Conference Registrations*

- **Design of implemented module**: retrieve personal information for an Indico conference registration from data pod
- Original idea to store personal information of conference registration in data pod abandoned due to:
  - Sensitivity of payment details requiring reliable data retrieval
  - Archival of events need the data at Indico
  - Management of events/conference need performant data retrieval
Challenges with Solid Status Today

- Few applications using Solid pods so far
- No encryption at rest
  - CERN needs encryption or on-premise hosting
- User interface mostly challenging
- No formal support for the open source solutions.
  - A great enthusiasm in gitter though!
- Solid being a living standard, the specifications also evolve, especially in the Access Control area, leading to varying server implementations.

==> Impact on test-suite results.
Continuation CERN-Solid Collaboration

- Servers
  - Outstanding Solution
    - solidcommunity.net
  - Integration with CERNBox
  - Sandboxed Community Solid Server
  - Own Server Solution

- Applications
  - New applications with Solid in mind
  - Enrich existing applications with more prototypes
  - Structure existing data
Conclusion

- Solid can be easily and naively integrated
  - For more sophisticated solutions more time and efforts are needed
  - Different CERN applications could be more (Solid-)suitable
- Decentralization/Solid faces many challenges
- Active development and new initiatives give hope in Solid