Data Portability in Self-Sovereign Identity Applications

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RQ: How can we achieve interoperability in SSI applications while ensuring usability?

1. Background

Self-Sovereign Identity

- User is the only one managing their own data.
- Uses **decentralized** data storage (blockchain).
- Removes the need to have an account for every service you use.

TrustChain SuperApp

- SSI application under development by the Delft Blockchain Lab.
- Built upon **IPv8**: A library for creating distributed applications, based on a P2P-overlay.

2. The problem of interoperability

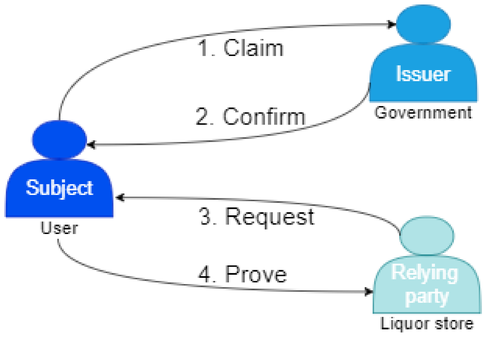
Problem

- Relying parties might use another application than the Super App but must be able to communicate with it in a secure way.

Solution: Verifiable claims

- Advantage: No actual data about the user is sent.
- Disadvantage: Cannot send very extensive data.

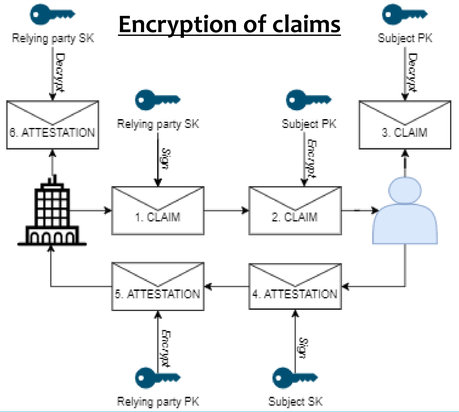
Verifying claims with attested data



3. Communication protocol

- **Public/private key pairs** are used for encryption to keep data secure.
- A registry of **Trusted Issuers** (TIs) maintains a list of peers that are allowed to issue certain identities.
- TIs are assigned by **Trusted Accreditors**, which are listed in a TA registry.
- User data and claims are stored **on the device of the user**, such that only they can access it.

Encryption of claims

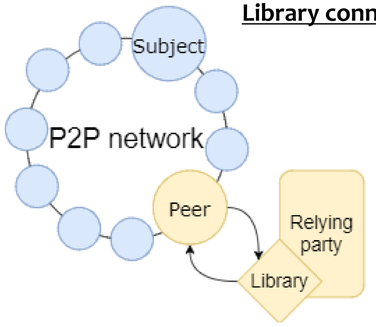


4. Framework design

The framework consists of two parts

- **A library for the relying party.**
  - Easy to integrate for developers.
  - Connects to IPv8 → Becomes a peer in the network.
- **An application in the SuperApp.**
  - Holds the TA and TI, as this is public information.
  - Has an overview of requests and attestations.

Library connection

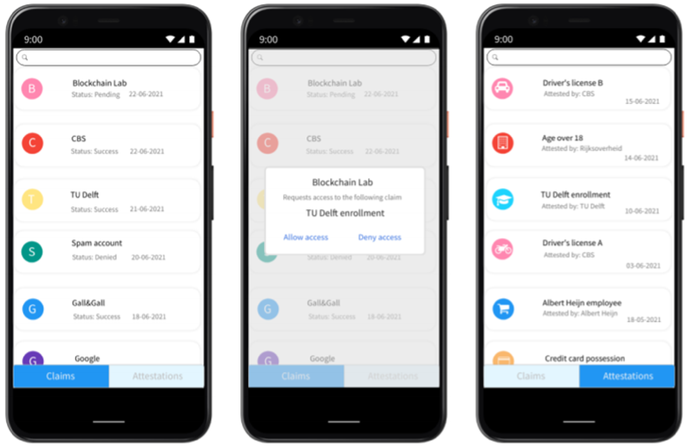


5 Usability review

Improvements based on user study

- **Rephrase**: claims → requests
- **Rephrase**: attestations → Your data
- Add **more information** (buttons) on all the screens and the notification.
- Make the **distinction** between separate items clearer.
- Add **more information** to the requests: What data was requested?

Mock-ups of user interfaces in the Super App



5. Conclusions and further research

Our framework

- ✓ **Secure**
- ✓ **Enables interoperability**
- ✓ **Focus on usability**

Future work

- Research towards secure data storage.
- Use Verifiable Credentials (access requests) to allow peers access to this data storage.
- Our framework can be extended for this purpose, as interoperability and security remain vital.