

# Towards Data Resilience for Fully Distributed Self-Sovereign Identity Managers

## 1. Research Background

- The Identity Crisis [1]
- Self-Sovereign Identities [2] (SSI) - Solution to the Crisis
- The Lack of Data Resilience in SSI Managers [3]

The following research question is at the center of our work:  
**How to make fully distributed Self-Sovereign Identity management systems data resilient?**

## 3. Achieving Data-Resilience for Self-Sovereign Identity Managers

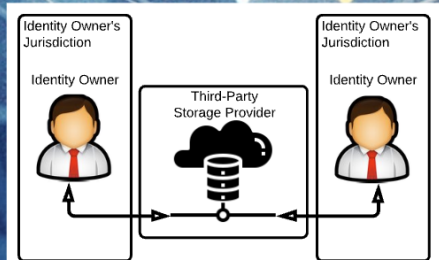


Figure 1: Third-Party Storage Providers

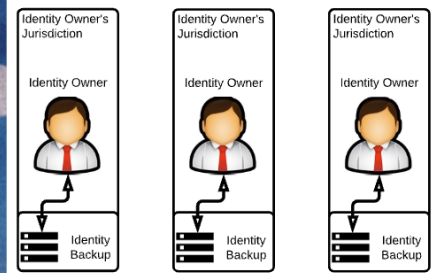


Figure 3: Identity Owner as Storage Provider

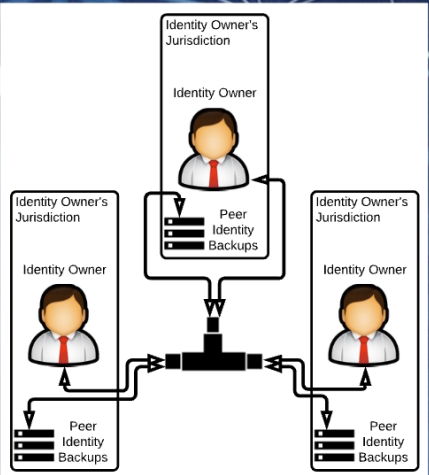


Figure 2: Peer-to-Peer Backup

## 2. Requirements for Data Resilience

Data resilience is achievable through identity backups. Unfortunately, there is no research on the matter. We identified eight additional requirements that traditional backup systems need to become suitable for identity backups.

Control	Availability	Portability	Usability
Transparency	Persistence	Consistency	Access Revocation

## 4. Comparison Between the Three Solutions

	Control	Availability	Transparency	Persistence	Portability	Usability	Consistency	Access Revocation
<b>Third-Party Storage Providers</b>	--	++	--	++	--	++	0	++
<b>Peer-to-Peer Backup</b>	--	0	-	--	+	+	0	++
<b>Identity Owner as Storage Provider</b>	++	0	++	+	++	+	0	0

## 5. Proof of Concept Implementation

- Identity Recovery Mechanism
- Transaction Synchronization Mechanism
- Access Revocation Mechanism

## 6. Conclusions

- Formal Specification for SSI Backup Systems
- First Steps Towards Data and Disaster Resilience
- Adoption of Self-Sovereign Identities

## References:

[1] Gergely Alpár, Jaap-Henk Hoepman, and Johanneke Siljee. The identity crisis. Security, privacy and usability issues in identity management. 2011.  
 [2] Sadek Ferdous, Farida Chowdhury, and Madini O. Allassafi. In search of self-sovereign identity leveraging blockchain technology. 2019.  
 [3] Dirk van Bokkem, Rico Hageman, Gijs Koning, Luat Nguyen, and Naqib Zarin. Self-sovereign identity solutions: The necessity of blockchain technology. 2019.

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