



Editorial: Establishing Self Sovereign Identity with Blockchain

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Editorial on the Research Topic

Establishing Self Sovereign Identity with Blockchain

Digital identity is a divisive topic. This is especially true of the Self-Sovereign Identity systems and standards being established today using decentralized architectures with blockchain technology foundations.

Self-Sovereign Identity (SSI) places individuals in control of their personal information; practitioners draw an analogy with physical wallets because a collection of digital identity credentials held in an SSI digital wallet are used within the digital realm in a similar way to paper and plastic credentials used in everyday life.

Fundamentally, the SSI approach serves to wrest control of digital identity from long-established centralized systems and authorities, democratizing and helping to rebalance the distribution of online power between individuals and institutions.

SSI represents a paradigm shift in the way digital identity is commonly managed and controlled today, presenting a serious alternative to many existing business models. This could provoke vested interests and opposition from global institutions and political structures that rely on their centralized digital identity infrastructures.

This Research Topic aims to provide a rich resource for identity practitioners, researchers, technologists, adopters, and policymakers to understand and advance the subject of SSI. While there is a wealth of publicly available material, this Research Topic provides the rigor of community peer review and the trust and confidence that this engenders.

The editors set out to curate a wide-ranging Research Topic of new academic research coupled with real-world experience and in-depth knowledge on the realities of implementing SSI. The topic brings together diverse perspectives from authors and reviewers invited from academia and industry, drawn from 12 countries and four continents, reviewed over a 2-year span. Several contributors have devoted their careers to SSI and been instrumental in driving SSI to where it is today, on the foothills of widescale adoption.

The 2-year curation period unintentionally incorporated the onset of the COVID-19 pandemic that hastened the use of online services, bringing debates around decentralized vs. centralized systems into the mainstream media. The pandemic created an unplanned pause in progress on this topic as most contributors were affected and many turned their energy to applying SSI technologies to the public health crisis, forming global collaboratives focused on helping global trade and travel to restart safely using privacy-preserving health credentials. Several papers were delayed and then revised in this light.

A common thread binding this topic together is the open standards that have emerged from the global SSI community. The Verifiable Credentials Data Model is now a W3C recommended standard. Coupled with Decentralized Identifiers (DID), these standards can ensure

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interoperability between SSI ecosystems without reliance on centralized identity registries and authorities.

Identity systems have been evolving over centuries, accelerating recently with the advent of the internet, mobile digital devices, and population growth. This context is explored within several of the papers within this topic that are introduced below. The Research Topic provides new and experienced practitioners with a grounding on the development of identity systems, arriving at the rationale for SSI today within their own context. On a broad scale, a useful external reference on the historical development of identity systems and SSI can be read here [Young et al.](#)

The characteristics of SSI apply naturally to the *Blockchain for Good* forum inhabited by this Research Topic. This is highlighted by two case studies related to the African continent. The first describes a prototype system to carry out the initial steps of birth registration in an urban Kenyan setting ([Freytis et al.](#)) using an identity system based on Verifiable Credentials and Decentralized Identifiers. Another outlines an ambitious solution to develop a blockchain based SSI backbone for Africa ([Darnell and Sevilla](#)) that seamlessly incorporates government issued identity documentation, providing a strategic vision that builds on research around the rate of mobile technology innovation within Kenya.

An underlying theme is the deep concern with the prevailing wind of global capitalist society and systems that prioritize profit and economic growth over well-being for people and the planet. The decentralized mindset of SSI engenders new possibilities for exploring change in our economic thinking and value accounting practice ([Manski](#)) and the need to design compelling value propositions to drive SSI adoption ([Lockwood](#)) that can play a part in addressing these concerns.

A common misconception of SSI is that the digital credentials are all self-certified and cannot be trusted in the way credentials issued by centralized trust authorities are. This is not true and, in fact, there is a sizable opportunity for today's trusted credential issuers to deploy their credentials into new decentralized channels that will provide security, privacy, and process efficiency benefits for all parties. Holders can take control of their data and eliminate the need for passwords. Issuers and relying parties dramatically reduce their exposure to data security risk by reducing their reliance on centralized identity silos that are a magnet for cybercrime.

This topic is a resource for those seeking to understand the building blocks and challenges of creating and growing SSI identity networks. Developing an SSI system is not straightforward; it takes a journey of collaboration and

compromise. The Sovrin Network ([Windley](#)) identity metasytem is discussed and this itself is a deployment of Hyperledger Indy ([Abramson et al.](#)). Real-world lessons and recommendations are offered by the creators of a consortium-based approach to building an identity network for broad adoption across Canada ([Boysen](#)), based on SSI principles with blockchain. An insightful perspective is provided on high-profile projects in education, offering workable solutions to the key challenges within the blockchain-enabled, European digital credentials sector ([Grech et al.](#)). Arguably, SSI adoption still requires significant design-focused work at the human interface layer ([Lockwood](#)).

SSI relies on decentralized technology systems, governance, and compatible trust frameworks. These are complex concepts, and the successful establishment of SSI needs technologists and policymakers to work together ([Chango](#)) and appreciate their respective perspectives on digital identity.

At the time of writing, the DID specification stands on the brink of acceptance by the W3C as a new internet standard. Unsurprisingly, the key objectors to this milestone are a trio of global tech firms that control a large section of the web browser market and perhaps perceive a threat rather than recognizing a golden opportunity to embrace SSI for the benefit of all.

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