

Bosch Research

Economy of Things – Contributions to the community

Self-Sovereign Identities (SSI) – user-focused concept for data-efficient identity management

Renningen, November 18, 2021 – To enable individuals, companies and things to interact, do business and network securely and digitally, a trustworthy and reliable identity system is required. If the aim is to have a system of authentication for humans, organizations and machines that is also particularly user-focused, then the approach has to center around data efficiency and data sovereignty. “Since offering users control and sovereignty over their own data is a highly desirable goal, we are working with innovation partners to establish an identity system that works without any central data collector and is operated equally by many participants,” says Dr. Nik Scharmann, Project Director of the “Economy of Things” (EoT) strategic advance engineering project at Bosch Research. Self-sovereign identities – SSI for short – is the chosen approach.

SSI technology – decentralized and across all domains

The features that are characteristic of this kind of identity data infrastructure are their decentralized structure, data efficiency and cross-domain functionality. When digital identities are managed on a decentralized basis, they are, as a result, independent of any intermediary that stores the data and manages it centrally. After all, as soon as a third party acts as a central hub, users generally lose control over what happens to their data and who can view it. SSI is quite different. The owner of the identity directly manages the identity attributes such as machine ID, personal birth data or company master data, while the identity itself is managed decentrally. This is because SSI technology has no central service controlled by a third party, as is the case with logins and ID checks via video ident. With SSI, only the public keys required to verify identity characteristics are stored decentrally – on a blockchain, for example. This blockchain is operated decentrally by multiple independent servers and therefore offers much better protection from the influence and manipulation of individual players. Experts refer to this concept as distributed ledger technologies (DLT). From a technical perspective, and in the context of identities, this is a decentralized synchronization layer for cryptographic material that is needed to verify attributes – what is known as a decentralized public key infrastructure (DPKI). Global standards driven forward in the World Wide Web Consortium and the Decentralized Identity Foundation and open-source publication of standard components are to make it possible for various IT systems to interact and for every player to participate independent of any third party.

Players can create and manage identities themselves – without having to submit unencrypted data to an external service provider, for example. “SSI technology networks people, companies and machinery using a standardized basis and thus removes some of the obstacles to digital interaction,” says Stephan Hoeh, Head of Product Area User Management at Bosch.IO. In this particular Bosch subsidiary, he is responsible for ensuring the SSI approach leads to product developments. For users, this can lead to the following applications. Instead of having to reveal new data over and over again for every action – to buy a rail ticket, to hire a car, to check into a hotel – users pull out a “digital wallet”, as it were, and authorize access without revealing data unnecessarily. After all, SSI makes it possible to reveal identity data selectively, that is to say, the owners of the data can decide which data or sections of documents are shared under which

circumstances. This could be the last name only, for example. Using cryptographic processes makes it possible to prove that this selection of data truly refers to the correct identity data. The SSI technology reduces the disclosure of information to the minimum required – across all industries and sectors. “The SSI system is capable of crossing many domain boundaries without surrendering control of the data. The standard solutions currently on the market cannot achieve this so easily,” says Scharmann.



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Use in collaborative data space projects

In Germany and Europe, SSI is really starting to take off, driven by the creation of collaborative data space projects. Alongside questions relating to SSI, the major challenge is managing all the players in such a way that the benefits of the ecosystem are at the forefront of the transaction for all parties. For an Economy of Things to be operated openly, neutrally and sustainably, and without a platform operator working in a similar way to a monopoly, it needs a regulatory framework (good governance) that transparently describes the necessary structure and the process of collaboration. The rules of governance are defined in contracts, providing the cooperation with legal certainty and stability. The trick is finding the correct balance between revising and defining the framework. Previous large-scale cooperation projects involving data platforms have shown that conventional organizational structures are not conducive to working efficiently in the long term. At the same time, fully decentralized digital platforms cannot replace organizations! The objective of the EoT team’s research is therefore to combine technical decentralization and central management bodies to ensure the best possible economic system. As Scharmann says: “We are determined to rise to the wide-ranging challenges of cryptology, economics, law and software development so as to lay a resilient business foundation for successful cooperative data spaces.”