Innovative concepts and software for managing digital master data and certificates

Companies today manage and maintain master data from business partners in multiple instances in various in-house IT systems – and do the same with their own master data in third-party systems. Each company has to invest a great deal of time and money in ensuring this data is of good quality. This is due to the high number of data sets created in the process – which amount to several million in the case of major corporations. In addition to this, suppliers have to submit hundreds of certificates year after year to customers such as car manufacturers. Sustainability certificates have recently become increasingly important, too. In practice, this usually results in a considerable amount of manual work on both sides that is very time consuming and prone to errors. The team responsible for the strategic advance engineering project "Economy of Things" (EoT) at Bosch Research is working with partners on an innovative concept that aims to tackle these very issues.

Principles and advantages of Self Sovereign Identity (SSI)

"We are developing a solution based on the principles of Self Sovereign Identity (SSI) technology," explains Werner Folkendt, an industry expert on the development team, adding: "That means every legal or natural person looks after their master data themselves. They have sovereignty over their data. The company agent software then creates a decentralized identifier (or DID, a localized, self-managed ID number) for legal persons. This DID and the associated company master data could be considered a kind of digital business card that you carry around with you in a virtual company briefcase and can present to your business partners when necessary, along with other electronic forms of ID such as bank cards, tax identification numbers, etc."

Once such a business card and the included electronic IDs have been created, a sort of "certified copy" of them can be sent to the company agent software of partner companies and thus exchanged with others. This takes place via secure communication channels provided by the SSI technology. These communication channels can be used to transfer the data in an encrypted and cryptographically protected format, thereby avoiding the problem of phishing, as every partner knows who will receive the data at the other end of the communication channel. In addition, data is not stored with any intermediaries. All this also applies to company certificates. The company agent software remembers the business partners for every business card and every certificate that has been distributed. As a result, changes and updates can be communicated and queried automatically. Besides being more efficient, this approach is first and foremost less susceptible to errors – to give just two key advantages.

The concept of verifiable credentials also comes into play, with a standardized format making shared master data and certificates machine-readable. On top of this, the signature added by the publishing party ensures the data cannot be tampered with. For the first time, addresses or certificates can thus be shared, checked, and incorporated into business partners' systems in an automated process, with the software solution taking care of everything behind the scenes.
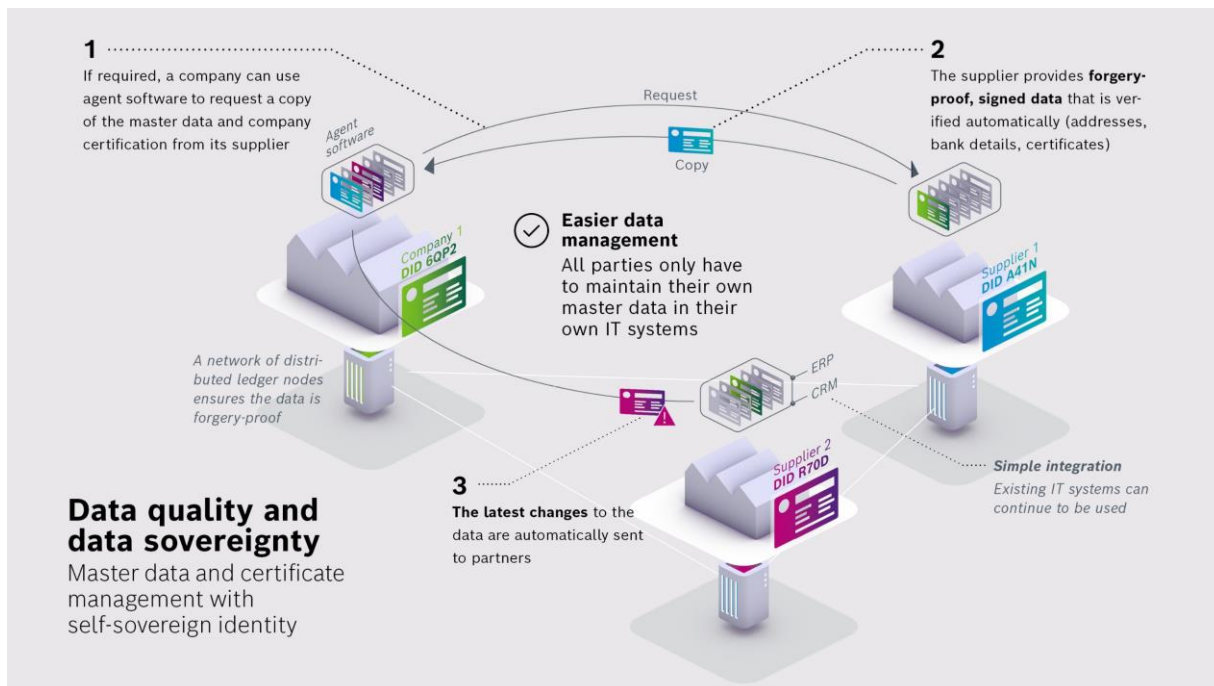
The self-sovereign identity principle ensures greater data quality and sovereignty in master data and certificate management.

"This principle does not require a centralized IT platform, which is a very important feature of our concept. From a technical perspective, the solution is based on a distributed ledger system on the one hand and company agent software at each company on the other. The latter is developed and provided as open-source software," Folkendt explains.

Flexible solutions for small and medium-sized companies

The EoT team at Bosch Research has also thought about smaller companies. After all, not everyone is able and willing to operate network nodes and install agent software. In such cases, service providers acting as master data administrators take care of this task, once again following the principle of decentralized data storage and ensuring owners retain sovereignty over their data. Only the automated transfer is assigned externally. Service providers can thus expand their product range and also benefit from the technology. In the case of microenterprises, apps on cell phones will be used to share the data based on the same principles via peer-to-peer networks. Depending on the functional scope, it may be necessary to establish a connection to the distributed ledger system.

The goal: To roll-out an interoperable master data and certificate management system for companies that can be used internationally

Whatever the size of the company, the EoT team is working with partners to build prototypes over the coming months for all application scenarios and to create a production-ready minimum viable product. The goal is to roll-out an interoperable master data and certificate management system for companies that can be used on an international scale.

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