Bosch Research

Economy of Things – Contributions to the Community

Publicly funded iBlockchain research project – using blockchain technologies efficiently and securely for industrial applications

The publicly funded iBlockchain project (short for “Industrial Blockchain”) aims to comprehensively and systematically research solutions for industrial applications based on blockchain technologies. The six research partners in total, led by the coordinating partner Ruhr-Universität Bochum, also include Bosch. The company’s role in the project is to ensure a strong practical focus on industrial manufacturing processes. Firstly, this means developing an Industry 4.0 demonstrator. Secondly, Bosch will be helping design and then implement scalable basic technologies (e.g. second layer).

Motivation

Blockchain is a relatively new technology that first attracted worldwide attention with the launch of the cryptocurrency Bitcoin. Yet it is more than just the technology behind Bitcoin. Blockchain technologies are currently initiating changes in various markets and sectors where business models, products and services are based on network transactions. Manufacturing and logistics processes are also being increasingly networked in industrial environments, with machines interacting autonomously with one another and exchanging valuable information. It is particularly important to safeguard data and process integrity in this respect. Features of blockchain technologies such as decentralization, the use of cryptography and consensus-based decision-making can offer advantages in this area.
However, to fully harness the potential of blockchain technologies for industrial applications, a number of challenges still need to be overcome. The complexity involved in developing blockchain protocols and applications remains comparatively high. Conflicting goals exist, for instance, with regard to decentralization, scalability and security, which need to be resolved.

Goals and steps forward

The project aims to comprehensively and systematically research solutions for industrial applications based on blockchain technologies. The project team is analyzing and evaluating the relevant technical and economic principles. Appropriate blockchain protocols and smart contracts are being examined. Smart contracts take the form of programs that run automatically when certain criteria are met. They require trusted access to signed sensor data from physical devices. In the example of a freight forwarding company, this may mean that a smart contract contains the terms and conditions of transportation, such as adhering to secure transportation routes. To verify the route, the contract needs the position data for the route traveled, at intervals of one kilometer, for example. Integrating this type of sensor data into a blockchain network requires oracles. A central element of the project is the development of secure and trusted hardware-based oracles. The results of the project are being implemented in demonstrators and evaluated in terms of their technical feasibility for industrial applications. They need to show a high level of IT security and be cost-effective, resource-friendly and scalable.

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Innovations and opportunities

Blockchain technologies offer the prospect of making lasting changes to and overhauling business models, processes and transactions, both in industrial environments and in the public sector. The project results will help answer technological and economic questions that remain unresolved from today's perspective.

Key project data

Consortium:

- Ruhr-Universität Bochum (coordinating partner)
- Technische Universität Darmstadt
- NXP Semiconductors Germany GmbH, Hamburg
- Robert Bosch GmbH, Gerlingen-Schillerhöhe
- brainbot technologies AG, Mainz
- Frankfurt School of Finance & Management gGmbH, Frankfurt am Main

Volume:
7.5 million euros
(66 percent funded by the German Federal Ministry of Education and Research)

Runtime:
Until 09/2022

Source (only German):
https://www.forschung-it-sicherheit-kommunikationssysteme.de/projekte/iblockchain

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