



Five questions, five answers:

## **Blockchain – A distributed database for better transparency and security on the internet of things**

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### **1. What does “blockchain” mean?**

A blockchain comprises databases that store sets of transactional data. These allow private individuals and businesspeople to store sensitive data or figures (e.g. on sales transactions, deliveries, or money transfers) on many distributed computers, thus eliminating the need for a central server operated by, say, a bank. Interlocking chains ensure it is impossible to falsify data exchanged among manufacturers, logistics companies, repair specialists, and other users.

### **2. What is the principle behind blockchain?**

Digital information is stored block by block. The type of information is secondary; a blockchain can store a contract, certificate, or will. Everybody in a blockchain network can check independently whether the other parties to an exchange of data are using the same blockchain version. In other words, all parties can access some or all information in a chain. As a result, manipulating data would require an unbelievable amount of effort – assuming it is even possible in the first place.

### **3. What are the benefits of blockchain?**

Transparency, security, and efficiency are the three key advantages of blockchain. For example, a trusted third party is not required to vouch for money transfers. Users therefore have no need for banks, insurance providers, intermediaries, or auditors. Blockchain users can depend on each other, sealing the deal with a kind of virtual handshake. This innovation also makes financial transactions faster, less expensive, and more secure. In consequence, notaries and insurance brokers are being compelled to reduce their traditionally high fees for services rendered.

### **4. Where is blockchain used?**

Blockchain technology is used primarily wherever data tracking is important. Postal services, for instance, can use blockchains to prove that a package has been delivered. Some hope to exploit this technology in the future for the

authentication of digital documents. The blockchain principle can also be applied to the purchase or sale of vehicles, real estate, and stocks.

## **5. How does Bosch use blockchain?**

Bosch is currently researching many possible applications. One project at an advanced stage concerns odometer fraud in motor vehicles. In this project, a connected test car regularly sends the current odometer reading to a secure distributed database that is accessible worldwide. A digital certificate verifies that the data is authentic. Only the vehicle owner can read the data, which is always encrypted before it is sent. This ensures compliance with data security requirements because no organization can access the vehicle identification number and the vehicle's odometer reading – neither the original equipment manufacturer, nor Bosch, nor its project partner TÜV Rheinland, a German certification authority. When the owner decides to sell their vehicle, they can choose whether or not to have a certificate issued to verify the authenticity of the data on record.

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*The Bosch Group is a leading global supplier of technology and services. It employs roughly 390,000 associates worldwide (as of December 31, 2016). The company generated sales of 73.1 billion euros in 2016. Its operations are divided into four business sectors: Mobility Solutions, Industrial Technology, Consumer Goods, and Energy and Building Technology. As a leading IoT company, Bosch offers innovative solutions for smart homes, smart cities, connected mobility, and connected manufacturing. It uses its expertise in sensor technology, software, and services, as well as its own IoT cloud, to offer its customers connected, cross-domain solutions from a single source. The Bosch Group's strategic objective is to deliver innovations for a connected life. Bosch improves quality of life worldwide with products and services that are innovative and spark enthusiasm. In short, Bosch creates technology that is "Invented for life." The Bosch Group comprises Robert Bosch GmbH and its roughly 440 subsidiaries and regional companies in some 60 countries. Including sales and service partners, Bosch's global manufacturing and sales network covers nearly every country in the world. The basis for the company's future growth is its innovative strength. At 120 locations across the globe, Bosch employs some 59,000 associates in research and development.*

*The company was set up in Stuttgart in 1886 by Robert Bosch (1861-1942) as "Workshop for Precision Mechanics and Electrical Engineering." The special ownership structure of Robert Bosch GmbH guarantees the entrepreneurial freedom of the Bosch Group, making it possible for the company to plan over the long term and to undertake significant upfront investments in the safeguarding of its future. Ninety-two percent of the share capital of Robert Bosch GmbH is held by Robert Bosch Stiftung GmbH, a charitable foundation. The majority of voting rights are held by Robert Bosch Industrietreuhand KG, an industrial trust. The entrepreneurial ownership functions are carried out by the trust. The remaining shares are held by the Bosch family and by Robert Bosch GmbH.*

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