



Blockchain technology



What is the situation?

Any time we make a transaction online, whether it is buying a product, making a financial transaction, selling a property, or managing an insurance policy – we need to ensure that the data that is being transmitted and stored and the payments that are being made as part of these transactions cannot be manipulated, and that we do not lay ourselves open to fraud. What we need is a trustworthy solution that makes it possible to trace back a particular transaction in a transparent manner. This is usually done by recording the transaction. For example, any time you transfer money, your bank will keep records of this transfer. The bank serves as an intermediary in the transaction process, but, unfortunately, any intermediary

can be manipulated. So we need to find new ways of storing data that ensure trust and are tamper-free.

Where does blockchain technology come in?

Blockchain is a type of decentralised database, an 'unhackable' digital registry that keeps records of digital transactions and makes them transparent to all parties involved. This allows digital transactions to be carried out without an intermediary. Transaction-related information is grouped into blocks that are strung into a chain – the blockchain. The term is used to describe the entirety of information that is stored across all blocks of the chain.

How exactly does it work?

Blockchain is a technology that allows data to be stored on the internet in a way that is virtually impossible to hack and makes obsolete the need for a central entity to ensure trust. The blockchain runs on all of the computers forming part of the blockchain network, with each node of the network receiving a complete replica of the blockchain. New blocks of data are linked to older blocks, thus making a chain of blocks – the blockchain. The information stored on the blockchain, for example transaction data, is visible to all members of the network.

The protocol of the blockchain network provides for a number of security mechanisms that prevent fraud and help validate the authenticity of each and every transaction. For example, any time bitcoins are being transferred, the data stored on the bitcoin blockchain will be automatically checked to see whether the person transferring the bitcoins actually has sufficient resources to do so. In order for a transaction to be validated, the majority of the computers that are part of the blockchain network need to approve it. Hacking a blockchain is extremely difficult. This is because every block not only contains data on a particular transaction, but also information for verifying the authenticity of the preceding block. If someone wanted to hack one block on the chain, they would need to hack all of the subsequent blocks and also change the information there. This kind of computing power is usually not available to individual members, but only to the majority of the network and therefore makes the blockchain virtually impossible to hack.

Where blockchain technology is used

As blockchain technology makes the need for a central entity to ensure trust obsolete, it can be used in many different ways. It is being hailed as the solution to a variety of applications across the insurance industry, banks, fintech start-ups, industrial companies and the public sector. Blockchain has become widely known as the technology behind bitcoin – the world's best-known crypto currency (digital currency). But there are now efforts to use blockchain technology for digitising land registers, transforming stock trading, and using smart contracts to secure supply chains. As can be

seen from the bitcoin example, blockchain technology is ready to be used. However, whether it can also be used successfully in other sectors remains to be seen. Whether it is stock trading or insurance management – blockchain offers numerous benefits for all sectors. Not only is it virtually impossible to hack, the storing of information in a decentralised manner also means that the technology will remain intact even if one of the nodes breaks down. Practical tests of the technology will show whether it can live up to the expectations and whether it will be accepted by the public.

The 'Smart Data – Innovations in Data' technology programme places a key focus on the transfer of data on the internet. ISÆN (Individual perSonal data Auditable addrEss Number) is a french standardisation initiative for identity management that is based on blockchain technology. This method has been studied as part of the Federal Ministry's accompanying research programme on Smart Data. The study can be found online at http://www.digitale-technologien.de/DT/Redaktion/DE/Downloads/Publikation/smartdata_studie_isaen.html

About Smart Data – Innovations in Data

As part of its technology programme entitled 'Smart Data – Innovations from Data', the Federal Ministry for Economic Affairs and Energy is providing funding for a total of 16 flagship projects undertaken from 2014 to 2018 which are intended to open up the future big data technology market for german firms. Smart Data is part of the german government's High-Tech Strategy and the Digital Agenda. More information about the Smart Data technology programme can be found here: www.smart-data-programm.de.

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