

Blockchain



Overview

- Description: The blockchain technology is a public access database that is the basis of the so called bitcoin protocol^[1]. To prevent manipulation blockchains contain of continuously growing lists of encrypted and linked (transaction) datasets and are redundantly distributed within a network. The used mechanism makes it nearly impossible to manipulate this database.
- State of research: The development of blockchain applications is often divided into three phases^[2]: In Phase 1 blockchain is only utilized as cryptocurrency. In Phase 2 blockchain technology can be applied in the financial sector for so called Smart Contracts . And in phase 3 smart contracts will be enhanced to decentralized autonomous organizational units with own regularities.
- Capabilities: Blockchain technology is able to build up totally neutral, decentralized, absolute trustworthy databases and platforms with an extreme high security level. This can be used for every kind of transaction system and, especially, for trading or transaction platforms with the need for high reliability. Even server providers (i.e. so called node or miners) are not able to manipulate the blockchain.
- Limits: The visibility and the possibility of tracing all transactions could be a disadvantage although all users are anonymous. Weak points in this architecture are the user accounts that might be attacked. Furthermore, growing blockchain databases need a lot of computational power, data space and data traffic because of the redundancy of blockchain architecture.

Further Information

- Key player: Satoshi Nakamoto (pseudonym), ETH Zürich, IBM, University of London, Cornell University, University of California San Diego, Princeton University, University of Illinois, Microsoft
- Readiness: The technology itself has already entered application readiness for cryptocurrencies and is already in use (e.g. Bitcoin). First theoretical concepts for smart contracts on the basis of blockchain technology are in development at the moment. The actual status is marked by fast exploitation of more and more application fields.
- Users: Players in the field of: IoT, Smart Grid, Supply Chain Management, medical sector, finance, media, public sector, Darknet etc.
- Future outlook and forecast: It will take some time (mid-term perspective) until blockchain is advanced enough to enter phase 2 (compare above) and especially phase 3 can be regarded as a long-term perspective.
- Related Technologies: P2P networks, security and cryptography, process modelling
- Links: [1] Satoshi Nakamoto (2008), "[Bitcoin: A Peer-to-Peer Electronic Cash System](#)"; [2] Fraunhofer Gesellschaft, multiple authors (2017), "[Positionspapier Blockchain – Technologien, Forschungsfragen und Anwendungen](#)"

Picture: <https://upload.wikimedia.org/>