

**SMART CONTRACTS: NEW APPROACHE OF PAPERLESS OFFICE
WORK MANAGEMENT IN THE CONTEXT OF BLOCKCHAIN
TECHNOLOGY**

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This work is devoted to studying principles and essence Smart Contracts in the Context of Blockchain. Blockchain technology has considerably changed how we think about secure and transparent transactions, enabling the creation of applications where multiple parties can carry out transactions without needing a trusted central authority. It was proposed consider a smart contract as a digital agreement on a blockchain network that is executed automatically upon fulfilling some terms and conditions.

What are Smart Contracts? Most popular smart contract development platforms. Where smart contracts can be used now? Advantages offered by smart contracts. How smart are Smart Contracts? A Smart Contract – sounds promising. When we meet this term in the context of blockchain technology, it seems we deal with something extra complex and futuristic.

Is it that complicated? Let's find out. Smart contracts are a kind of computer program or algorithm of certain behavior integrated into the blockchain network. If the predetermined conditions, specified by the code, are followed, it triggers the performing of a particular action or sequence of actions. For example, if you put \$5 in a ticket machine and press the «day ticket» button, it will print and dispense a certain – predetermined type of ticket.

As in a paper contract, the fulfillment of the conditions is mandatory. Only in this case, the transaction will be performed, and the users will receive the conditioned result. Once the algorithm is successfully completed and the transaction is correct, smart contracts become a part of the ledger in a blockchain network.

So, we can say that the Smart Contract is a self-executing program with «if... then» logic based on blockchain. Easy enough. However, one smart contract can include several different conditions, and one application can execute multiple smart contracts to perform a consistent set of related processes. There can be as many conditions that are necessary to execute the task successfully.

Currently, blockchain technologies supporting smart contracts are actively used for complex computing tasks that involve artificial intelligence (AI) and

machine learning (ML). This combination of technologies could be the basis for AI-enabled smart contracts and would be able to create very complex, more responsive enterprise-level smart contracts and dApps with the potential to seriously expand the capabilities of this technology, unlike simple smart contracts which can be developed manually. Most popular smart contract development platforms. Ethereum was the first platform in the world where smart contracts were used and even today it is extremely popular among developers. Ethereum now is based on the PoS consensus algorithm. Its smart contracts are written in Ethereum's own smart contract programming language - Solidity. The execution environment for smart contracts is called the Ethereum Virtual Machine (EVM) and is interoperable with other blockchains such as Solana and Avalanche, allowing developers to move their smart contracts to other platforms.

Hyperledger Fabric is an IBM enterprise-focused private blockchain platform that also supports smart contracts, or what Fabric calls «chaincode». The platform is capable of processing up to 20,000 transactions per second with no transaction fee. Hyperledger Fabric runs the code on top of Docker containers which allows a reduction in cost for smart contract applications. Fabric uses traditional high-level programming languages such as Java and Go and leverages Crash Fault Tolerant (CFT) consensus algorithm. For easier and more efficient smart contract development, it offers a set of tools, including Hyperledger Composer. The modular and versatile design of Hyperledger Fabric meets a wide range of industry use cases.

Like other next-generation smart contract platforms, Solana aims to solve scalability problems. It has a record-high speed of 65,000 transactions per second. The main reason for such high performance is that Solana uses an innovative combination of Proof of History (PoH) and Proof of Stake (PoS) consensus algorithms. A transaction fee is rather low - just \$0.00025.

Smart contracts built on Solana can be written in Rust, C++, and C. In addition, the platform is compatible with EVM, allowing developers to run Ethereum-based smart contracts in the Solana ecosystem. Where smart contracts can be used now? Smart contracts eliminate unnecessary paperwork and the cost of expensive intermediaries that are an essential part of traditional contracts, transactions, and exchanges while maintaining the transparency and traceability of the blockchain and reducing counterparty risks. These features make smart contracts a valuable tool for various use cases.

Smart contracts are an essential component of many DeFi (Decentralized Finance) applications and have already significantly influenced their evolution. DeFi applications (dApps) provide services that are alternative to the banking and finance industry – such as trading, lending, borrowing, exchange, and a range of other financial services – as well as entirely new types of products and decentralized business models that can deliver significant value to users.

Blockchain technology in the gaming industry could allow players to get more benefits from in-game purchases and asset accumulation. In games, blockchain technology is usually represented by NFTs based on smart contracts. They help, for example, to avoid developers' manipulations to induce users to make repeated purchases. The user can be sure that the previously purchased artifact will not lose its properties or in-game value after the next game update. The immutable nature of smart contracts will not permit such mischief.

Smart contracts can protect digital artists' property rights by providing transparent royalty rules. For example, the digital environment is a great platform for musicians, especially singles or beginners, to introduce their work to audiences. But low traceability, miserable payouts due to a large number of intermediaries, and long non-transparent royalty payment processes create a lot of problems. With smart contracts, musicians could be paid a certain sum every time a user pressed the play button on one of their tracks, enabling the royalty payout process to be completed in seconds instead of months, eliminating the need for unnecessary third parties and building a direct seller-consumer interaction with their fans.

In addition to the examples mentioned above, smart contracts are already used in real estate, insurance, healthcare and clinical trials, retail, supply chain management, and many other areas.

Advantages offered by smart contracts. So let's resume the benefits of smart contracts deployment: Transparency – the contract is the code, which is publicly available to view for everyone. The transparency, traceability, and immutability of data help to create a better sense of trust; Security – blockchain-based smart contracts offer a very secure and transparent way to document and automate business processes. To enhance the security of storage transactions on the blockchain, data encryption can also be used; Cost-efficiency – processes enabled by smart contracts require less human intervention and no third parties, and therefore it reduces costs; Speed – the absence of intermediaries reduces economic costs as well as time. Immediate automated execution as soon as the conditions are met saves time compared to manual and third-party contracts; Very soon, smart contracts will become even more complex and smarter, and much more widespread as people become more confident and trusting of blockchain technology.

In most team is always here to help you leverage all the benefits of smart contracts. We have chosen Hyperledger Fabric platform to provide the highest level of data protection, reduce costs and make customers' business processes smarter.

References

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