

## **Essay**

### **Blockchain application in Almaty city context**

Blockchain is a distributed ledger technology represented by a continuous sequence of blocks which contains all records about transactions. It differs from an ordinary data base in that the records cannot be edited or deleted. This technology uses many independent users' devices to store the data. Thus, it is a distributed system and if one node fails it still will be functional.

The key point of the public blockchain is the access for everyone. So, any user in the world can join to the network and add or verify some data. Some of the most popular public blockchains networks are Ethereum and Bitcoin. Ethereum is a marketplace for processing smart contracts and decentralized applications. Smart contracts allow the users to make transactions without any third-party automatically enforce the contract rules by its' functions. Moreover, Ethereum is programmable and developers can also build their own dapps. KYC-Chain company is protecting the data of their users via a sequence of cryptographical protocols based on the Ethereum network. The platform distributes responsivity among trusted storages that authorize client services.

On the other hand, private blockchain is a closed network. The access is given to only certain entities. This type of networks set some rules on the rights and restrictions. Private blockchain is usually applied to a specific sector such as financing or government. Hyperledger and Ripple are the common examples of private blockchain. Maersk shipping company is applying private blockchains using IBM's Hyperledger Fabric framework to remotely track the cargo data and streamline global trade transactions. The platform has over a hundred participants with the various custom authorities and had enabled to cut down five middlemen per transaction, while normally shipping process at Maersk company took over 200 interactions.

The root advantage of public blockchains is the high decentralization which leads to strong security and reliability. As the network grows it becomes nearly impossible to successfully attack on the it. Also, the data related to transactions is provided for public access and can be easily verified increasing the transparency of the network.

The biggest disadvantage of the public blockchains is the slow speed. For example, Bitcoin is managing about 7 transactions per second. Public networks have to reach a consensus every time. Another one is the energy consumption. The consensus algorithm, Proof-of-Work, which is used in the most of the public blockchains like Bitcoins requires a high usage of electricity power.

In contrast private blockchains consume less time to reach consensus as there are much fewer participants and the decisions made only by a few authorized nodes. Such a networks reaches speed of thousands transaction per seconds.

The disadvantage of the private networks is that they are more centralized. The security and reliability depend only the authorized nodes. That leads to less transparency and higher vulnerability.

In conclusion, blockchain technology could be applied in many various cases as business to business for organization or business to customer interactions. In Almaty city it could be useful in currency exchange, organizing public government, auditing supply chains and storages and etc. avoiding need of third party or centralized authority services decreasing the transaction fees and trust issues. The smart supply chains can help small and medium business a lot and increase the economic growth in the city. It would track the product on its' way from the supplier to the end customer and increase the quality of good and cervices using the smart-contracts.

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