Blockchain Technology

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Assignment 2

1. Which features distinguish databases from Blockchain ledgers? Provide a comparative analysis of the two.

Answer:

Database:

Generally a database is a data structure which is used for storing information. It is an organized collection or storage of data which is able to store a new data or access an existing data. The data stored in a database can be organized using a database management system. A database is implemented using the client-server network architecture.

Blockchain:

A blockchain is a growing list of records, called blocks that are linked using cryptography. Each block contains a cryptographic hash of the previous block, a timestamp, and transaction data. Here, modification of data is not permissible by design. It allows decentralized control and eliminates the risks of modification of data by other parties with sufficient access to the system.

In a traditional database, a client can perform four functions on data: Create, Read, Update, and Delete (collectively known as the CRUD commands). The blockchain is designed to be an append only structure. A user can only add more data, in the form of additional blocks.

The primary difference between a blockchain and a database is centralization. While all records secured on a database are centralized, each participant on a blockchain has a secured copy of all records and all changes so each user can view the provenance of the data.

Key differences between Blockchain and a Database are:

Database	Blockchain
• Database uses centralized storage of data.	• Blockchain uses decentralized storage of data.
• Database needs a Database admin or Database administrator to manage the stored data.	• There is no administrator in Blockchain.
• Modifying data requires permission from database admin.	• Modifying data does not require permission. Users have a copy of data and by modifying the copies does not affect the master copy of the data as Blockchain is irresistible to modification of data.
• Centralized databases keep information that is up-to-date at a particular moment	• Blockchain keeps the present information as well as the past information that has been stored before.
• Centralized databases are used as databases for a really long time and have a good performance record, but are slow for certain functionalities.	• Blockchain is ideal for transaction platform but it slows down when used as databases, especially with large collection of data.

2. Analyse, using a diagram, how a distributed ledger works, present its main characteristics, and explain how it differs from a "traditional" centralized ledger.

Answer:

Distributed ledger technology (DLT) is a digital system for recording the transaction of assets in which the transactions and their details are recorded in multiple places at the same time. Unlike traditional databases, distributed ledgers have no central data store or administration functionality.

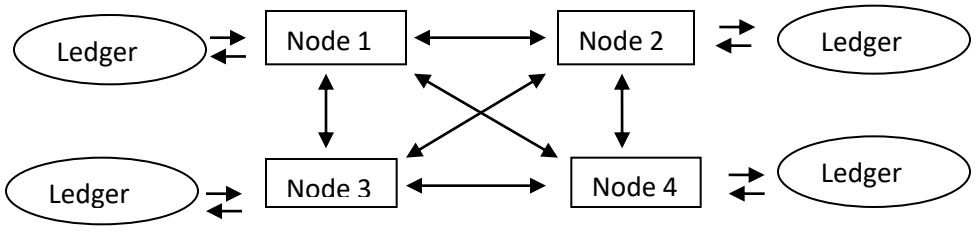
In a distributed ledger, each node processes and verifies every item, thereby generating a record of each item and creating a consensus on its veracity. A distributed ledger can be used to record static data, such as a registry, and dynamic data, such as financial transactions.

Distributed ledger technology (DLT) refers specifically to the technological infrastructure and protocols that allow the simultaneous access, validation and updating of records that characterizes distributed ledgers. It works on a computer network spread over multiple entities or locations.

DLT uses cryptography to securely store data, cryptographic signatures and keys to allow access only to authorized users.

The technology also creates an immutable database, which means information, once stored, cannot be deleted and any updates are permanently recorded for posterity.

This architecture represents a significant change in how information is gathered and communicated by moving record-keeping from a single, authoritative location to a decentralized system in which all relevant entities can view and modify the ledger. As a result, all other entities can see who is using and modifying the ledger. This transparency of DLT provides a high level of trust among the participants and practically eliminates the chance of fraudulent activities occurring in the ledger.



DLT's main difference from traditional, centralized ledgers is that a copy of the ledger is distributed to each node on the network, and every node can view, modify and verify the ledger, which helps ensure trust and transparency.

Interest in distributed ledger technology grew significantly in the decade after the 2009 launch of bitcoin, a cryptocurrency powered by blockchain technology that was the first to demonstrate that the technology not only worked but could scale and remain secure.

From that time onward, organizations across industries experimented with DLT and how it could be used in enterprise processes. Financial services, healthcare and pharmaceutical sectors were early leaders, and supply chain management a common application.

The great advancement of DLT is its ability to minimize or eliminate the often time-consuming and error-prone processes needed to reconcile the different contributions to the ledger, ensure that everyone has access to the current version and that its accuracy can be trusted.

Distributed ledger vs Traditional centralized ledger

Distributed ledgers operate independently of a central authority. This makes them faster and more flexible than traditional centralised ledgers. The fact that transactions are automatically mirrored across all ledgers means that information is shared with minimum delay.

What's more, each distributed ledger goes through its own verification process for each transaction. This means that if a transaction is entered in error, there is a very high chance of that error being caught quickly.

Even if the error is missed by the automated verification process, the fact that multiple human eyes will look at it acts as an effective secondary check.

With traditional centralised ledgers, by contrast, a central authority controls transaction entry. Transactions may be (and often are) copied into other ledgers, sometimes very quickly. They are not, however, subject to any additional verification.

In short, therefore, distributed ledgers undertake security checks on a per-ledger basis whereas centralised ledgers only undertake one round of security checks. This means that distributed ledgers are much more resource-intensive, but also much more secure.

3. Suggest which type of blockchain should be used for the security of donations in a charity organization. What benefits does the blockchain technology introduce in such a scenario? Explain your answer using an example.

Answer:

Now a day, blockchain technology has been implemented in different sectors. The use of blockchain technology allows you to make the process of giving and receiving money more transparent. It is necessary to build a single platform for tracking donations that will track all information regarding gifts, transactions, and donors. Based on blockchain technology, the system provides transparent accounting of operations for donors, charitable foundations, and recipients. A transparent contribution channel should be available on a philanthropic platform, allowing public users and contributors to follow and monitor where, when, and to whom charity donations were disbursed.

Charities are in the business of keeping track of things, like charitable donations and volunteers. So Blockchain's security, trustworthiness, and full transparency make it an ideal tool for charity work.

Managing donations more efficiently is another benefit for charities, as well as improving trust with donors through the ability of being able to track and trace transactions through Blockchain.

What does this mean for charities? In practical terms the use of Blockchain means that if one of the blocks is changed it is immediately evident that it has been altered. This makes life difficult for cyber criminals and hackers. They would find it hard to corrupt a Blockchain without changing every block in the chain, across all versions.

When describing Blockchain the phrase ‘digital ledger of transactions (DLT)’ is used, which means it is duplicated and distributed across computer systems. With Blockchain, transactions are recorded with a cryptographic signature, called a hash.

Each block within this chain of information contains a number of transactions and each time a new transaction is made in this Blockchain, a record is added to every participant’s ‘ledger’. It is essentially a growing list of records.

Any web-based application is a centralized application which means that anything we do on the platform is managed by a server that is owned by a single company. In Decentralized Application for charity funding in which there are two main categories- the campaign creators and donors. With the help of Ethereum Blockchain the information about all the transactions is secured on a blockchain network. Blockchain has a series of blocks which holds funds and transactions and as a result, it does not permit the money to end up in the hands of anyone and minimizes all potentials of it being mishandled.

Blockchain has been around for a while now. As it gains momentum across multiple marketplaces, charities are taking advantage to rejuvenate the sector.

Below are some benefits of using Blockchain in charity.

Boost Trust, Transparency, and Accountability

With an increased ability to track and trace donations, beneficiaries will be able to see who is donating and where the money is going. This transparency can result in more trust for those who will benefit from charitable donations. Additionally, knowing exactly where their money goes when they donate, people might feel inspired to give more.

Improved Security

A blockchain is an immutable public ledger. Any interested party can access data within the Blockchain, but they cannot manipulate or edit it.

Conclusion

Blockchain solutions are still in their early stages and have a long way to go. However, the technology it's already revolutionizing charity and the way people donate. With a bucketful of benefits, Blockchain for charity is here to stay, and the future looks brighter.