DEMYSTIFYING DECENTRALIZATION

Whether you're creating new payment networks, building Web3 apps or establishing ownership in the metaverse, decentralized technology (DLT) seems to be everywhere these days.

DLT is ushering in a new era of financial infrastructure. To understand what's so exciting about DLT, just compare the opposites: traditional databases run by a single administrator and the public DLTs that power Bitcoin, Ethereum and most of the world's crypto currencies.

TRADITIONAL DATABASE MODELS	PUBLIC DISTRIBUTED LEDGER MODELS

DEFINITION

Traditional database models:

Whether they store data in centralized or distributed models, traditional database models are controlled by a single administrator.

Data can be accessed remotely by users and systems.

Public distributed ledger models:

Also known as a blockchain, this is a decentralized network with no central authority.

Computers known as nodes communicate with each other to maintain a record of data. The administration is performed by all of the nodes and stakeholders that use it.

DATA CHANGES

Traditional database models:

When a change is made, the record is available to any system or person accessing the system.

Transactions can be undone or modified after the fact by the database administrator.

Public distributed ledger models:

Nodes validate transactions and share them across the network.

Once changed, a transaction cannot be undone, but it can be reversed by a new transaction if both of the transaction signers agree.

SPEED AND PERFORMANCE

Traditional database models:

Changes are made in a limited set of locations, so they can be quickly recorded and made available to any person or system accessing the system.

Traditional models generally have greater transaction capacity relative to public DLT because they don't require the onerous computational validations that most DLT models do.

In addition, traditional models have evolved many techniques to improve performance, including distributed processing and parallelism.

Public distributed ledger models:

The mechanisms for validating transactions can make it slower to validate a new transaction compared to traditional models.

Some of the most prevalent public DLT solutions are constructed as proof-of-work models and require high computational power to validate transactions.

Proof of stake, layer 2 protocols, sidechains and other methods have been designed to help improve processing performance. The so-called Ethereum merge is an example of a proof-of-work network switching to a proof of stake, to address performance and environmental impacts.

RESILIENCY

Traditional database models:

Traditional systems represent a single failure point, even if the administrator has robust disaster recovery set ups.

Public distributed ledger models:

All of the nodes on the network would have to go down to lose the data.

With nodes distributed across many systems, geographies, owners and networks, the likelihood of them all going down is extremely low.

ABILITY TO UPGRADE

Traditional database models:

Changes can be made at any time by the database administrator or operator and are done so at their direction.

The change is well controlled, and it's relatively easy to define the time and date that it will take place.

Public distributed ledger models:

Any changes in the underlying software must be agreed to and adopted by most node operators. If the change is significant and the node operators don't all agree on it, then a so-called "hard fork" may be created. This is where a branch of nodes splits off from the original network.

REGULATORY CONSIDERATIONS

Traditional database models:

The data can be tightly controlled, so the administrator can ensure it's not shared outside authorized users and that it's running on certain hardware in a certain location.

It can also be said to be adhering to data protection rules within the country in which the data or users are domiciled.

Public distributed ledger models:

While some data is encrypted, other data is public. Moreover, each node can carry the data for all participants. So, while the data itself might be protected, it may physically exist in any location where a node is operating.

This can make data privacy and protections more complex to engineer.

DATA SECURITY

Traditional database models:

Any unauthorized access to the database exposes all the information.

A traditional database is like a vault in the sense that a break-in puts everything stored in the vault at risk. This creates a powerful incentive for bad actors to invest time and computing power to break in.

Public distributed ledger models:

DLT is a very secure way of protecting data. Data is changed through a cryptographic process, so only key holders can change or access the protected data.

If a traditional database is akin to a vault, DLT is like a set of lock boxes. A thief would have to break into every single lock box to access all of the data stored in the system.

TRANSPARENCY AND PRIVACY

Traditional database models:

Participants can only see reporting requirements or published data that is made available by the administrator.

The administrator has full details of the data and the users that have accessed the data. The data is only available to authorized users.

It's up to the administrator, in compliance with local data retention rules, to decide if historical data should be archived and who is allowed to access it.

Public distributed ledger models:

The data records and history are contained within the blocks of the public ledger. So, anyone accessing the network or operating a node can see the transaction history going back to the very first record.

Transactions are pseudonymous, represented by their addresses in the record. Regulatory and law enforcement agencies can already access this data and work to connect these addresses to real-world people, institutions or events. This process creates lists of the addresses of known good or bad actors, which are shared among both enforcement agencies and market participants.

Public distributed ledgers are creating new frameworks for supply chain management, person-to-person payments, lending, borrowing and investing.

While the enthusiasm is warranted, these models bring unique challenges and complexities. If you haven't started already, then now is the time to expand your understanding - and find trusted partners that can help you access these technologies in a safe and efficient way.

For more insights into public DLTs and blockchain, including their role in cryptocurrency, watch our webinar.

About FIS

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