Future of Insurance: Blockchain and Big Data

August 10, 2017

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National Conference of State Legislatures
The Problem: Recording Transactions

- Transactions take place every second - orders, payments, account tracking - and involve various participants like buyers, sellers, and intermediaries (such as banks, auditors, or notaries) whose business agreements and contracts are recorded in ledgers. Each party to a transaction records the transaction in their own ledger, or record.

- Every organization, either public or private, keeps its own records, and they’re private. In other words, each participant of a transaction keeps their own ledger.

- Reconciling transactions across individual and private ledgers takes a lot of time and is prone to error.

- Ledgers in use today are deficient in many ways: inefficient, costly, non-transparent, and subject to fraud and misuse. This leads to bottlenecks and slowdowns of transaction settlements.
The Problem: Recording Transactions

➢ Lack of transparency, as well as susceptibility to corruption and fraud, leads to disputes. Having to resolve disputes and possibly reverse transactions or provide insurance for transactions is costly.

➢ While we all want to agree on the history of transactions, we do not all trust each other or any single entity to be a “trusted arbiter” to settle transaction disagreements.

➢ Ideally, a trusted recorded transaction from end-to-end would reduce those vulnerabilities.
The Problem: Transactions are Complex

A. Each participant has his own, separate ledger — increasing the possibility of human error or fraud

B. Reliance on intermediaries for validation creates inefficiencies

C. Can be a paper-laden process, resulting in frequent delays and potential losses for all stakeholders

Source: IBM
Blockchain promises to solve this problem and enables participants to agree on the history of transactions through the use of a shared ledger, which is updated every time a transaction occurs.

- Blockchain is a peer-to-peer network, which sits on top of the internet, that was introduced in October 2008 as part of a proposal for bitcoin, a virtual currency system. Bitcoin is the first application of blockchain technology.

- A blockchain contains a history of individual transactions. It is an open, distributed ledger that can record transactions between parties efficiently and in a verifiable and permanent way.

- Blockchain is a tamper-proof and records transactions in a public or private peer-to-peer network. Distributed to all member nodes in the network, the ledger permanently records, in blocks, the history of asset exchanges that take place between the peers in the network.
Blockchain gives participants the ability to share a ledger which is updated every time a transaction occurs through peer to peer replication. Privacy services (using cryptography) ensure that participants see only the parts of the ledger that are relevant to them, and that transactions are secure, authenticated and verifiable.

Blockchain stores information in transparent, shared databases, where they are protected from deletion, tampering, and revision.

In a blockchain, every agreement, every process, every task, and every payment would have a digital record and signature that could be identified, validated, stored, and shared.
Blockchain makes it better.

A. Single shared ledger that is tamper-evident. Once recorded, transactions cannot be altered

B. All parties must give consensus before a new transaction is added to the network

C. Eliminates or reduces paper processes, speeding up transaction times and increasing efficiencies

Source: IBM
Participants in a blockchain network agree on the methods used for transaction verification – a process known as “consensus”.

A blockchain network uses a consensus protocol to agree on ledger content, and cryptographic hashes and digital signatures to ensure the integrity of transactions. No transaction can be added without consensus on the blockchain and EVERY change is recorded. The result is transactions that are irreversible and agreed to by all members in the network.

All the confirmed and validated transaction blocks are linked and chained from the beginning of the chain to the most current.

Transactions can be verified close to real time and combined with the extensive use of privacy services make fraud and cybercrime very difficult.

Consensus ensures that the shared ledgers are exact copies, and lowers the risk of fraudulent transactions, because tampering would have to occur across many places at exactly the same time.
In a blockchain, new transactions are broadcast to participants on the network. Each node collects new transactions into a block. Nodes accept the block only if all transactions in it are valid. Nodes express their acceptance of the block by working on creating the next block in the chain. Nodes always consider the longest chain to be the correct one and will keep working on extending it.

Example:

A blockchain has five trustees. If any 3/5 agree of accepting a block on the chain, then the block is added.

Validity condition for adding a block = 3/5 signatures (digital)
Resolution for conflicting chains = look for longest chain
How a blockchain works

1. A wants to send money to B

2. The transaction is represented online as a 'block'

3. The block is broadcast to every party in the network

4. Those in the network approve the transaction is valid

5. The block then can be added to the chain, which provides an indelible and transparent record of transactions

6. The money moves from A to B
### Blockchain And Government

<table>
<thead>
<tr>
<th>Service Description</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land Transfers and Property Title registrations</td>
<td>72.1%</td>
</tr>
<tr>
<td>Personal Identification and Passport Documentation</td>
<td>68.9%</td>
</tr>
<tr>
<td>Management of Health Records</td>
<td>65.6%</td>
</tr>
<tr>
<td>Vehicle Registrations</td>
<td>54.1%</td>
</tr>
<tr>
<td>Welfare Distribution and Monitoring</td>
<td>37.7%</td>
</tr>
<tr>
<td>Urban planning; wider pedestrian sidewalks, increased times for crossings</td>
<td>21.3%</td>
</tr>
<tr>
<td>Public Transport Scheduling</td>
<td>16.4%</td>
</tr>
</tbody>
</table>

*Source: Blockchain survey, Standards Australia analysis*
Benefits of Blockchain Technology

➢ Trust and Validity
Reduction or even elimination of counterparty risk, all transactions are immutable, meaning they cannot be altered or deleted.

➢ Empowered Users
Users are in control of all their information and transactions.

➢ High Quality Data
Blockchain data is complete, consistent, timely, accurate, and widely available.

➢ Durability, Reliability, and Longevity
Due to the decentralized networks, blockchain does not have a central point of failure and is better able to withstand malicious attacks.

➢ Transparency and Immutability
Changes to public blockchains are publicly viewable by all parties creating transparency.

➢ Simplification
With all transactions being added to a single public ledger, it reduces the clutter and complications of multiple ledgers.

➢ Faster Transactions
Interbank transactions can potentially take days for clearing and final settlement, especially outside of working hours. Blockchain transactions can reduce transaction times to minutes and are processed 24/7.

➢ Lower Transaction Costs
By eliminating third party intermediaries and overhead costs for exchanging assets, blockchains have the potential to greatly reduce transaction fees.

Challenges of Blockchain Technology

➢ Nascent Technology
Resolving challenges such as transaction speed, the verification process, and data limits will be crucial in making blockchain widely applicable.

➢ Uncertain Regulatory Status
Blockchain may face a hurdle in widespread adoption by certain business sectors if its government regulation status remains unsettled.

➢ Control, Security, and Privacy
While solutions exist, including private or permissioned blockchains and strong encryption, there are still cyber security concerns that need to be addressed before the general public will entrust their personal data to a blockchain solution.

➢ Integration Concerns
Blockchain applications offer solutions that require significant changes to, or complete replacement of, existing systems.

➢ Cultural Adoption
Blockchain represents a complete shift to a decentralized network which requires the buy-in of its users and operators.

➢ Cost
Blockchain offers tremendous savings in transaction costs and time but the high initial capital costs could be a deterrent.
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