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Everything You Wanted to Know About Blockchain

January 2017 | by Jaqui Lynch

What is a Blockchain?

The easiest way to understand Blockchain is to think of it as a distributed ledger of transactions or a continually updated list of all transactions. For more information, visit bit.ly/2hJOr1h.

How It Works

Blockchain is a data structure of linked data blocks. All participants or nodes in the network have a copy of the Blockchain and, when someone wants to add a block, the nodes perform mining. Mining is when the nodes run algorithms to review and validate the transaction. If a majority agree it looks valid, then the transaction is approved and the new block is added to the chain. Several flavors of Blockchains exist. Bitcoin is a public and permission-less version where anyone can take part and add to the chain. However, private or permissioned Blockchains involve nodes which have to be preauthorized to participate. Either way the nodes in the network participate in determining what transactions are valid and, thus, what gets added to the chain. For more information, visit on.wsj.com/1nBCZ6e.

Three key things needed for a Blockchain to function are a network of nodes, an agreed upon protocol and a consensus mechanism for mining. The consensus mechanism consists of the rules used to determine how transactions are verified and how the nodes will agree on the current state of the Blockchain. There are multiple consensus algorithms available, depending on whether the chain is a public or private chain and also on how much trust has already been established. The nodes evaluate transactions and, if approved, they get packaged into a block that's added to the chain, which is then redistributed to all the nodes in the network. This can happen rapidly so many transactions can be processed.

Where To Use Blockchain

Blockchains can be used for digital banking, compiling data on sales, tracking digital rights usage, tracking payments to content providers, and tracking shipments. Blockchain can be used for smart contracts and decentralized applications such as ride sharing or crowd funding. Blockchains can be used for implementing prediction markets and generic governance tools. They can also be used for digital signatures; tracking and verifying integrity of messages; and automating processes.

IBM has published multiple articles on Blockchains (ibm.co/1OhUGnS). They expect Blockchains to be used in the creation of more efficient systems for multiple areas including:

- supply chains,
- internet of things networks,
- gaming,
- multimedia rights management,

- government proof of identity
- insurance record management.

Potential Impacts of Blockchains

Reducing paperwork in the transaction pipeline reduces processing time with huge volumes of transactions. As long as transactions can be validated automatically then Blockchains can be used to process them. This means that Blockchains will give rise to increased automation with an internet of agents and smart peers who will analyze and approve marketplace actions. This agent-managed, peer-to-peer automation will make it possible to scale significantly but requires planning. As with any automation, clear business rules are needed but the potential to reduce paperwork and time to market is significant.

Using secure hashed history provides for better security and a heightened ability to audit and validate transactions. This makes it much easier for the business to pass audits. Blockchains also have the potential to eliminate the need for bank clearing houses as each bank could have its own copy of the ledger which would allow them to automatically approve transactions. This is because Blockchains plus business logic can be used to not only validate transactions but also to provide a tamperproof history of the transaction record.

Challenges Around Blockchains

Implementing Blockchains has several associated challenges. The two most obvious are

1. the requirements for storage as the chains grow

2. the time needed for synchronization and mining as the chains and networks of nodes grow.

Additionally, participants need to agree on a common network protocol and technology stack as well as a consensus mechanism.

Businesses will also need to change the way they perform some functions. As with any form of automation, processes need to be repeatable so that they can be programmed. For example, smart contracts need to be approved from a legal perspective so that the business can be sure they can be validated and honored.

Blockchains Today

In October 2015, Docusign and Visa showcased a Blockchain application that allows a person to enter a car,sign all purchase or lease documents, and pay for the car electronically , within minutes and without leaving the car (bit.ly/2d9xVUa). This will provide a much better customer experience and will streamline the purchase process. Banks and credit card companies, like Visa and MasterCard, are also experimenting with Blockchain as a way to safely move money between banks and between banks and businesses.

Everledger is using Blockchain to track diamonds from the mine to consumers as a way to combat insurance fraud as well as avoid conflict diamonds. According to one Wired article (bit.ly/2fbJXhG), over 980,000 diamonds have been registered since 2015 and the company plans to expand into the wine and fine art market.

Summary

Blockchains have the potential to be a disruptive technology that can streamline tasks and processes in a secure and auditable way. The ability to have a distributed ledger of transactions also provides for better reliability as there's not a single point of failure. Blockchains also open the door to the use of smart contracts which can be used in the financial services, public sector and healthcare services areas. Bitcoin

has been around since 2008 and is based on Blockchain but Blockchain can provide so much more than just support for Bitcoin which is why companies are now starting to seriously consider how they can take advantage of Blockchain in order to get competitive advantage and streamline business processes.

Moving forward in this internet of things world, where autonomous vehicles are becoming a reality, I expect to see Blockchains being used to monitor, record and trace ownership of cars. I also expect to see Blockchains heavily used in fraud prevention and intellectual property protection services. I highly recommend evaluating Blockchains to anyone involved in industries where authenticity is critical.