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Chapter 11: **Blockchain and blockchain-enabled applications in law – a lawyer’s guide**

By Olga V. Mack, vice president and CEO, Parley Pro

The world is changing. We live in the digital age, with new technologies emerging daily and fundamentally changing our lives. Perhaps one of the most transformative of these new technologies is blockchain. One way or another, it will transform how we live, work, and transact.

Blockchain is a distributed database that allows for secure, transparent, and tamper-proof transactions between two or more parties in a peer-to-peer (P2P) – without an intermediary – manner. Its applications are endless, and it has the potential to revolutionize many industries, including law.

This is a guide for lawyers who want to understand blockchain, how it could be applied in law, and how it can enhance law practice.

What is blockchain?

Before diving into blockchain’s applications in law, it is essential to understand what blockchain is and how it works.

At its core, blockchain is a distributed database. It is a type of distributed ledger technology (DLT). This means that, instead of storing the transaction details on one centralized database (as is the case with most traditional transactions), the data is spread across a network of computers (or “nodes”). Each time a transaction is made, it is recorded on every node in the network. The growing lists of records, called “blocks”, are securely linked using cryptography.

Each block contains (1) a cryptographic hash of the previous block, (2) a timestamp, and (3) transaction data. This way, each block contains information about the previous block. This makes blockchain transactions irreversible. That is why blockchains are secure by design.

Blockchains are typically managed by the P2P computer network. Nodes collectively follow a consensus algorithm protocol to add and validate new transaction blocks.

This decentralized structure has several advantages.

First, it makes the data more secure, as there is no single point of failure

that can be exploited by hackers. To tamper with the data, one would need to hack into every node in the network, which is virtually impossible.

Second, it makes the data transparent. Because each transaction is recorded on every node, anyone can view the entire history of a particular asset (like a house or a piece of land). This transparency can help to prevent fraud and corruption.

Finally, it makes the data tamper-proof. Once a transaction is recorded on the blockchain, it cannot be changed or deleted. This immutability is one of blockchain’s most valuable features.

How does blockchain work?

When a transaction is made, it is bundled up into a “block” with other recent transactions. Each block contains a unique cryptographic code known as a “hash”, which links it to the previous block.

This chain of blocks is stored on every node in the network. So, if someone wanted to tamper with a particular transaction, they would not only have to change that transaction in the block, but they would also have to change the hash of that block and every subsequent block in the chain. This is virtually impossible, which is why blockchain is so secure.

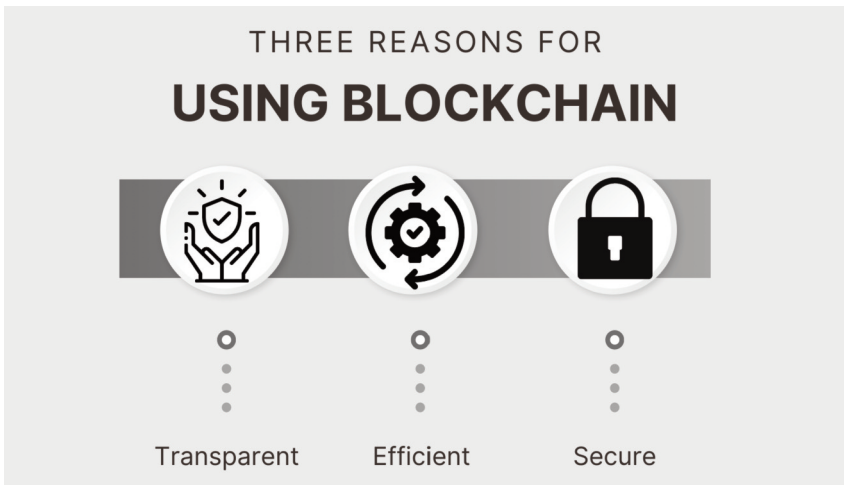


Figure 1: Reasons to use blockchain.

Why use blockchain?

Before we explore the various applications of blockchain, it is first essential to understand why you want to use it.

From what we have covered thus far, it is clear why blockchain is valuable

in any industry where there is a need for transparency and trust. For example, blockchain could track the provenance of a piece of art or goods. By recording each transaction on the blockchain, you create a complete history of the artwork that would be impossible to forge.

Another reason to use blockchain is that it is very efficient. With no need for a central authority to verify or approve transactions, they can be processed much faster than traditional transactions. For example, a blockchain-based system could be used to settle stock trades in near real-time instead of the two days it currently takes.

Finally, blockchain is often used for its increased security over traditional databases. As mentioned, blockchain is distributed across a network of computers, meaning there is no single point of failure that can be exploited by hackers, and it is very difficult for data to be corrupted or deleted.

Blockchain-enabled applications

Now that we've covered blockchain basics, let's look at how it can be used.

Application 1: Much more intelligent contracts and contract analysis

Blockchain can create smart contracts, a self-executing code based on if-then logic, written in code and stored on the blockchain. They can be executed automatically without the need for human intervention. Thus, they can transform an asset into a programmable asset.

Smart contracts have several advantages. Some of the most important are listed below:

- *They are more efficient.* Smart contracts can be executed automatically and in seconds without human involvement. This can save a lot of time and money. For instance, if you are buying a house, the whole process could be completed in a matter of minutes rather than the months it currently takes. During the 2008 financial crisis, much money was lost due to delays caused by the slow manual processing of paper-based contracts. With smart contracts, this would not have been an issue. An additional benefit is that, while traditional paper contracts can be easily altered, smart contracts are stored on the blockchain, so they cannot be changed or deleted after they are created.
- *They are more secure.* As discussed, the blockchain is a decentralized database spread across a computer network, ensuring no one weakness is exploitable by hackers. Smart contracts on the blockchain are executed automatically, eliminating the need for a third party (such

as a bank or a lawyer) to act as an intermediary. This makes the process more efficient and reduces opportunities for fraud and corruption. Consider, for example, a situation where you want to buy a house. With a traditional contract, you must go through a real estate agent, who contacts the seller. Then, the agent draws up a contract and sends it to both parties for approval. This slow and cumbersome process leaves room for human error and fraud. With a smart contract, the whole process is automated. You simply send the appropriate amount of money to the contract, which executes the sale and transfers ownership of the house to you. This would all happen in seconds, independent of any human involvement.

- *They are more transparent.* Storing these contracts on the blockchain makes them fully transparent. Anyone can view the entire history of a particular contract. This stands in contrast to traditional paper contracts, which are often obscured and inaccessible. This transparency could help to reduce fraud and corruption, as it would be immediately apparent if someone tried to change a contract.
- *They are fairer.* Smart contracts are executed automatically and in seconds, without human intervention. This means they are less likely to be biased or influenced by human emotions because all decisions are automated and self-execute when certain conditions are met. This contrasts traditional paper contracts, often drawn up by lawyers or third parties. These contracts can easily be biased in favor of one party. In addition, smart contracts can be programmed to include certain conditions that must be met before they can be executed. For example, a contract could specify that the payment is automatically remitted when certain goods are delivered in good condition. This would help to ensure that both parties are treated fairly.
- *They have a wide range of applications.* Smart contracts can be used for various applications, including financial transactions, voting, and managing supply chains. For instance, smart contracts could automatically manage a product’s supply chain. The contract could specify that the product can only be shipped if it is delivered to the customer within a certain timeframe. This would help to ensure that the product is not damaged or lost during transit. In addition, smart contracts could be used to create a decentralized marketplace, allowing buyers and sellers to connect with each other directly without the need for a third party such as eBay or Amazon.

As you can see, smart contracts have the potential to revolutionize the way we do business. They are more secure, transparent, and fair than traditional paper contracts. Plus, they have a broad and ever-increasing range of uses.

Application 2: Streamlined payments in legal instruments and litigation/settlement

In the past, making payments in legal instruments and litigation/settlement has been a slow and cumbersome process. This is because the process often requires the involvement of banks or lawyers. With blockchain, payments can be made directly between parties without needing third-party involvement. This would streamline the process and make it much faster and more efficient.

Here's how it would work:

1. Party A and Party B agree to the terms of a legal instrument or settlement. When making payments, they can do so directly without needing a bank or lawyer. The blockchain platform will take care of the rest.
2. The blockchain platform records the terms of the agreement and processes the payment. Even if one of the parties defaults on the agreement, the payment will still be processed and recorded on the blockchain. This provides a degree of security and peace of mind for both parties.

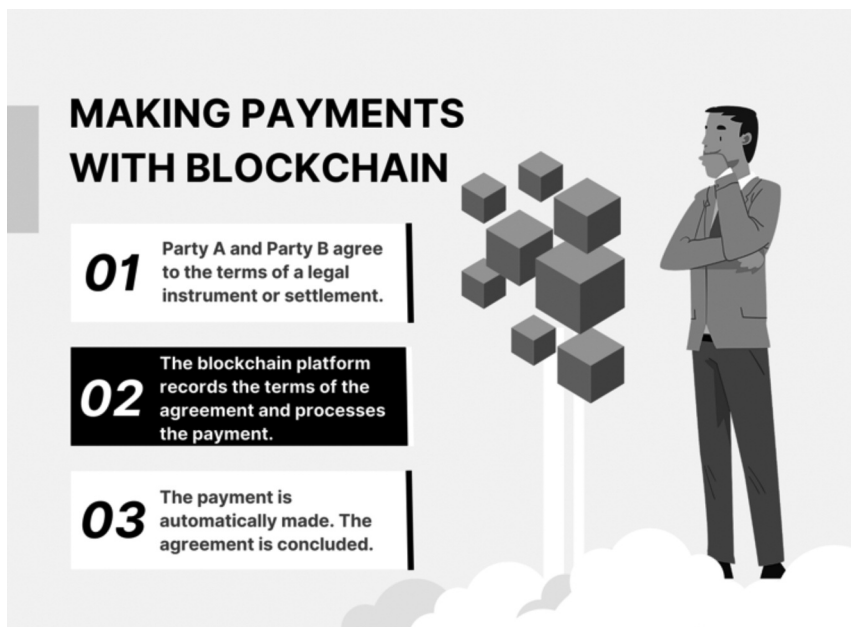


Figure 2: Making payments with blockchain.

3. The payment is made, and the agreement is concluded. This process is much faster and more efficient than the traditional way of making payments in legal instruments and litigation/settlement. It would also save on costs, as there would be no need to involve third parties.

When it comes to streamlining payments, blockchain can help solve several problems, addressing such negative characteristics as:

- Slow and cumbersome process;
- Need for third-party involvement;
- Defaults on payment;
- High costs; and
- Time-consuming process.

This extract from the chapter ‘Blockchain and blockchain-enabled applications in law – a lawyer’s guide’ by Olga V. Mack, is from the title The Handbook of Legal Tech, published by Globe Law and Business.