



WHITE PAPER | 2023

# Blockchain

Understanding the role of blockchain  
**in digital trade documentation**

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**TRUSTED.  
SECURE.  
ACCELERATION.  
SUSTAINABILITY.**

## TABLE OF CONTENTS

<b>I. INTRODUCTION.....</b>	<b>- 3 -</b>
<b>II. DEfiniton of blockchain.....</b>	<b>- 3 -</b>
<b>A. data storage approaches .....</b>	<b>- 3 -</b>
<b>B. the blocks of the blockchain.....</b>	<b>- 4 -</b>
<b>III. blockchain in trade .....</b>	<b>- 4 -</b>
<b>A. security.....</b>	<b>- 5 -</b>
<b>B. verification / validation.....</b>	<b>- 6 -</b>
<b>C. a trusted system .....</b>	<b>- 6 -</b>
<b>D. availability.....</b>	<b>- 7 -</b>
<b>IV. wavebl's privacy layer .....</b>	<b>- 7 -</b>
<b>V. summary.....</b>	<b>- 8 -</b>
<b>VI. About wavebl .....</b>	<b>- 8 -</b>
<b>Appendix I - definitions .....</b>	<b>Error! Bookmark not defined.</b>

## TABLE OF FIGURES

<b>Figure 1 - Centralized vs. Decentralized Data Storage Approach .....</b>	<b>- 4 -</b>
<b>Figure 2 - The various stakeholders along the blockchain.....</b>	<b>- 5 -</b>
<b>Figure 3 - Blockchain as a trusted system .....</b>	<b>- 7 -</b>

## I. INTRODUCTION

WAVE BL uses a blockchain ledger to transfer possession and record title, including the times these actions were performed. Such a record enables the parties concerned to verify the timeline of transfers and the authenticity of the documents exchanged. This article will explain the advantages of using blockchain as a recording technology, the technical challenges it raises, and our answer to those challenges.

In this white paper, we will explain the advantages of using blockchain as a recording technology, the technical challenges connected to it, and how WaveBL overcame these challenges by adding its own proprietary layer.

## II. DEFINITION OF BLOCKCHAIN

A blockchain is a decentralized, digital ledger (which is a database) of transactions that is duplicated and distributed across an entire network of computer systems. These attributes, and the way in which ledger entries are connected to each other, meaning that transaction records are **impossible to delete or alter**.

### A. DATA STORAGE APPROACHES

Data can be stored using a centralized or decentralized approach. When using the **centralized** approach, the data is stored in one place and controlled by the entity that hosts (i.e., stores) the data. In contrast, when using the **decentralized** approach, data is stored in multiple places and controlled by many entities. Each entity hosts the same data; the result is that many identical copies exist.

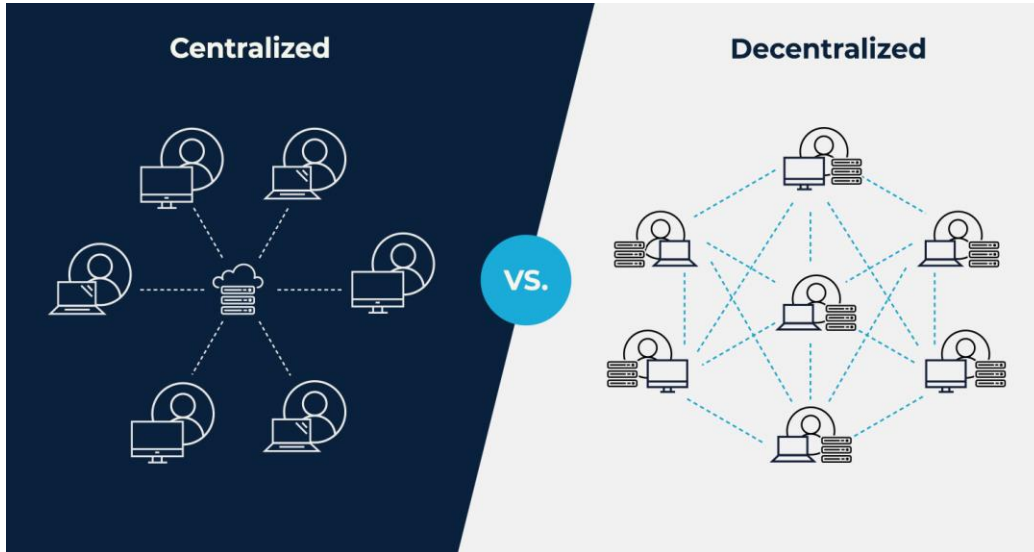


Figure 1 - Centralized vs. Decentralized Data Storage Approach

WaveBL’s blockchain technology uses the decentralized approach, which means that data is stored in multiple places and controlled by many entities. Each entity hosts the same data; the result is that many identical copies exist.

**B. THE BLOCKS OF THE BLOCKCHAIN**

A blockchain is a decentralized database, which means that multiple users, and not only the owner of the database, are responsible for it. As a result, identical copies of the database are stored in multiple locations. The data are therefore stored in “blocks” that are the basic data units in the blockchain. Each block contains important data, such as a record of a transaction, a unique fingerprint identifier (cryptographic reference) to the previous block, and a unique identifier.

**III. BLOCKCHAIN IN TRADE**

The international trade industry is moving away from the traditional way of processing and handling trade documents to digital Bills of Lading and related documents. To make these digital trade documents secure and reliable, blockchain technology is the optimal way to ensure this.



Figure 2 - The various stakeholders along the blockchain

Using blockchain for international trade has several advantages.

### A. SECURITY

In international trade, the blockchain contains users who participate in the transaction and use it to issue, sign, transfer, and receive documents securely.

When a new record (“block”) is added to a blockchain, all the other parties in that blockchain must consent to this. In other words, they must confirm the new addition via the automatic **consensus** process. This means that the parties “agree” on the shared history of the blockchain. Once all parties have consented, the new “block” is added to the blockchain.

Each block has its own unique fingerprint identifier, which is a number that is cryptographically calculated based on the actual content of the block and the fingerprint identifier of the *previous* block in the chain. This mechanism prevents forgery of both the block’s contents and the overall chain of records.

To illustrate, if an unauthorized person would try to change a record after the fact (a “block”) in the blockchain, then the fingerprint, which was calculated based on the old content, would no longer match the new content. Even if that person would try to avoid this by updating the fingerprint itself, it would fail. This would only work if that person would be able to update all the fingerprint information in each previous block in order to keep the calculations consistent. This would mean updating each individual copy of these blocks that are stored separately on the computers of each party on the network. Furthermore, it would also require the creation of a new fingerprint for each of these blocks. This can only be done using a cryptographic process that requires time and huge amounts of (expensive) computational power. Needless to say, the whole idea of successfully tampering with a record in the blockchain is practically impossible. **The result is that blockchain is extremely resistant to forgery.**

## **B. VERIFICATION / VALIDATION**

A transaction is tracked and logged in each copy of the blockchain on the computer of the individual users. The data is logged only after a full consensus process is performed by each user. During the consensus process, the data and its computed fingerprint are verified as mathematically valid. This means that users no longer have to manually verify and validate documents.

## **C. A TRUSTED SYSTEM**

The fact that blockchains are decentralized means that parties to a transaction don't need a third party (such as a centralized service provider) to perform and validate document transfers for them. In other words, **there is no central entity that manages the blockchain; each document exchange is performed directly between the parties involved, and verification is automatically performed by the network.** This also means that documents are not exposed to any third parties outside the transaction: they aren't stored in a third party's centralized data centers or subject to external approval.

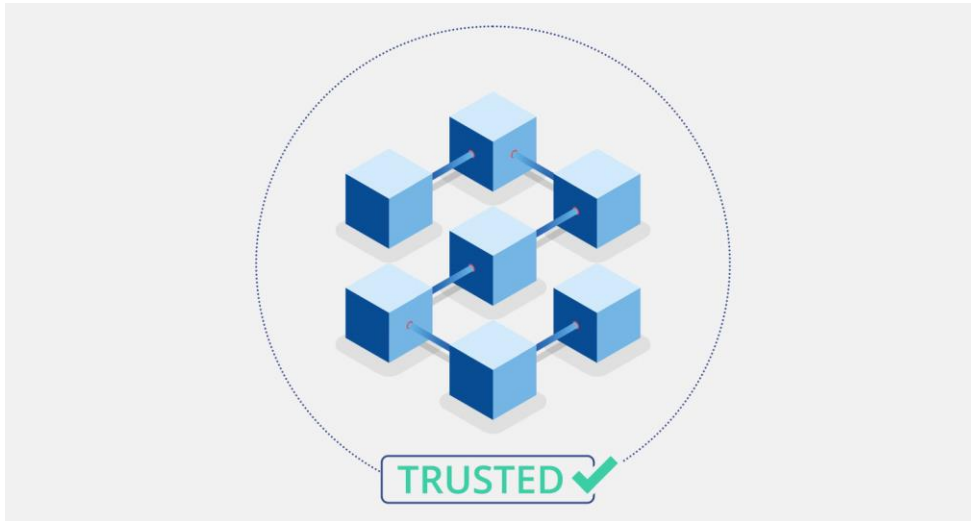


Figure 3 - Blockchain as a trusted system

#### D. AVAILABILITY

Since blockchain is decentralized, any blockchain network is always online, 24/7. Even when a user is offline, he can still access all his data since users store a copy of the blockchain locally. Once that user goes online again, the network will automatically update with the new data that was added in the meantime.

## IV. WAVEBL'S PRIVACY LAYER

The blockchain network is fully transparent, which means that when a user publishes a new transaction to the blockchain, everyone can see it. This could be an issue when it comes to private business information that should not be exposed.

To solve this issue, Wave BL has developed a proprietary privacy layer that encrypts document transactions. It ensures that document exchanges between parties cannot be tracked by parties outside the transaction. This is done by generating unique **one-time public keys** for users to use in each

transaction. That means that the same public key can never be used twice, making it impossible for external observers to track a user's transaction history.

WaveBL's privacy layer therefore preserves the secrecy of sensitive business information concerning when and between whom transactions are performed. No one who is not a party to the transaction can track the parties involved.

## **V. SUMMARY**

Blockchain technology is gaining momentum quicker than ever, with many industries, such as financial institutions, recognizing the significant advantages it offers in terms of secure, decentralized record keeping. These are exactly the advantages that make it a perfect fit for the trade industry.

Adopting blockchain technology makes it possible for trade to adapt to today's world, benefitting from the speed and simplicity of digital transactions without compromising the security and privacy that are essential to doing business.

The Wave BL platform is built on blockchain technology to allow organizations to transfer electronic Bills of Lading (eBLs) between parties quickly and securely.

## **VI. ABOUT WAVEBL**

WaveBL is a blockchain-based digital platform that facilitates the traditional process of transferring original paper documents electronically. The proprietary solution enables instant, encrypted, and authenticated transfer of trade documents and other unique digital documents. WaveBL's platform is designed to meet the needs of all parties involved in trade, from major market players, such as carriers and shipping companies, to agents, brokers, and banks.

[www.wavebl.com](http://www.wavebl.com)