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The Bridge

**Hello, crypto world!**

## ***Abstract***

*In the first issue of The Bridge, a publication that aims to bridge the knowledge gap between the traditional financial world and the new digital world, we introduce two fundamental concepts: blockchain and cryptocurrencies.*

## **What Is the Blockchain?**

In one sentence, a blockchain is a digital ledger that records all the transactions that have ever taken place. This ledger is not owned by a single person but rather replicated and stored among multiple stakeholders, making it decentralised.

At its core, blockchain is a foundational technology with multiple use cases. Blockchain can be used in any ecosystem which requires validation of data records and involves multiple stakeholders. In this issue, this broad idea of a blockchain will be further explored by using the famous game of Chess as an analogy.

We will see how a blockchain-based chessboard enhances the game of Chess versus a conventional digital chessboard and compare this enhancement to the transformation of traditional chess into an online virtual game back in the 90's, although the game remained the same!

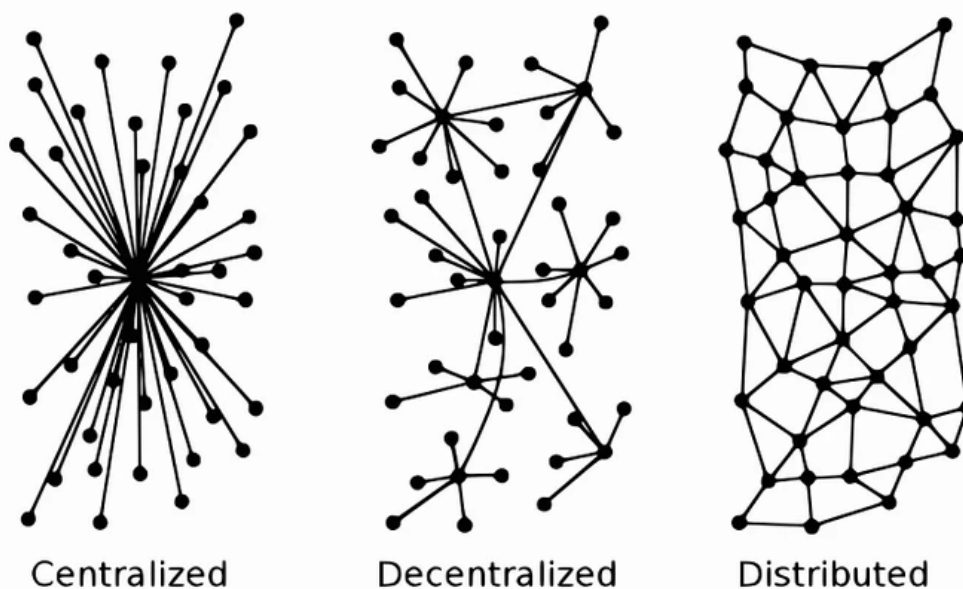
## **Chess as we know it today**

While chess was played for centuries<sup>1</sup> on a physical chessboard, development of computers and the internet led to the invention of the digital chessboard. One of the most crucial advantages of this new technology was that the rules were pre-coded into the game and every move was recorded in a sequence. At first sight, this innovation did not seem revolutionary however, it did have one significant implication: it now became “almost” impossible for the players to cheat within this new digital environment.

## Blockchain based chess results in a fairer game

In digital Chess, players may not know or trust each other but they can still easily play a game together. This is because the role of the arbiter is delegated to the central computer (a central authority, a “judge”) improving the game’s fairness. However, this central authority, i.e. the computer which the players’ moves now also becomes the central point of failure for the system. An unfair player could attack this single point of control to easily change the recorded moves and get an unfair advantage over another player. If done properly, there will be no way to recover the “original” game as all available records will support the current game, which in fact is a tampered version of the truth.

Now, let's see how the blockchain could help us avoid such problems. In a blockchain-based chessboard, there is no central authority but instead, multiple validators (akin to a “jury”) that continuously validate each move by checking its fairness. Once the last move is confirmed as a fair move by the majority of validators, this new information is recorded in every validators’ record. A malicious player seeking to cheat on a blockchain-based chessboard will have to corrupt more than 50 per cent of the validators to ensure that his unfair move is recorded as a fair one. This setup requires a lot more monetary resources on the hacker’s part, which act as a disincentive for him to cheat in the game. This is how a decentralised validator network helps in building a better chess game.

**Exhibit 1: Network organisation**

Source: [cryptovalueinvestor.com](http://cryptovalueinvestor.com)

## Immutability

The second value add that blockchain brings to chess is the feature of immutability. As mentioned earlier, in case of a digital chess game a malicious player could change all the records, or more specifically go back a few moves and change a single move. In a non-blockchain based setup, this can happen because although the moves are recorded in a sequence the data is not inter-linked. In other words, a small tampering in the past records may not have any material effect on the outcome. However, in a blockchain-based chess game this is not possible, as each new move is chain-linked with the past move. Any tampering with past records will result in a drastic change in the final outcome. For the malicious player to change a single specific move in the past, he will first have to change all the moves that came after that. This makes the blockchain practically immutable.

## Peer-to-Peer

In a chess game where opponents do not entirely trust each other, it will be tough for them to play together. In case of the digital chessboard, the role of the judge is held by a single system. Although this solves the problem of not having to trust your opponent, it creates another issue where the trust shifts to this central authority. This central validator holds a prominent position in the network and the entry barrier to play the role of a validator is high. On the other hand, for most of the blockchain-based networks, the barrier to entry is almost negligible, allowing anyone to join the network as a validator. This removes the role of a central authority and makes the game peer-to-peer. In simple terms, *by the people, for the people*.

## Cryptocurrencies

A cryptocurrency is an incentive mechanism that actually makes the blockchain work the way it should. In a game where there are no barriers to entry to become a validator, not all the people who join as validators are necessarily good actors. To incentivise good behaviour in a chess game, a currency (token) is issued within the chess community which is paid to people who work towards the progress of a fair game. To understand this better, imagine for a while that you are a member of the chess jury and your task is to assess whether a move is correct. The first member to validate the move broadcasts it across all members of the jury. If the assessment is acknowledged by the majority of the members (51% or more), a consensus is formed, and the first member receives a token for the work he did. This forms the basis of the Proof of Work (PoW) consensus algorithm that Bitcoin uses for instance.

As a result, each validator is incentivised to become the first one to verify and broadcast the correct assessment, which is likely to be acknowledged by the consensus. A toxic behaviour by a malicious member consisting of broadcasting a wrong evaluation is thus a bad idea since this member will never get a token as a reward. Additionally, there will be an opportunity cost loss as well.

The cryptocurrency itself derives its value from the number of players that are using the system to play chess. The token distribution scheme is called tokenomics. It is designed to

reward good behaviour that reinforces trust in the system, and as trust is vital to attract new users and to build loyalty among current users. The more the users in the network, the more valuable the token and the safer the ecosystem. In other words, *tokenomics* substitutes centralized authority through a set of incentives that promote fairer game play. It builds trust in the system, even when players or jury (*peers*) do not trust each other. The result of this trust enforcement mechanism is a so-called “trustless” network.

## Conclusion

Blockchain improves the foundation of any business and makes it more decentralised while causing no material impact to the rules how business is conducted. Any business using blockchain technology will potentially create outcomes where cheating is impossible, corruption is avoided and good behaviour is encouraged, and that without the need of any trust enforcing authority. This is just some of the possibilities that blockchain technology offers whilst still being in its infancy.

<sup>1</sup> According to Wikipedia, the history of chess goes back almost 1500 years. The game originated in northern India.

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