# Unit 21. Blockchain Technology – Everything you need to know in layman's language

The Blockchain technology has become a regular news item with the emergence of cryptocurrencies like Bitcoin. Now, this technology is disrupting almost all markets, changing the way we do our day to day business. Yes, the blockchain technology is changing our world.

Let's decode the latest buzz word – The Blockchain Technology – in this post. Thank you for the excellent feedback on our earlier articles in this series – on Artificial Intelligence, Internet of Things (IoT), and Automation. Feel free to post your feedback on this article in the comment section at the post-bottom.
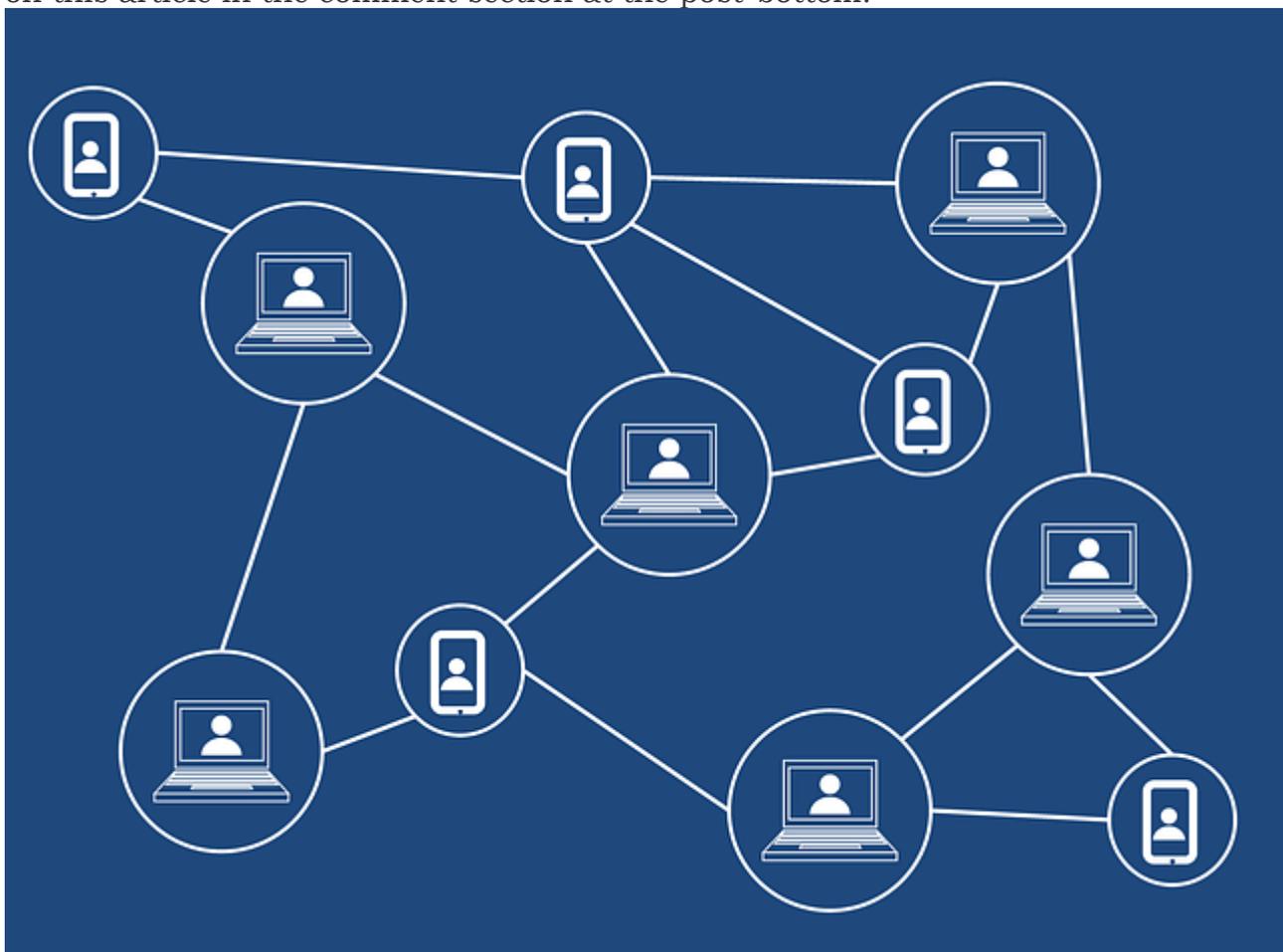
Comparing Blockchain to an Excel Sheet

Imagine a Microsoft Excel Sheet file in your laptop with details of some transactions you made. You can call it a *ledger*.
Now, imagine that your Excel Sheet file is copied to hundreds of your friends' computers, connected to each other forming a network. The ledger in your laptop has become a *distributed ledger*.
Then imagine that this network of computers is designed with a **technology** to regularly update this Excel Sheet, whenever you or your friends update the ledger.
You now have a basic understanding of the blockchain!
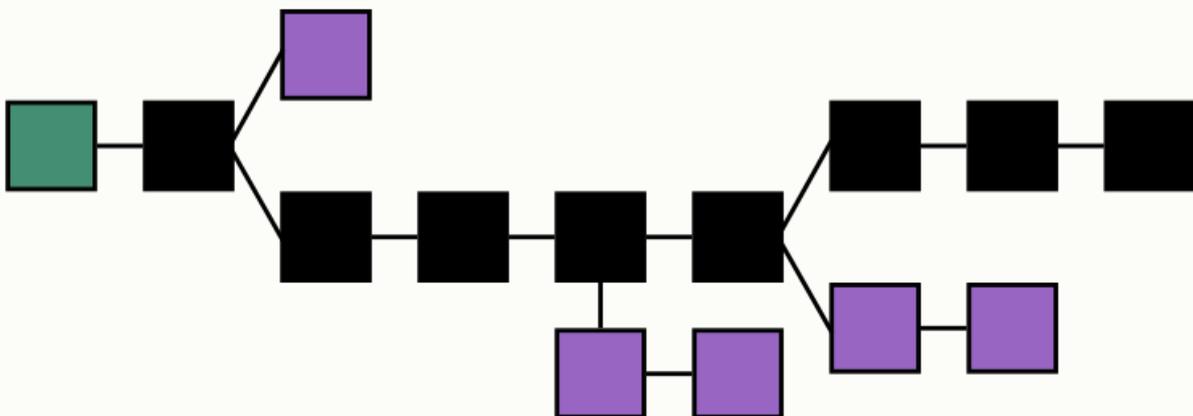
What is a blockchain?

In simple terms, blockchain is a digital ledger.

Wondering what is a ledger?

Ledger is a book containing accounts to which debits and credits are posted from books of original entry.

A blockchain is a digitized, decentralized, public ledger. So simple, right?

Defenition of Blockchain

The main chain (black) consists of the longest series of blocks from the genesis block (green) to the current block. Orphan blocks (purple) exist outside of the main chain.

The blockchain is an **incorruptible digital ledger** of transactions that can be programmed to record virtually everything of value.
Each list of record in a blockchain is called block.

So a blockchain is a continuously growing list of records called blocks, which are linked and secured.

Who invented blockchain technology?

Blockchain Technology was invented by Satoshi Nakamoto in 2008 for use in the cryptocurrency bitcoin, as its public transaction ledger. Satoshi Nakamoto's aim in creating the decentralized Bitcoin ledger—the blockchain—was to allow users to control their own money so that no third party, not even the government, would be able to access or monitor it.
The creator of Bitcoin, Satoshi, disappeared back in 2011, leaving behind open source software that the users of Bitcoin could update and improve.

The invention of the blockchain for bitcoin made it the first digital currency to solve the double spending problem without the need of a trusted central authority or central server.

The bitcoin design has been the inspiration for other applications.

Bitcoin Is To Blockchain As Email Was To The Internet
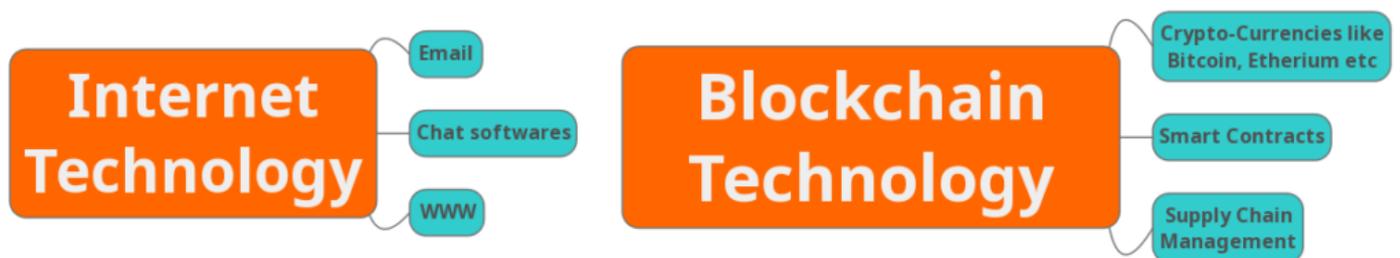
In the 1990s, when the internet technology (TCP/IP or HTTP) was in the native stages, email was the first major application. Later new applications like web browsers came. Websites became popular. People started using chat software like Skype. Now if you look at your mobile, see how many different applications are run using the Internet.

Similarly, when blockchain technology emerged, bitcoin was the first major application which used it. Other cryptocurrencies followed the trend. Now, blockchain technology is used in a variety of applications like security, online voting etc.

Internet Technology vs Blockchain Technology

Simply put, the Internet allows computers to exchange information; Blockchain allows computers to record information.

Both use a lot of computers (nodes).

The Digital Economy, Wikinomics is bold on the subject and reflects about Blockchain that:

The first generation of the digital revolution brought us the Internet of information. The second generation — powered by blockchain technology — is bringing us the Internet of value: a new platform to reshape the world of business and transform the old order of human affairs for the better.
Blockchain is a vast, global distributed ledger or database running on millions of devices and open to anyone, where not just information but anything of value — money, but also titles, deeds, identities, even votes — can be moved, stored and managed securely and privately. Trust is established through mass collaboration and clever code rather than by powerful intermediaries like governments and banks.

Technologies behind blockchain technology!
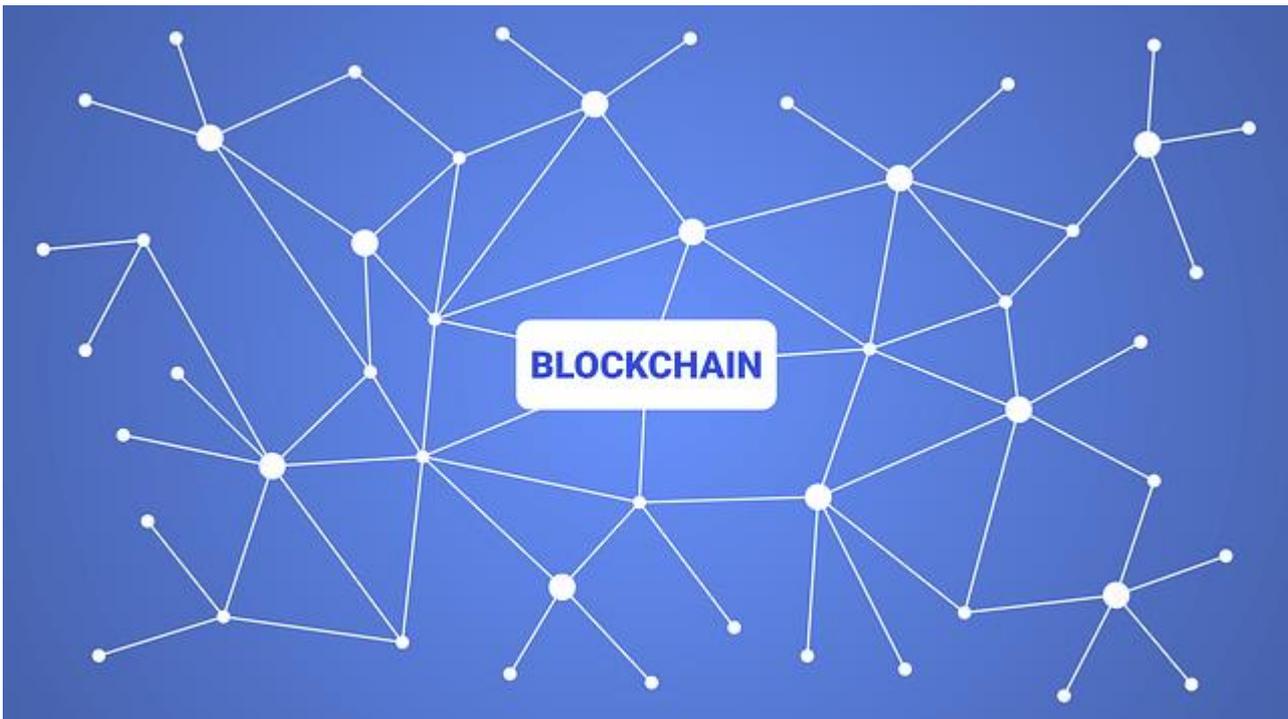
1. Private Key Cryptography
2. P2P Network (Peer-2-Peer)
3. Program (the blockchain's protocol)

What is the need of blockchain technology?

The blockchain is a mechanism to bring everyone to the highest degree of accountability. No more missed transactions, human or machine errors, or an exchange that was not done with the consent of the parties involved.

The most critical area where Blockchain helps is to guarantee the validity of a transaction by recording it not only on the main register but a connected distributed system of registers, all of which are connected through a secure validation mechanism.

Blockchain technology can find applications in the following areas in future:

- **Smart contracts –** Any industry heavily reliant on contracts, such as insurance, financial institutions, real estate, construction, entertainment, and law, would benefit from blockchain's indisputable way to update, manage, track and secure contracts. Smart contracts, those that are embedded with if/then statements and be executed without the involvement of an intermediary, also use blockchain technology.
- **Supply chain management –** Whenever value changes hands or the status of asset changes, blockchain is ideally suited for managing the process.
- **Asset protection –** Whether you're a musician who wants to ensure you get royalties when your music gets played or a property owner, blockchain technology can help you protect your assets by creating an indisputable record of real-time ownership.
- **Personal Identification –** Governments manage vast amounts of personal data from birth and death records to marriage certificates, passports and census data. Blockchain technology offers a streamlined solution for managing all of it securely.
- **Payment processing –** Blockchain has the potential to be highly transformative to any company that processes payments. It can eliminate the need for intermediaries that are common in payment processing today.
- **Crowdfunding –** As with traditional crowdfunding, a blockchain powered crowdfunding campaign seeks to secure investment for a new project from an interested community. But in this instance, funding is most likely to come in the form of bitcoin or other cryptocurrencies.

Blockchain technology – opportunities and advantages

- The blockchain allows our smart devices to speak to each other better and faster.
- Blockchain solves the problem of manipulation. It brings everyone to the highest degree of accountability.

- Online identity and reputation will be decentralized. We will own the data that belongs to us.
- Cryptocurrencies take the power away from governments to control the value of currencies and hand it to people.
- The potential is great for people in the informal economy to exploit the blockchain's middleman-free way to exchange asset.
- Blockchain technology can more equitably address issues related to freedom, jurisdiction, censorship, and regulation, perhaps in ways that nation-state models and international diplomacy efforts regarding human rights cannot.
- Blockchain-based systems allow for the removal of intermediaries involved in the record keeping and transfer of assets.
- The removal of intermediaries and settlement on distributed ledgers allows for dramatically increased transaction speeds compared to a wide range of existing systems.
- Data entered on the blockchain is immutable, preventing against fraud through manipulating transactions and the history of data. Transactions entered on the blockchain provide a clear trail to the very start of the blockchain allowing any transaction to be easily investigated and audited.

Blockchain technology – Criticisms and Challenges

Huge power required: Remember all that computing power required to verify transactions? Those computers need electricity. Bitcoin is a poster child of the problematic escalation in power demanded from a large blockchain network. That's

not appealing given today's concerns about climate change, the availability of power in developing countries, and reliability of power in developed nations.

Security about the private key: The private key must remain secret at all times because revealing it to third parties is equivalent to giving them control over the bitcoins secured by that key. The private key must also be backed up and protected from accidental loss, because if it's lost it cannot be recovered and the funds secured by it are forever lost, too.

Transaction speed: Transaction speed is also an issue. As we noted above, blocks in a chain must be verified by the distributed network, and that can take time.

Summary

In scaling society up from tribes and small groups, governments have had to confront the problem of enabling secure commerce and other interactions among strangers. The methods now may be very different, but the goal is still the same – a secure way of transactions.

The complex world of big data and IOT is emerging. Blockchain will be an important part of our financial and technological digital future.

The 'blockchain' technology behind bitcoin could prove to be an ingredient of an entire new world of technology, as big as the internet itself, a wave of innovation that drives the middleman out of much commerce and leaves us much more free to exchange goods and services with people all over the world without going through corporate intermediaries.

It could radically decentralise society itself, getting rid of the need for banks, governments, even companies and politicians.