Blockchain Technology: Blockchain Technology – A New Technology for Creating Distributed and Trusted Computing Environment

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Abstract. In these (several) past decades (1950 to 2018), the world is moved to wired things to wireless devices or electronics devices/ technology. This increment or development in networking technology faces several incidents like issues of leaking privacy of users, issue of surveillance and security breaches in systems. This paper discusses about compromising users" privacy as various issues, challenges and questions (raised in existed models). Note that due to these issues or breaches or loopholes, unknown users/ third- parties collect and control large amounts of personal data, also they may use this data against respective user, for example, for financial use, for blackmailing, etc. Hence, this article discusses about a new technology (i.e., Blockchain), on which every industry is trusting on. How this new technology has been growing as fastest technology only in the past decade to build among users and organization? Such answers have been given in this paper. Blockchain provides decentralized, distributed personal data management system which ensures users own and control their data or protect user's data any kind of breaches.

Keywords - Blockchain Technology, Bit Coin, Cryptocurrency, Security, Trust, Real-World applications.

I. INTRODUCTION ABOUT BLOCKCHAIN

The Blockchain is a concept of sharing information/ data in a distributed and decentralized manner. This concept was used previously in buying lands, but technically it was sued in 2008 in a cryptocurrency called Bitcoin [1]. A lot of changes and a lot of people are using this technology in real-world applications that make things more distributed and more trustworthy. This technology has been around since 2008. There are different blocks that make up the Blockchain concept, and each block makes up a chain. In which each block has information about the blocks that came before and after it in a chain (future coming block in a chain). As a cryptographic hash, which can be used as a unique ID, this information is made up of the following items:

- The date and time of the last block.
- This is a list of everything that happened during the time.
- Another way to figure out which block is the last one.
- It's called nonce.

To set how hard cryptographic puzzles are, you can use "None" as a number. If you want to add a new block or find a new block in the Blockchain network, you have to work for about 10 minutes. The value of this coin is automatically changed to make this happen. In a public Blockchain, like Bitcoin, there are a lot of nodes that keep copies of the important content. In other words, there is a limit on how many transactions can be made in order to keep the system from becoming one big group of people. It is different when you use a private Blockchain. Only nodes that have a stake in the transactions are adding or running them. Blockchain environments are not only very decentralized technologically, but they are also very decentralized in how they make decisions, which makes them even more decentralized.

This is what most people think of when they talk about "blockchain." The Bitcoin Blockchain is what most people think of when they talk about "blockchain." In terms of "permission-less" Blockchains, Bitcoin is the first one to come along. Anyone can write data to it by running some free software and not even having to sign up for an account. Keep in mind that the Bitcoin Blockchain file is a list of all the Bitcoin transactions that have been made since January 2009 until now. In simple terms, Bitcoin is a digital currency that uses Blockchain technology [1]. In other words, a Blockchain is a record of time-stamped transactions, each of which has a different number of output addresses (each address is a 160-bit number). A "header" is a piece of text that tells you what the block is about. It also tells you what is inside the block. Blockchain technologies are made up of six main parts.

- Decentralized: Blockchain doesn't need a single person or group to run it. The data can be recorded, stored, and updated all over the place (also in decentralized nature).
- When data is stored in a "blockchain," each node can see what other nodes are doing with it. This is why Blockchain can be trusted, because each node can see what other nodes are doing with the data.
- In most Blockchain systems, everyone can see the records and make apps with them. People can also use Blockchain technology to make any app they want.
- Consensus means that every node on the Blockchain system can move or update data safely. The idea is to trust one person to the whole system, and no one can stop it.
- Unless someone can take control of more than 50% of the nodes at the same time, records will not be changed.
- There was a trust problem between nodes, so Blockchain technologies solved that problem. This means that data can be sent or even sold anonymously, and you only need to know the person's Blockchain address.

So, here are some of the things that make Blockchain technology different from the rest:

- When a deal is made, everyone who is in it must agree that the deal is legal.
- If people know where an asset came from and how its ownership has changed over time, that's important.
- A transaction can't be changed after it's been added to the ledger, so no one can do that. In order to fix a transaction that was done in the wrong way, a new transaction must be made. As a result, both transactions can be seen.

- People can easily figure out who owns an asset or when a transaction is over if there is just one ledger that everyone can look at.
- It is important for a Blockchain to be decentralized, accountable, and safe so that people can trust it. The following are some of the benefits of Blockchain technology for business:
- It used to take days for complex, multi-party transactions like this to be done. Now, they're done in just a few minutes. People don't have to check a transaction with a central authority because it doesn't need to be done that way.
- There are a lot of ways blockchain networks save money, like by not having to pay for things.
- There is less oversight because the people who use the network keep it safe. All of the people on the network know each other, and they all know each other.
- People can trade things of value without the help of intermediaries.
- Because everyone has access to the same ledger, there's no need to do the same thing over and over again.

Tighter security and Data Validity are the two things that make the Blockchain safer: This is because the Blockchain's security features protect against tampering, fraud, and cybercrime, which are all bad things. The way the blockchain works makes it hard to change the data after it's been put in. It is possible to make member-only networks when a network has been approved. This lets people show that they are who they say they are and that their goods or assets are what they say they are. These are some of the ways blockchain is being used:

- Finance
- Retail
- Smart contracts and changes to the land can happen.
- There is going to be a new internet in the future.
- Future computing environments, like a distributed cloud, will be used.

That's what this section is about. It talks about how Blockchain works, what it is, and how it can be used in a lot of different things today. Section 2 talks about how Blockchain technology has changed over time. Section 3 talks about the structure of Blockchain, and then Section 4 talks about why Blockchain is important. Section 5 also talks about "How Blockchain technology helps build trust in a computing environment" and where it will be most useful in the near future, so keep reading. Section 6 then talks about a lot of problems and challenges with the Blockchain idea. In the end, Section 7 sums up this work and what's to come in a short way.

II. EVOLUTION OF BLOCKCHAIN

As we know, necessity is mother of invention. Most of the best innovations of the century have been done in last few decades. All of this becomes true because of development in technology and availability of resources. An invention never invention come directly, it arises or fetched up from a long time ago, but most of us (we people) do not know about that. For example, in buying or selling of lands, Blockchain was already in used in last 100-200 years. Everyone knows who was the previous seller or entire history of a sold land. Today's this concept is enabled with technology and changing the growth of industry/ organization/ practical applications. Hence, now we will understand about Blockchain technology from its evolution to till now.

A. Blockchain 1.0: Launching of Bitcoin - a New Cryptocurrency

The first Blockchain was conceptualized by an anonymous person named Satoshi Nakamoto in 2008-2009 [1,3, and 9]. It represents the technology of Bitcoin. It is introducing decentralization of data and information storage through a distributed, decentralized database. In this, no need to verify financial transaction for "trusted third parties". In this, they use method or structure that they are used to develop the structure of the internet, i.e., TCP/IP suite. Bitcoin create a drastic change to the internet itself so it needed to act as aplatform and have its own application layer build on the top of its core protocols.

B. Blockchain 2.0: Ethereum Rise - Smart Contracts

Vitalik Buterin (a Russian-Canadian programmer), One of the experts or co-founders of Ethereum and Bitcoin magazine, also the contributor to Bitcoin codebase [8]. It was in 2014 that he wanted Blockchain technology to be able to write this kind of code, so the Ethereum project was born. The Ethereum technology led the way with Blockchain 2.0, which makes it easier to save money. As a platform, it lets users use Blockchain with the idea of a distributed virtual machine, which is how it did this People call Ethereum and other platform projects a "distributed virtual machine." This is because they can run decentralized apps on top of their own Blockchains. As an added bonus, which means it can handle small value transactions. It also talks about token digital assets, and it came up with the idea of a decentralized organization called a Decentralized Autonomous Organization (DAO). It would be in charge of money and policy on Blockchain.

C. Blockchain 3.0: Next Generation Technology Without Mining-DApps

In general, Distributed Applications (DApp) are applications and services that don't need to be made by a single person or organization. Use decentralized storage and decentralized communication to make DApps work, and they work Decentralized Peer-to-Peer (P2P) networks and Blockchain technology are being used by DApps because they are different from other types of networks. This is not the case with a traditional application. Instead, the code is stored and run-on centralized servers. In her DApp, there aren't any of these things. Code for DApp frontends and user interfaces can be written in any language that can make calls to the DApps backend, just like a normal App [10]. But, when a DApp have its frontend (placed on decentralized storages), then it converts to new technology like Ethereum Swarm. Hence,it can be written as:

$$\text{DApp} = \text{frontend} + \text{contracts (running, i.e., on Ethereum)}$$

D. Blockchain 4.0: Making Blockchain usable in Industry

This is because Blockchain has moved to a new level because of how quickly things have changed and because people need both security and trust. Use: It is now used by businesses and other types of businesses. If users want to use Blockchain technology in one's business for example, users need ideas and solutions that work well with Blockchain technology. There are three things that make up Industry 4.0: automated systems, enterprise resource planning, and systems that work together. In this new industrial revolution, there is a lot of trust and protection from the outside world or anyone that wants to get into your private information. So, Blockchain meets these needs for more trust and privacy protection in the business world, so it's a good idea to use it. They can then order their replacement parts to arrive [2]. Several applications will be run by Blockchain technology in the near future, such as supply chain management, approval workflows and financial transactions. Condition-based payments will also be run by Blockchain technology. People who use IoT data to keep track of things like their health, assets, and more are also on the list. This is how it works now: Every company wants to work in a shared and trusted environment. Blockchain technology can help them do this. Blockchain 4.0, which makes Blockchain 3.0 more useful in real-world business situations, is

to blame for this (with providing higher trust among human being and machines). A better life will be had when Blockchain technology is used in businesses to meet the needs of Industry 4.0. It talks about how Blockchain has changed over time in this part (from past to present scenario of using of Blockchain technology).

III. STRUCTURE OF BLOCKCHAIN

Using a Blockchain, you can exchange some values (called a value-exchange protocol) through blocks (in a Peer-to-Peer network), but you can't change or change the next blocks. This is called a "blockchain." As technology has changed, so has the term "blockchain." A block is a way to store data in a package (uses linked lists and pointers). It is a data structure called a "container" that groups transactions together so that they can be added to the public ledger called the Blockchain. The block header shows the structure of the blocks in a well-ordered way (every block has data from the previous block and the next block). This is metadata, which is data about data (refer figure 1). Make sure you know that the first block in the Blockchain is known as the "genesis block" (built in the year 2009). In the Blockchain, the "mother" of all blocks is called the "blockchain." Some other important parts of Blockchain architecture can be called:

- It is a person or computer called a "node." This is part of the Blockchain architecture (each has an independent copy of the whole Blockchain ledger).
- This is the smallest part of a Blockchain system, but it is what makes it work. Blockchains have records, information, and so on in them.
- These are called "blocks." Transactions that are sent to each node are kept in a file called a "record" file.
- There are a lot of blocks in a chain.
- To add a new block to the Blockchain, users need to have a group of people check it first.
- Because of this, it takes a lot of work to use the Blockchain.

Adding Blocks to Blockchain: To learn how adding a new block to the Blockchain works, start at the beginning. In this case, a group of people decide on a miner who will deal with the transactions. A certain time has to pass before people can vote. In the past, every person in the community could vote in the polls, but now they can't. Remember that everyone can vote only once. It then becomes a miner, which means the person with the most votes can mine for the next time. Some transactions have been made in a new block that has just been added. New blocks are linked to the Blockchain by their hash value. It is possible for researchers to look at the header of a block to find out what the hash value of the last block is. Look at that number. It's the hash value of the last block that you looked at. A miner signs the new adding block with his or her keypri. This way, we can figure out which miner added the new block and give him a reward. This is done. Finally, the system will let people know that one more block has been added to the system. Everyone else must agree with the new block. It also needs to be done by other miners. They need to make a new block and add it to the one that's already there.
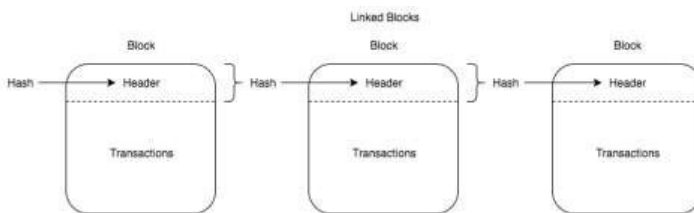

Figure 1: Structure of a Blockchain Network

In summary, there are various components of a Blockchain structure, included as:

- The nodes in the Peer to Peer (P2P) network
- The properties of the block and the block that started it
- The transactions in the ledger
- Validation or mining is the process of finding out whether something is true or not.
- At the heart of a Blockchain architecture is "consensus."
- Proof-of-work

Hence, this section discusses about a detailed explanation of creating blocks, and adding of respective blocks in a Blockchain. Now in next section, this work will discuss about necessity of Blockchain technology in current or for today's applications.

IV. NECESSITY OF BLOCKCHAIN TECHNOLOGY

In near future, Blockchain technology may be popular or not, but the concept of distributed networking willin trend as a special need (always). It is highly essential because of its time saving or cost – saving or tight data security but due to its distributed nature. Blockchain is important because it brings trust to peer-to-peer networks (using primarily data structure like linked list and pointers in a network). To be a Trusted Third Party (TTP), a bank is a very important thing. In simple terms, adding trust to a decentralized network is a big deal. This means that people can cut out middlemen all over the world if they use blockchain. Enhances reach of a businesses.

- Ensures swift transactions
- Restricts frauds
- Reliability and transparency
- Immutability
- Cost effective

Blockchain technology gives new tools for authentication and authorization in this smart era/digital world, which makes it hard for centralized administrators to stay in charge of many different things. Today's the Blockchain application can useful to consumers via several benefits, i.e., from business perspective, it is a game changingtechnology, and in near future, it will be used in many applications like finance, bank, land reforms, etc. In this section, we discussed about necessity of Blockchain technology in early stages and in current era or several applications. Now next section will explain "how trust is built in several (real-world's) applications using Blockchain concept, and in how many applications this technology can be useful in near future"?

V. BUILDING TRUST USING BLOCKCHAIN TECHNOLOGY

In a Blockchain network, each block carries the value of a transaction from one place to another. Through/ considering data structure with hash function (also cryptographic puzzle to solve) makes Blockchain tamper- proof, i.e., via providing higher (tight) security and anonymity among large number of users, we build trust using Blockchain. Businesses and individuals use blockchain to build trust because of the following five things, which are all important:

- All the people can see and copy their own copy of the ledger, which is updated with each transaction and selectively copied by each person. This makes the ledger more sustainable. It almost feels like real time. This means that the Blockchain platform doesn't belong to, or is controlled by, any single person or group. This means that its long-term existence doesn't depend on any one person or group.
- Secure, Private, and Immutable: Permissions and cryptography keep people from getting into the network and make sure everyone is who they say they are. Privacy is kept by using cryptographic techniques and/or data partitioning

techniques to give participants only a limited view of the ledger; both transactions and the identities of the people who made them can be hidden. After the conditions are agreed to, no one can change a record of the transaction. Errors can only be fixed with new transactions.

- Participants in a transaction have access to the same records, which means that they can verify transactions and check identities or ownership without the help of third-party intermediaries, like banks. Transactions are time-stamped, so they can be checked almost right away to make sure they are real.
- Consensus-based and Transactional: All network participants must agree that a transaction is valid. This is the most common type of network. The use of consensus algorithms is how this can be done. Each Blockchain network can set the rules for when a transaction or asset exchange can happen.
- In addition, the platform can be used to build business rules and "smart contracts" (contracts that run when one or more conditions are met). Blockchain business networks can grow and change as they grow to support full business processes and a wide range of activities.
- Because the Blockchain technology is distributed, decentralized, has tighter security and is flexible are the main things that make it better than other technologies [4, 6, and 7].

Today Blockchain is used almost in all applications/ sectors from agriculture to Transportation, to build trust [6, 13, and 14]. Note that due to its immutable nature and using verification of nodes (by other peers in a network), complete privacy of user is maintained through blockchain network.

V.   FUTURE WITH BLOCKCHAIN

As discussed above, Bitcoin is only the first application of Blockchain. Blockchain provides the facility of recording and storing Bitcoin transactions, but Blockchain has many uses apart of Bitcoin. For example, Big Data (term coined in early 20"s century) with Blockchain network is enabling to solve several problems/ objectives/ goals, discussed in [7]. Blockchain has a very strong structure and is very spread out, which makes it a good place to deliver trusted services to society. In this part, we talk about how Blockchain can be used for things like identifying people and protecting data. By using blockchain technology, people may be able to avoid this problem, which is how to prove who you are. This technology doesn't need a trusted, central authority to work. The following things can be done with Blockchain:

- They put the registration for a new car on the Blockchain and give it back to the owner.
- Manufacturer: They add information about what kind and model of car they made to a template for that kind of car. This is how the smart contract lets them (a digital agreement or set of rules that govern a transaction).
- As soon as a smart contract is made to confirm that someone is buying a certain type of car from a dealer, that person can get that car from that dealer.
- It can be done after a "smart contract" is signed by both the dealer and the leasing company to make sure that the deal is real.
- The lessee can look at the cars that are available for rent and fill out any paperwork that is needed to sign the lease, so they can drive them.
- There are a lot of people who want to lease a car from the leasing company at the same time. The process goes on until the leasing company wants to get rid of the car.

People who study Blockchain technology said above that a small contract made with this technology transfers ownership of the thing you own to a scrap dealer, who has the right to get rid of it. In the case of Bitcoin, Blockchain can be used for things other than money, just like

it can. General rule: Blocks can hold any kind of information on the Blockchain network, which makes Blockchain technology very flexible and useful. When it's important to keep a record that is safe, transparent and not easy to change in a decentralized way, blockchains can be very useful. There are also other ways to use it [14, 15, 16 17, 18, 19, and 20]

- Making voting more clear
- Keeping track of physical goods
- Systems that use digital IDs
- Making different types of financial instruments
- To make voting more transparent and trustworthy, Japan has tried to use the Blockchain concept in 2018 [5, 16].
- Decentralized Web
- Decentralized Applications
- Decentralized Smart Environment
- In the future, some other countries will also use this idea in their election process.

People use blockchain technology for more than just moving money. Other things can be done with it. These kinds of records can be stored on blockchains. They can store any kind of information because they can record any kind of information. This means they can be used to store any kind of information. It's now possible for anyone to "tokenize" any kind of real-world thing thanks to blockchain-based technologies like Ethereum. It is the same way that people can show that they own a company with tokens as with stocks. Suppose a group of people own a restaurant together. Blockchain technology could be used to make that restaurant into a "token." Then, they could vote on important things without even meeting face-to-face. To make things even easier, we can also make tokens of physical goods that are part of the manufacturing supply chain, gold, silver, and other things we own. Blockchain is said to be a new technology that will change the world of money soon. Then, too, slow transactions and a lack of standardization could slow down growth.

A.   An use case with Hyperledger

Enigma, on the other hand, is a "traditional" Blockchain technology that is used today. When it comes to Story, on the other hand, it is a peer-to-peer cloud storage network that claims to be the "most secure cloud." First, Factom is the first Blockchain technology to keep records that can't be changed [2, 4]. A Blockchain platform called Hyperledger is free and open source. It was started by the Linux Foundation in December of last year. In Blockchain-based distributed ledgers, it is used to run them. Hyperledger is free to use and there is no charge for it. A lot of big technology, financial, and supply chain companies use ledgers that support global business transactions. This project aims to improve a lot of things about their performance and reliability.

Organizing a lot of different projects to make open protocols and standards into a single project is the goal of this project. It provides a modular framework that lets different parts be used for different things. In this case, there would be a lot of different Blockchains. Each one would have its own consensus and storage method. People who need to identify themselves and keep track of their access could also find these services here. A decentralized platform that we'll look at now is called Enigma. These people can work together even if they aren't in the same place at the same time. Users can use this because it is built on the Blockchain technology. In order to build a "privacy by design" decentralized application, people don't have to use a trusted third party. Enigma wants to make it easier for people to do this (TTP). When Enigma is used in general, it is a way to use Blockchain technology, but computation and data storage are not done inside the Blockchain. Rather, the Blockchain is used to run secure multiparty computations done by nodes in the network. These nodes, which store and compute, are part of the network. There are a lot of different nodes that work together to solve problems without giving each other any information

about how they did it. In this case, there is no single person who can see all of the data. Instead, each party has a piece of data that isn't very important (i.e., doesn't make sense) that they can use.

This section talks about how to build trust in many different ways. In this section, we also talked about how Blockchain can help build trust, like how it could become a bullet-proof technology soon. Now, in the next section, we'll talk about a few problems with Blockchain technology in a very quick way.

VI. ISSUES AND CHALLENGES WITH THE BLOCKCHAIN TECHNOLOGY

Even though the Blockchain technology has a lot of potential for the future of the Internet, it has a lot of technical problems. Blockchain is becoming more important than any other technology when it comes to making a distributed web, a distributed cloud, and other things like that. But, using Blockchain technology in a lot of different ways comes with a lot of problems because of a lot of important issues. These important issues can be talked about as: Firstly, scalability is a big deal. However, bigger blocks take up more space and take longer to spread through the network. Large amounts of data are stored in a lot of blocks, which slows down processing. Keep in mind that the trade-off between block size and security has been a hard one to make. In that way, branches could happen a lot, which slows down Blockchain development. Third, too much electricity is wasted in the mining block. Using proof of work wastes a lot of power. Proof of stake consensus, on the other hand, could lead to the rich getting richer because the process is based on proof of stake. Now, there are five main problems that this Blockchain technology needs to solve in order for it to be widely used by businesses and people all over the world.

A. Current Critical issues and Limitations of Blockchain Technology

Miners are getting incentive in verifying new blocks, but this incentive is being decreased whereas the computation power is increasing or requirement of electrical energy is also increasing day by day to mine new blocks or any transaction. Note that a user contains all of the transaction of Blockchain whatever has been created or generated so far. Some very important problems have been fixed (addressed) in Blockchain when making a transaction or making a block.

- There are a lot of new words for Blockchain technology, so it's not easy to learn them. People are now more likely to use cryptography, but it's a very specific field full of words. Because it's a good thing, there are a lot of people working on making glossaries and indexes that are both complete and easy to read.
- Blockchains are not resistant to bad people, but they are "antifragile," which means that they respond to attacks and become stronger after they've been harmed. Because this needs a lot of people to use it. There are less benefits if the Blockchain isn't strong and there aren't many nodes spread out over a large area. A lot of people have talked about this in some permissioned Blockchain projects. Is this a big deal?
- In the beginning, Bitcoin was said to be "near free," but now it has a lot of fees. It could only process about seven transactions per second until the end of 2016. Each transaction costs about $0.20 and can only hold about 80 bytes of data. This is how much each transaction costs: There is also a lot of politics because the Bitcoin Blockchain can be used for more than transactions. The people who don't like this are because it makes miners keep going through and recording the same things for a long time.
- If a Blockchain is used to keep track of things, they need to be good things. There is no way to know for sure that the data on a Blockchain will not be stolen. Users have to make sure that when they record events, they are correct. In a Blockchain system of record, if people put garbage in, it will come out the same way.
- When more than half of the computers that run the network tell a

lie, the lie will become the truth. Bitcoin and other blockchains have a security flaw that makes them less safe. It was important for Satoshi Nakamoto to talk about this kind of attack when he made Bitcoin. People in the Bitcoin community keep an eye on mining pools to make sure no one has too much power over the network without their permission.
- Since Blockchain protocols make it easier to keep track of governance models, there have been a lot of public disagreements. Because miners are forming another type of incentivized governance model, there have been a lot of public disagreements about this.

Following is a list of some of the other problems with Blockchain technology. In this example, there is a lack of technical knowledge and not enough people who have the right certification. There is also a lack of scalability, less privacy, security concerns, complexity, higher transaction costs, and manual errors.

B. Challenges Occurring in Blockchain

In Blockchain, a transaction usually takes 10 minutes to update/ complete. Another goal of our system is to ensure the scalability of the system/ database (because requests may grow to large number or ~1 million per day in a system), and also ensuring the security of all generating data. As we discussed, many countries are trying to use Blockchain concept in the election process, but opposition are worrying about cloud threating. Only few threats like 51% attack on cloud computing are possible when Blockchain technology is being used there [11]. In summary, some other challenges in Blockchain technology are [12]:

- Initial Costs for Setup
- Consumption of energy
- Integration with the legacy system
- Security and privacy
- Public awareness

There are a lot of different things about Blockchain technology that are talked about very thoroughly in this part. Some of the issues Blockchain technology is having right now and in the near future are also talked about in this part of the text. For now, that's it. During the next section, we'll sum up this project in a very short way and talk about what we're going to do next (related to Blockchain technology).

VI. CONCLUSION AND FUTURE WORK

When users look at the Blockchain, you see a network of blocks, which means it has a structure of mesh network (of computers) that is both distributed and decentralized (for making a communication). Also, researchers talked about this in the sections above. Blockchain is a hot or must-have technology for providing secure, transparent, and trusted services. That's true, but don't forget that we're still in the beginning stages because the technology isn't ready yet and hasn't been tested at a large scale (completely). In many cases, the amount of data, the speed at which it can be transferred, and the speed at which it can be agreed upon will need to be significantly increased for this technology to work. To show this, for example, we should look into the fact that Bitcoin only adds up to 1 megabyte (MB) of data every ten minutes. When we show that Blockchain technology should be more about control than trust, we show that it's better to use it. Furthermore, we say that in Blockchain systems, complete control isn't always possible because of the nature of decentralized decision making. This means that trust is still important in some Blockchain environments. We think that Blockchain technology is a technology that gives more control to people who are involved in a transaction, but less control from a system's point of view. Now, some of the things we should be looking into in the future are mentioned in subsection 8.1. We should really pay attention to these

issues and points.

A. Future Work

As long as participants can be identified and can be trusted to act the way they say they will, not all Blockchain ecosystems need the same things.

- Peer-to-peer has a lot of flaws: People who use "peer-to-peer" models may not be able to agree on what the "real" or "true" state of the data should be. For example, if each peer is updating at a different speed and has slightly different states, how do we figure out what the data should be? In a "untrusted" peer-to-peer network, where we can't always trust any of the peers, how do we make sure that the system can't be easily hacked by bad peers?
- The question is: How do we make it hard for dishonest miners to make blocks? You should keep in mind that this is only a problem for ledgers where the block-makers are not trusted. A common problem is when two or more miners make blocks at the same time.

Blockchain technology is often linked to trust, but it should be linked to control. If complete control is possible in Blockchains, there is no need for trust, according to empirical data, so there is no need for this technology in our work.

Disclaimer. Links and papers provided in the work is only given as examples of Blockchain for different sectors. To leave any citation or link is not intentional.

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