A Comparative Analysis of Block Chain Technology Applications

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Abstract—Blockchain is a technological development that permits changing how society exchanges and connects. This reputation is specifically inferable from its properties of permitting mutually mistrusting entities to exchange information and associate without depending on a confided in the third party. In this paper, we evaluated the essential standards and attributes of the BCT and investigated the exhibition and application situations of various domains. We additionally gave specialized direction for choosing a reasonable areas and summarized the impediments and future improvement of BCT technology.

Keywords—BCT, smart contract, review, application

I. INTRODUCTION

The BCT was presented in the treatise "Bitcoin: A peer-to-peer electronic cash system" by Satoshi Nakamoto in 2008. It is the innovation of bitcoin. Customary exchanges require a concentrated confided in the establishment [1]. The confirmation and record of the shares depend completely on a trusted foundation, which may cause numerous issues of exchange cost, efficiency, and security[2]. Decentralization is the main feature of BCT, and it very well may be utilized to take care of these issues [3]. All the nodes in the BCT have equivalent status. These nodes accomplish agreement by utilizing the earlier agreement of the rules and following the rules of majority strength [4]. They execute the functions of information appropriated capacity and exchange data recognition in the circumstance that different nodes are not completely trusted[5]. So we can viably take care of the exchange issues.
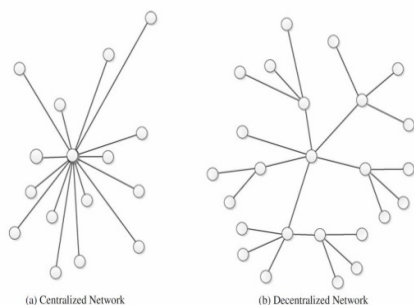

Fig. 1. Aarchitecture of different networks [6]

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BCT is an information structure shaped by a time sequence of blocks. The block is a collection of information containing related data and records, and it is the basic unit of BCT [7]. The data structure of the BCT is made up of a block header and a block body, the block header for the most part contains the hash estimation of the previous block, which is utilized to interface the previous block to guarantee the trustworthiness of the BCT and the block body contains the fundamental data of the block. This data along with the hash estimation of the previous block and the irregular number in structure of hash estimation of the current block [8]. In the Bitcoin application situation, each block data records framework to exchange information data delivered by participating nodes inside a specific time range [9]"container-title":"2019 IEEE Asia-Pacific Conference on Applied Electromagnetics (APACE. The transaction records incorporate sender and recipient identification, and other extra information.
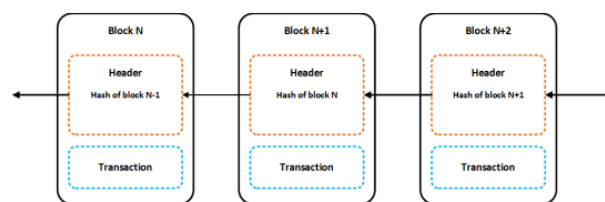

Fig. 2. BCT in the Bitcoin, adapted [6]

The above exchange information, every information block contains the block ID, timestamp, an association relationship with a previous block, etc. At that point, blocks are interconnected into a series that records the entirety of the past data over the whole organization [10]quality, and the validation of several important criteria in agriculture and food supply chains. The growing number of issues related to food safety and contamination risks has established an immense need for effective traceability solution that acts as an essential quality management tool ensuring adequate safety of products in the agricultural supply chain. Blockchain is a disruptive technology that can provide an innovative solution for product traceability in agriculture and food supply chains. Today's agricultural supply chains are complex ecosystem involving several stakeholders making it cumbersome to validate several important criteria such as country of origin, stages in crop development, conformance to quality standards, and monitor yields. In this paper, we propose an approach that leverages the Ethereum blockchain and smart contracts efficiently perform business transactions for soybean tracking and traceability across the agricultural supply chain. Our

proposed solution eliminates the need for a trusted centralized authority, intermediaries and provides transactions records, enhancing efficiency and safety with high integrity, reliability, and security. The proposed solution focuses on the utilization of smart contracts to govern and control all interactions and transactions among all the participants involved within the supply chain ecosystem. All transactions are recorded and stored in the blockchain's immutable ledger with links to a decentralized file system (IPFS. These information blocks are communicated progressively to the whole shared organization. When they are added to the chain, they are changeable and difficult to be tempered[11].

II. BENEFITS FROM BCT

BCT, as examined in the above section under its design, offers some inherent benefits which the business has been searching for a long while now[12]. The conveyed idea of BCT acquires a lot of transparency in the preparing and subsequently decreases the requirement for manual check and approval [13]. The key features of the BCT incorporate the following: Adjacent real time

A. Adjacent real time
BCT empowers the close to continuous working of recorded transactions, and reducing risk. [14].

B. No intermediary
BCT innovation depends on cryptographic proof rather than trust, permitting any different parties to execute straightforwardly with one another without the requirement for a trusted third party [15].

C. Distributed ledger
The shared appropriated network records a general information of transactions. The BCT is dispersed and exceptionally accessible. The BCT doesn't safeguard the personalities of the gatherings or the exchange information, just the evidence of the transaction presence [15].

D. Irreversibility & Immutability
The BCT contains a certain and checkable information of each and every exchange ever constructed. This prohibit previous block from being modified and thusly stops double fraud, and modifiable of transactions [16].

E. Smart Contracts
Stored procedures executed in a BCT to measure pre-characterized execute a commercially or legally enforceable transaction without the contribution of a middle person [17].

III. APPLICATION OF BCT

This section, the application of BCT in different domain which are systematically discussed. Such applications have been categorized into different clusters, i.e. healthcare, business and industry, financial services, and other applications[18].

A.   Finance Services
BCT is considered as the significant technological development behind the Bitcoin framework. It has been generally used for the financial transaction which is supposed digital currency [19]. These days, digital forms of money have shown up as conspicuous software systems. In Fig. 3, the initial first Block or beginning block contains the first transaction[20]. Digital money has its cash (coin). Mining is the way toward bringing another new block into the BCT. Every node utilizes BCT to confirm whether the coin is genuine or if it has not been spent already. Before the exchange records are affixed into the BCT, a more number of members agree. Mining measure resource-intensive tasks, this manner makes it extreme for an assailant to approve an invalid transaction [21].
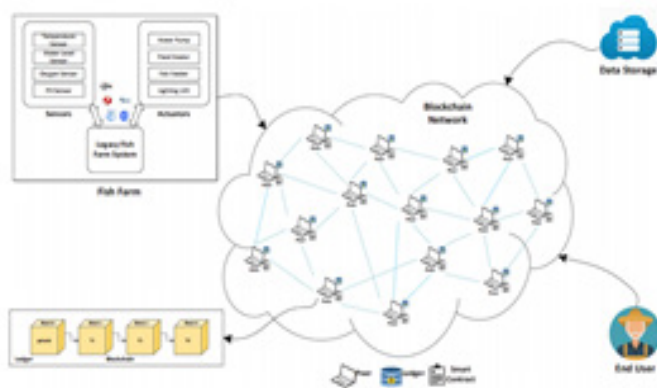

Fig. 3. Conceptual architecture of BCT [20]

B.   Internet of Things (IoT)
BCT innovation develops and our investigation of its uses grows, it joins other disruptive technologies, for example, enormous information, the Internet of Things, intelligent assistants, and autonomous vehicles in making significant open doors just as having possible unintended social consequences [15]. Despite the fact that digital currencies brought BCT innovation to wide consideration, BCT has countless other potential uses[22]. For instance, smart contracts could turn into the management system for private records including transports, and clinical records; openly available reports including land titles, vehicle enrollments, visas, and building grants; individual records including training declarations and degrees, business records, vehicle or house keys, and bundle conveyances; and different varieties including coupons, vouchers, licenses, licenses, and tickets[23].

C. Medicine and Health
BCT has tremendous potential for the interoperability gives that exists in the current medical care frameworks. It tends to be utilized as a standard which permits the stakeholders, for example, medical services elements, clinical analyst, and so

on to share electronic health record (EHR) safely [24]. The sharing of EHR empowers us to improve the nature of clinical consideration and upgrade the proposal for specialists, for example. In any case, manage medical care information., i.e. acquiring, storing, and analyzing, privacy issues [25].The framework grants clients to access EHR from a common information pools utilizing BCT after verifying their identity and cryptographic keys. To accomplish client's validation, a personality based verification is received. An efficient lightweight block configuration is proposed to upgrade the current implementation of BCT [26].

D. Agriculture
The significance of food safety quality while proposing an agri-food SCM traceability framework utilizing RFID and BCT innovation. BCT is received for guaranteeing the mutual and distributed data is reliable and valid [27]. Besides, the term smart manufacturing' in the period of Industry 4.0. Industry 4.0 indicates the adaptability of items and services to be shared over the Internet or different organizations, for example BCT [28]. Concerning the SCM management, Industry 4.0 is relied upon to accomplish the situation of decentralization and self-regulation [20].

E. Biomedical
The current research region of BCT applications in the biomedical space. The objective is to distinguish biomedical issues treated with BCT innovation, the degree of development of particular methodologies, types of biomedical information considered, BCT highlights and functionalities exploited and BCT innovation systems utilized [29].

F. Supply Chain Management SCM
The utilizations of BCT technology (BCT) in SCM the management of SC are discussed about in business practice and there is expanding enthusiasm for this theme inside the academic network [30]. In this paper, we plan to join these two points of view on BCT in SCM to sum up a present status of the art and to determine roads for additional exploration [31]. For this reason, a thorough structure of utilization case bunches of BCT in SCM is created by the distinctive features of BCT.

IV. RESULT ANALYSIS: DISCUSSION
Fig. 4. shows the examinations chose in this literature survey, a correlation of them with respect to the important data built up in the previous part. This section discusses the different analysis result after approximately 40 literature review papers. Considering the outcomes got from the literature review introduced in this work, these days, during literature review 10% researchers are centering their endeavors in the SCM for the agriculture part [32]. A framework to improve the effectiveness of food SCM.
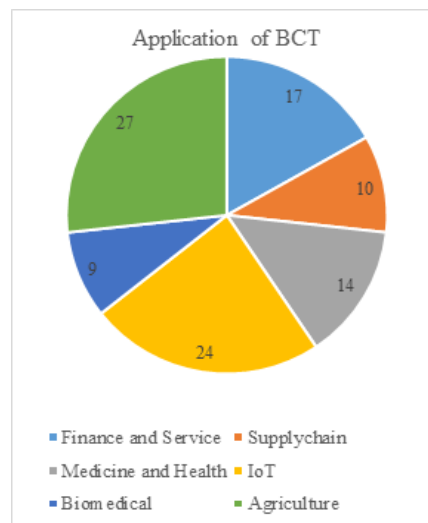

Fig. 4. Analysis of the different application of BCT

The IoT innovation has been generally applied in agriculture, there are a few challenges identified with protection and security that need to be addressed. To overcome these difficulties, 28% researchers use BCT which permits the production of a distributed digital ledger of transactions that is shared among the nodes on IoT organization.

The review shows that various examines have proposed different use cases for the application of BCT in health-care; There is a 14% researcher to study the effectiveness of healthcare sectors.

An agri-food SCM detectability framework is established, in view of RFID and BCT innovation. This framework covers the entire cycle of information whole process and data management of each connection in the agri-food SCM, which understands the observing, and recognized the management for the quality and safety of the agri-food, 27% researchers discuss the BCT which is discussed about the agri-food SCM traceability system.

CONCLUSION
Although the capability of BCT is generally professed to be at standard with early business internet firms needs to understand the key features of the innovation and how it can fathom the current issues as on one hand, internet-enabled exchanged of information while on the other, the BCT can include the exchange of significant worth. Many areas need to recognize openings, decide plausibility and effect, and test evidence of ideas. They conclude that regulators should engage, mediate at the beginning phase and shape the advancement. This will permit them to understand the innovation, survey the danger, and empower the customized solutions for their particular obstacles.

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