



## **Implementation of Blockchain in Accounting Information System**

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### ABSTRACT

When technologies and frameworks are designed, they are not as dynamic and flexible as blockchain technology and cannot meet the needs of other domains. Blockchain was designed specifically for cryptocurrencies and should not be used in other areas. However, in recent years, it is argued that we might be able to blockchains in other fields such as accounting and confidentiality. In this study we are going to use blockchains for accounting information systems through enterprise resource planning. The proposed solution represents the concept of a data vault supported by blockchain, as blockchain can be used to prevent fluctuations in stored data. To apply this we are going to use a cryptographic primitive to the data in the black and chain the block to secure the data. The study shows that a simple, lightweight version of blockchain can be applied to help businesses store their financial and accounting data in data vaults, ensuring data integrity against change.

Keywords: Blockchain, Cryptocurrency, Data Vaults, ERP, Cryptographic Primitive

### **1. Introduction**

Data is an integral part of accounting information systems (ie AIS); therefore, it requires careful transaction and handling, and the data stored in the database are secure and safe, but to some extent. Data can be compromised, where at least one person with unrestricted access can manipulate the data to their will or business requirements. Therefore, a computer system should be provided to companies to protect their financial information on a different location from their system. Such systems can ensure that auditors and financial regulators can ensure that the data is genuine, tamper-proof, and that no future changes will be made to the data in its form. copy or carbon copy is available and stored in the Data Warehouse. Traditional databases (i.e. databases) are used to store data, but data integrity is never an issue. DB is not as efficient as Blockchain. Blockchain has essential functions, ensuring data integrity and preventing the possibility of unwanted changes. Fortunately, data warehouses apply similar concepts.

#### **1.1 Motivation**

To achieve data integrity in accounting information systems through the use of blockchains by implementing data vaults.

#### **1.2 Aim and Objective**

##### **Aim**

This paper aims to build a software which uses blockchains as a data storing technique to prevent tampering and leaking of data in any form.

##### **Objectives**

- Data acquisition, data storing, data vaults.
- The use of relational database to provide a cost effective solution.

2. **Literature Review**

To support this work, several related studies have been analyzed.

1. *Search Criteria:*

In this paper we are going to explore different types of ERP systems and blockchain capabilities in different fields. Our main focus is going to be the use of blockchains in accounting, auditing and finance.

2. *Existing Work in Blockchains:*

Blockchains has been proved to be of use in the following ways:

- Suitable for tracking assets and related activities.
- Can resolve many significant problems in healthcare while offering privacy, security, validation, and authentication.
- Can resolve two prominent issues in the accounting ecosystem: first, checking and validating the inputs by multiple parties involved in the transactions; second, if the audit process is involved in the transaction, the audit evidence would be as attestation engagement.
- The Blockchain-based database is suggested to be available on every node on the network. Any change would be validated through the consensus of all users.
- Can be used in an environment where the parties do not trust each other or if some parties are not trustworthy.
- Can fulfill the requirements of secure communication while maintaining the security and privacy of the data.

3. **Solution Methodology**

The solution model framework is supposed to work in three steps:

1. The first step would be that the given trial balance is being uploaded in the system.
2. Then it gives permission to access the model to the company and its parties after a trial balance is requested.
3. In the final step, the trial balance gets verified.

The solution model stores trial balances data and generates a true copy which is then used for validation against the company's AIS. This system generates hash values for every line in trial balance which is later used for comparison against previous and new hash values. The hash values are converted into blocks and stored in the system.

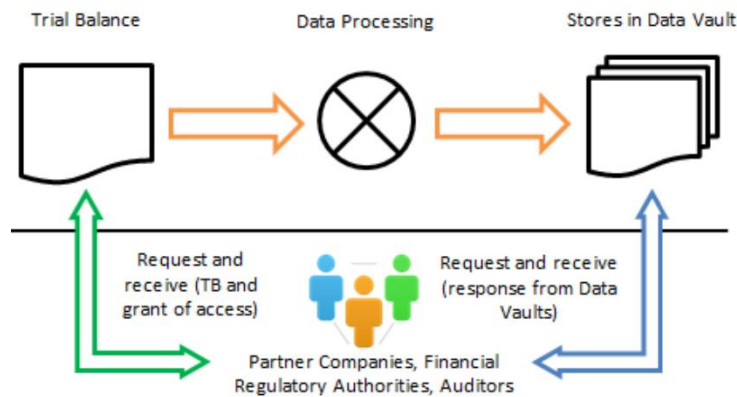


FIGURE 1: SOLUTION MODEL

**Layer 1-** The first layer consists of a user and front-end framework integrated with AIS. The user can interact with these data values and add or modify the necessary changes.

**Layer 2-** The second layer processes the information received from the first layer and creates blocks of data and information. These blocks are further modified to create a chain of blocks.

**Layer 3-** The third layer processes the data from the second layer and the data blocks are broadcasted to different nodes on the location network. Now the data is stored in a digital format in data vaults.

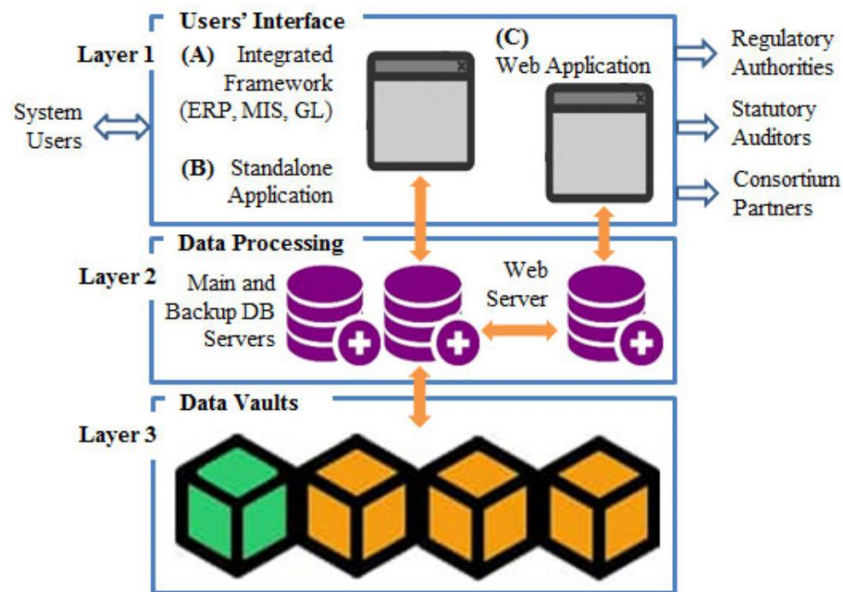


FIGURE 2: DESIGN DESCRIPTION OF SOLUTION MODEL

#### 4. Working Prototype:

1. Add 1 as the next block number to get and display the last block number.
2. Get previous block hash from DB.
3. Create an empty file and save it with a .DAT extension as the next number after block
4. The system calculates the Unixtime in seconds and displays it in seconds.
5. The system starts generating row hashes for each record, and a certain pattern is adopted. For each odd-numbered record, the system calls the hash function to get the correct 8 characters of the hash value. For even-numbered records, the system takes the left eight characters of the hash value. During this process, the system also counts the number of records uploaded and displays NoT.
6. The next step is to compute the root hash from the transaction rows. This root hash starts with the previous block hash value, adds hash values for each row from left or right, and ends with the root hash.
7. The system then generates block hashes from the metadata. Metadata includes block number, UNIX time value, NoT, previous block hash, and root hash. After creating the block hash, the system writes metadata to the first line of the block and closes the block.
8. A hash of the completed physical file is then generated and stored in table SY05. This hash value is not stored with the block, it is used to verify the complete block in case of modification or alteration.
9. After creating the block, the system updates the block number counter and hash value of the current block in table SY00. The metadata hash is used in the next block as the previous block hash value.
10. The block information table SY05 updates and stores the metadata information of each block.

11. Finally, the system notifies the user that the block has been created and displays its serial number.
12. The system does the final process and generates an access code which is a long string and stores it in the SY04 table in the DB and communicates it to the user as a token access code which is a combination of different pieces of metadata.

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000001000016088297810500099308349CAC40C29BCD4CB391C5F60D4895F05A34
660A38C1B2771105834D21517610788B0D6388D8D3D5DEF6126875246DD4256747
13105569E141C6C5003E3300E322A8C73C1998436D96E8A48D876B6F6E6CDF86DF0
E394595F7791001F7C8
11111001<CASH IN HAND (H. OFFICE)<<<<<154430<<<<8B89EA28
11111002<IMPREST AT FACTORY<120700<<<<<46388<<<C58BDF28
11111002<IMPREST AT FACTORY<260000<<<<<203617<<<6731FDE4
11111002<IMPREST AT FACTORY<<<<<476396<<<<1C9BF8F7
11111003<IMPREST AT KARACHI-LOCAL<<<<<76000<<<<868D314E
11111005<IMPR. LOCAL PURCHASES<260000<<4051<<<5000<<156A6174
11111005<IMPR. LOCAL PURCHASES<<<<<5000<<<<BCCB45EC
    
```

Metadata ←

Block Body ←

**Create Block**

**BLK No.** 00000100

**UTV (S)** 001608829781

**NoT** 05000

**PBH** 99308349CAC40C29BCD4CB391C5F60D4895F05A34660A38C1B2771105834D215

**RH** 17610788B0D6388D8D3D5DEF6126875246DD425674713105569E141C6C5003E3

**MDH** 300E322A8C73C1998436D96E8A48D876B6F6E6CDF86DF0E394595F7791001F7C8

**FH** 524548DA06AD1394A28D3EA4B85384815E30D33E969C4BF40D83E3E1F74DAF40

5000

	1-8	9-16	17-24	25-32					
	00000100	99308349	B0D6388D	8436D96E	B8538481	11111201	20000105	50000016	08829820
Block No.	Prev. Block Hash	Root Hash	Meta-data Hash	File Hash	Co. Code	FY TP	From Line	To Line	Unix Time (Seconds)
				-Block					

**5. Conclusion**

- The conclusion that we derive from this study is that blockchain technology is yet to be designed as dynamic and flexible as required by our design.
- In our study we designed a solution that can provide data integrity in AIS with the use of blockchain technology and data vaults.
- We analyzed various uses of blockchains and implemented them in the accounting sector.

**6. References**

- [1] M. Allahverdi, "A general model of accounting information systems," in Proc. 5th Int. Conf. Appl. Inf. Commun. Technol. (AICT), Oct. 2011, pp. 1-5.
- [2] A.G.Georgantopoulos,E.I.Poutos,andN.Eriotis,"Recentdevelopments and trends in accounting information systems," J. Bus. Finance Res., vol. 3, no. 1, pp. 1-9, 2006.
- [3] F. A. N. Al-Dalabih, "The impact of the use of accounting information systems on the quality of financial data," Int. Bus. Res., vol. 11, no. 5, p. 143, Apr. 2018.
- [4] H. Hou, "The application of blockchain technology in E-government in China," in Proc. 26th Int. Conf. Comput. Commun. Netw. (ICCCN), Jul. 2017, pp. 1-4.
- [5] S. D. D’Cunha. (2017). Forbes—Dubai Sets Its Sights On Becoming The World’s First Blockchain-Powered Government. [Online].

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Available: <https://www.forbes.com/sites/suparnadutt/2017/12/18/dubai-sets-sights-on-becoming-the-worlds-first-blockchain-powered-government/#1b4607b454ba>

- [6] The Smart Dubai. Accessed: Sep. 15, 2020. [Online]. Available: <https://www.smartdubai.ae/>
- [7] P. Zhang, D. C. Schmidt, J. White, and G. Lenz, Blockchain Technology Use Cases