



Project Proposal

Verify the Validity of Contracts (The Study Case Is Buying & Selling Of Land) Based On Blockchain

Submitted by

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Abstract

We live today in the era of the information and communication revolution, and the speed and safety of services performance has become the hallmark. Therefore, many countries have become in need of distinctive technologies to serve their needs and circulate them in all services provided to citizens, protect their data from forgery and facilitate access to it. One of these technologies is Blockchain technology, a technology that started in 2008 and in its simple sense is a distributed database with the ability to manage an ever-growing list of records called blocks

As the world has tended to use blockchain technology in many applications and fields, including (medical fields, elections, real estate and the sale of apartments, registration of land ownership ...) because of its effective role in preserving, storing and verifying data

Hence our responsibility and our national duty towards our country to support this technology and use it in the Palestinian Territory Authority to preserve the rights of citizens in the buying and selling process.

Because this process is one of the important and sensitive operations in which fraud may occur.

Whereas, through our visit to the Land Authority, it was found that there may be cases of fraud in the contracts, whether from internal or external parties, and in the context of our conversation with them they do not use any encryption methods to preserve these contracts and audits they have manual operations by the employee, so this All of them may cause some problems, and it has also been clarified that they have already had fraud and they solved this problem by recording the moment of buying and selling in a video

And store these videos with them for a period not exceeding two years

Therefore, the goal of our project was to find a model using blockchain technology that saves contracts and stores them in the blockchain, as well as retrieves and searches for any blockchain contract, in addition to

verifying contracts in case of suspected fraudulent contracts.

As we clarified that we will work on Operational & Archiving so that in Operational it will include all sales and purchases, starting with the citizen going to the Land Authority until the final contract, so that the outcome of this process will be an input to the Archiving phase.

Then each node resulting from the Operational process will be stored in a block and published on the blockchain network

1 Introduction

1.1 Overview of Blockchain

Blockchain technology which is "in the simplest of terms, a time-stamped series of immutable records of data that is managed by a cluster of computers not owned by any single entity. Each of these blocks of data (i.e. block) is secured and bound to each other using cryptographic principles (i.e. chain)."[1] Blockchain is a distributed database that is widely used for recording distinct transactions. Once a consensus is reached among different nodes, the transaction is added to a block that already holds records of several transactions. Each block contains the hash value of its last counterpart for connection. All the blocks are connected and together they form a blockchain [2].

Structure of Blockchain

First, Blockchain involves three basic concepts: block, chain, transaction. The “block” refers to distributed data, the “chain” means the chronological string of blocks arranged by transaction ledger and “transaction” the read/write operations on the block that will store/ retrieve the data. Figure '1.1' shows that the blocks are linked into a chain in chronological order , so that each block retaining the hash value of the previous block, to give finally the criteria of de-trusted, decentralized, distributed data storage structure. Since this technology uses cryptographic hashes, it ensures the data of any transaction can't be forged or tampered beside the ability of verification against integrity and security. While the distributed nature is served by the distributed data storage across network and peer to peer (P2P) communication [3].

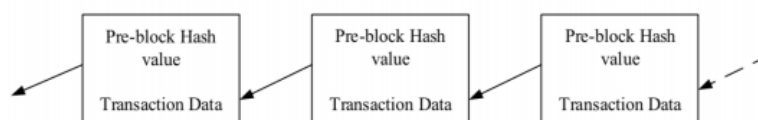


Figure 1.1: Blockchain Technology Mechanism [4]

1.2 Underline of Organization

The Palestinian Land Authority is a government authority with a ministerial rank, established in 2002 during the era of the Palestinian National Authority to manage the land sector. The Palestinian Land Authority was established according to Presidential Decree No. 10 of 2002 on 5/9/2002 by President Yasser Arafat. To achieve its goals, as the Palestinian Land Authority carries out broad tasks that fall within its general objectives, which include registering property rights, and conducting comprehensive surveys of Palestinian lands, including the process of surveying and registering property in the state of Palestine. Also, the vision of the Authority is represented by: For the Authority to seek to be the organizational and administrative reference for everything related to the Palestinian lands at the governmental, institutional and civil level, and to lay down the rules and foundations upon which it is based, and to form with the other concerned parties the basic pillar for establishing and setting up land laws and the mechanism required to implement Them [5].

On the date of 11/22/2020, an engineer was interviewed in the computer department, where she explained the procedures that take place during the direct buying and selling process within the authority and it was according to the form Figure below:

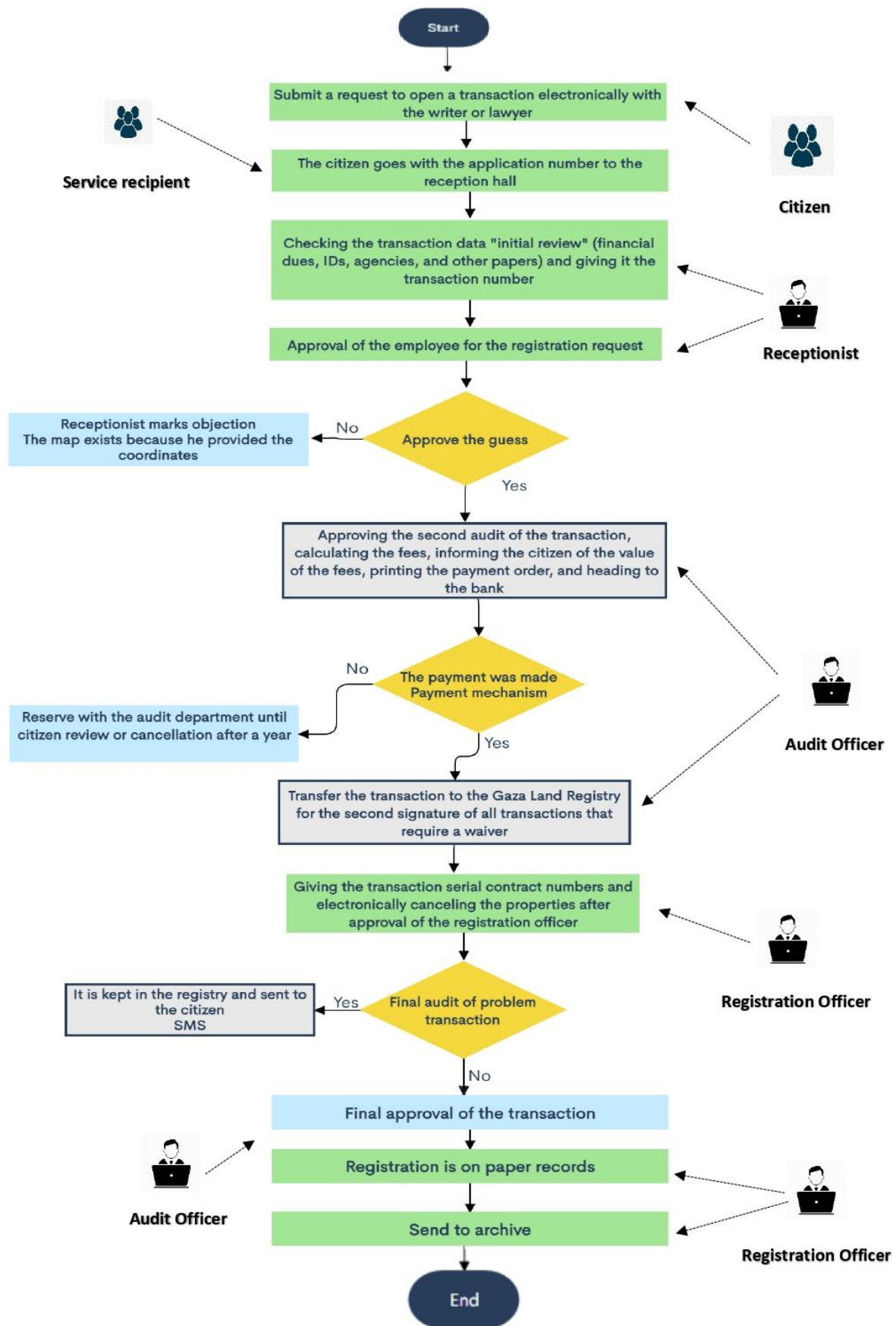


Figure 1.2: Blockchain Technology Mechanism [6]

1. The parties to the contract go to complete the registration application
2. Collecting the papers needed to open the transaction
3. The citizen submits an application to open the transaction to the Receptionist
4. The submitted papers are checked and verified Initial signature on the Registration application for all parties to the transaction
5. Transforming the transactions into a preliminary audit and they are Audited
6. The citizen turns to the receptionist and makes the payment associated With the transaction
7. The transaction is checked again for the conversion
8. Giving the transaction serial contract numbers and canceling the Properties electronically after the approval of the registration officer
9. Final approval of the transaction
10. Registration is on paper records
11. Send to the archive

1.3 Problem Statement

In the process of sales contracts in general, such as sale and purchase contracts, fraud is carried out either by one of the internal parties (employees) in the Land Authority or external parties (lawyer, citizen) This leads to long-term ownership problems.

1.4 Objectives

1.4.1 Main Objective

Develop a model based on blockchain technology to verify the validity of contracts (the study case is direct buying and selling of land).

1.4.2 Specific Objective

- Examining the Land Authority system in depth and studying it well to achieve the greatest benefit from the project.
- Deep understanding of previous studies and works in order to master the merits and try to implement them as much as possible to improve performance and avoid the negatives found in previous work to produce satisfactory results.
- Model development according to the following steps:
 - Designing the system.
 - Implementation of the final system currently, implementation is limited to the Land Authority, but in the future, implementation will be on any contracts.
 - Testing the system after completing it well.
- Evaluate the Model after the design and testing phase.

1.5 Limitation and Scope

1.5.1 Scope

1. The project targets the Palestinian Territory Authority in the Gaza Strip.
2. Blockchain technology is applied to the direct buying and selling process that takes place between the two parties within the Palestinian Land Authority.

1.5.2 Limitation

1. Lack of knowledge of Palestinian land employees Blockchain.
2. Opposing the use of new technology and the method of decision-making.
3. Cost of Blockchain need Money.

1.6 Literature Survey

From this study it is found that at a unique moment in history where our society is undergoing a transition from an industrial economy to an economy defined by a new set of technologies, ranging from digital to ultrafine technology. Among the latest waves of digitization is blockchain, a technology that many say promises to redefine trust, transparency and inclusion around the world.

After our extrapolation of some of the previous studies, it was found that blockchain technology can be used in many areas, including in the sale and purchase contracts of the authority, It has also been noted that there are previous indicators in our current era and This is what was observed from previous papers and studies, which indicates the blockchain technology in that.

In our turn, in this research, Will be split the scientific papers studies dealing with the blockchain property into three important parts:

The first section: Studies talking about smart contract.

Smart contract

This paper [7] talks about a systematic mapping study to collect all the research related to smart contracts from a technical perspective. The aim of doing so was to identify current research topics and open up challenges for future studies in smart contract research. The study extracted 24 papers from various scientific databases. The results showed that about two-thirds of the papers focus on identifying and addressing smart contract issues. Four main issues were identified, namely, codification, security, privacy, and performance issues. The rest of the papers focus on smart contract applications or other topics related to smart contracts.

It was observed through this study that there are many studies on blockchain technology and today the technology era is in dire need of it. The study also focused on important issues that we will benefit from in our research, especially the issue of privacy and security through our application of it to property contracts in the Land Authority.

Land registration with blockchain technology.

This study [8] talked about registering land on the Blockchain network by designing a smart contract. The proposed studies could provide many benefits to stakeholders including efficiency, transparency, trustworthiness and integrity for the various entities and processes involved in the purchase and sale of real estate. The framework mainly provides services that provide detailed history and non-tampering information regarding the property to ensure that the record is not tampered with. And It was noted here that there is an external link available via Restful for traditional property handling applications so that they can extract the record in real time of the land, such as dimension, location and price for that specific land. The proposed system will ultimately protect confidence in doing real estate business over the Internet.

It was noted through this study that there are important issues on which blockchain technology is based, especially on lands and contracts, as in our study, such as the location and price of the land, but they did not mention the machine that mentioned the parties allowed to extract the clear record in each land and did not mention the means to protect the records from the amendments of the authorized parties.

In this paper, the potential use of blockchain technology in land management is described, with an overview of recent developments in the field of blockchain technology - for example technical maturity, forks (steel), and governance. The relationship between person (s), right (s) and

things in a land administration system is the basis for defining the required function, given the complexity within these three elements: identity of the person, legal diversity (a 'bundle of rights') and diversity of things (including potential use). For "bitsquares"). The paper analyzes whether some of the principles of good governance in land administration (transparency, accountability, security, and rule of law) are being met using blockchain technology. In this context, it was concluded that the technology does not appear mature enough for application in land administration at this moment.

It was noted in this study that it dealt with one aspect, namely the law, and did not address the technical aspect in depth. It did not study the effects of blockchain technology on data protection and He did not explain in detail how to achieve transparency through this technology.

This paper discussed the use of two countries to modernize the cadastre by adopting blockchain technology. The paper examined how social, political and technical issues affect the state institution's willingness to public institutions when adopting an emerging technology while both countries (Honduras and Georgia) partner with private companies to gain expertise in the blockchain, and one case was less successful than the other. Whereas in Honduras, the lack of a comprehensive nationwide land registry with correct and complete land registries, as well as political resistance to changing the status quo, put an end to the blockchain project. In contrast, a strong public-private partnership with political participation, along with more modern and reliable digital land registries, has facilitated the

adoption of the blockchain of land registration in Georgia. It helps in analyzing these two situations .To identify the enabling and constraining factors related to digitizing public records and adopting blockchain initiatives for land registration. While these projects are not dependent on the invention of new technology, they do require process redesign and technological readiness. As these two cases illustrate, the combination of social and political factors with technology-related factors such as infrastructure and readiness creates the conditions necessary for the success or failure of advanced digitalization initiatives.

This is what was observed through previous research about the success story of blockchain technology in the country of Georgia and it did not succeed in Hindus, based on a basic and important criterion, which is the use of modern and reliable digital records.

Blockchain based system implementation.

This [9] paper provides a proof of concept for a use case that uses the Ethereum platform to build a blockchain network to buy, sell, or rent property. This study concluded with several results that provided an opportunity to create new scalable decentralized solutions for the development of smart cities by enabling paperwork. There are huge opportunities in this distributed ledger technology that will bring about revolutionary change in the coming years. The concept of blockchain can be used alongside smart contracts as a promising technology for sharing services and is a common requirement in smart cities. All blockchain transactions are stored in a shared, decentralized database. The transaction registered in the decentralized system is not subject to change and cannot be changed. Therefore, the opportunity for fraud is negligible.

It was noted here that the researcher used a new and important platform to implement the idea of a smart city on blockchain, but he did not go into the details of the contracts that will be simulated.

Summary

Through previous studies, we have attempted to demonstrate and illustrate the efforts of many researchers in reaching the concepts and features of blockchain technology as it may be broadly scalable for a variety of situations. These features do not only apply to the immediate context of currency and payments, or to contracts, property and all financial market transactions, but outside them to sectors as diverse as government, health, science, literacy, publishing, economic development, art and culture, and perhaps on a larger scale to enable human progress on a larger scale, and we tried Focusing on the topic of smart contracts to fit our research on smart contracts at the Land Authority.

Blockchain technology could be fully complementary in a potential future world space that includes both centralized and decentralized models. Like any new technology, blockchain is an idea that initially disrupted, and over time could foster the development of a larger ecosystem that incorporates both the old method and the new innovation. Some historical examples are that the advent of radio actually increased record sales, and e-readers such as the Kindle increased book sales. Now, we get news from The New York Times, blogs, Twitter, and personal drone feeds alike. We consume media from big entertainment companies and YouTube. Hence, over time, blockchain technology could exist in a larger ecosystem with both centralized and decentralized models.

2 Methodology

First of all, there will be meetings as needed to answer our inquiries by holding a meeting with the Palestinian Territory Authority to answer our inquiries.

Blockchain technology and smart contracts are advanced technology and any relevant recent works will be followed up and read, in addition to our follow-up course, which was recommended by Dr. Tawfiq, Blockchain Advanced Course (2)

We will choose the Incremental Prototype for this reason:

- Our understanding of the current system is not 100% in-depth
- Creating a blockchain-based system that needs to be constantly modified due to the ever-evolving blockchain technology

The steps that will be taken to complete this research will be discussed Where the model to be built and implemented was clarified as we explained the process of model design, implementation, trial and evaluation.

Two solutions were proposed to find the model to solve the aforementioned problems

Where the first solution there will be two types of Blockchain (Operating and Archiving)

The second solution would be Blockchain archiving

2.1 Design

The design phase will include the implementation and design of the processes to be implemented.

2.1.1 System Design

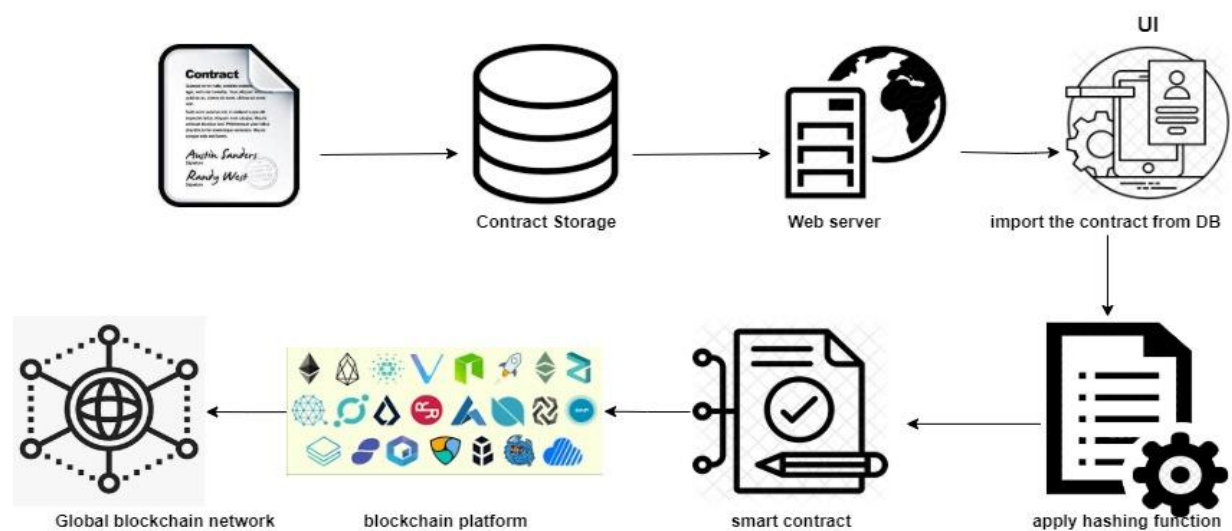


Figure 2.1: Blockchain Technology Mechanism [10]

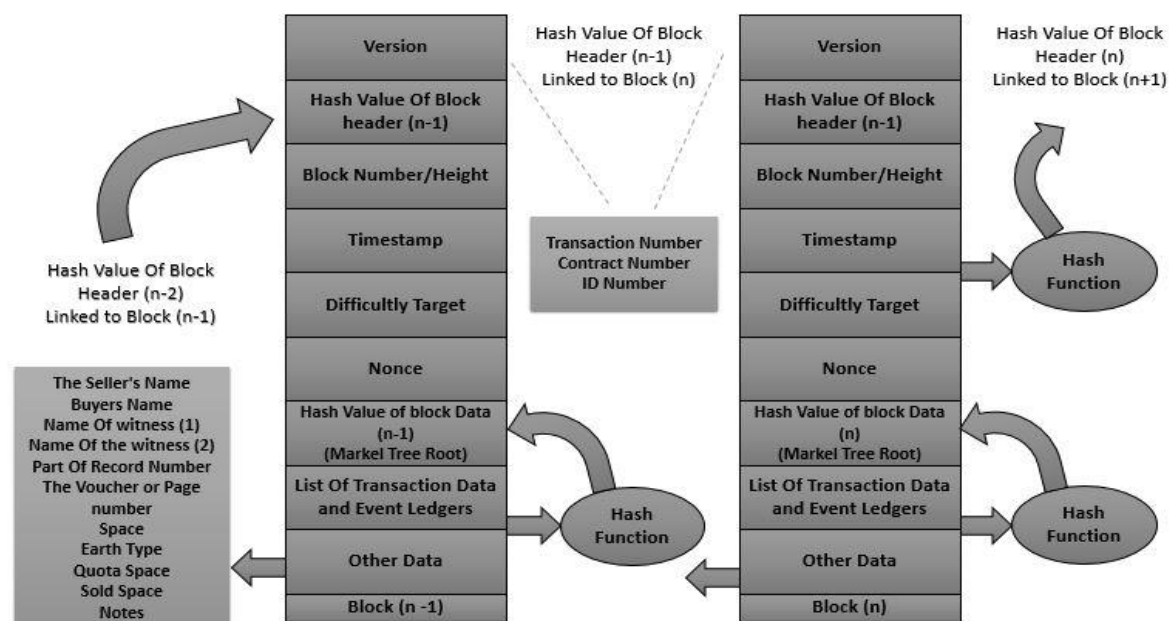


Figure 2.2: Blockchain Technology Mechanism [11]

Based on the study of the present system, we explained previously in the FlowChart diagram (Fig.1.1) The following solution has been proposed, which is based on the construction of the model)

You have an operations area and archive the operation process and archive the operation process but ours

I started the buying and selling process, which should start with the payment process.

Archiving (is the completion of the output resulting from the completion of the first stage)

Notice

What has been explained below is only for the in-process archiving phase. We will leave it to be carried out in the second part of the research, to make more sure of practical process, process accuracy and quality

Operational

All the processes related to the parties (seller, buyer, receptionist, authority) associated with the buying and selling process will have a block on a network, where there will be a starting block in (number) it according to the above drawing , in addition to a unified data form at all blocks to be filled according to the flow The process and then this block will be linked with the block associated with the seller's process so that it will be in the seller's block (pictures are taken from it and a hash is created for it and then a final hash after it is placed in a folder) so that this will be the entrance to the process of the receptionist and then the exit of this block will be Transaction number, hash contract number) to be entered in the authority process block

The exit sale of this block is the final exit from the buying and selling process Where (it will be a hash resulting from the previous series of steps) and thus it will be the input to the next stage which is archiving

Archiving

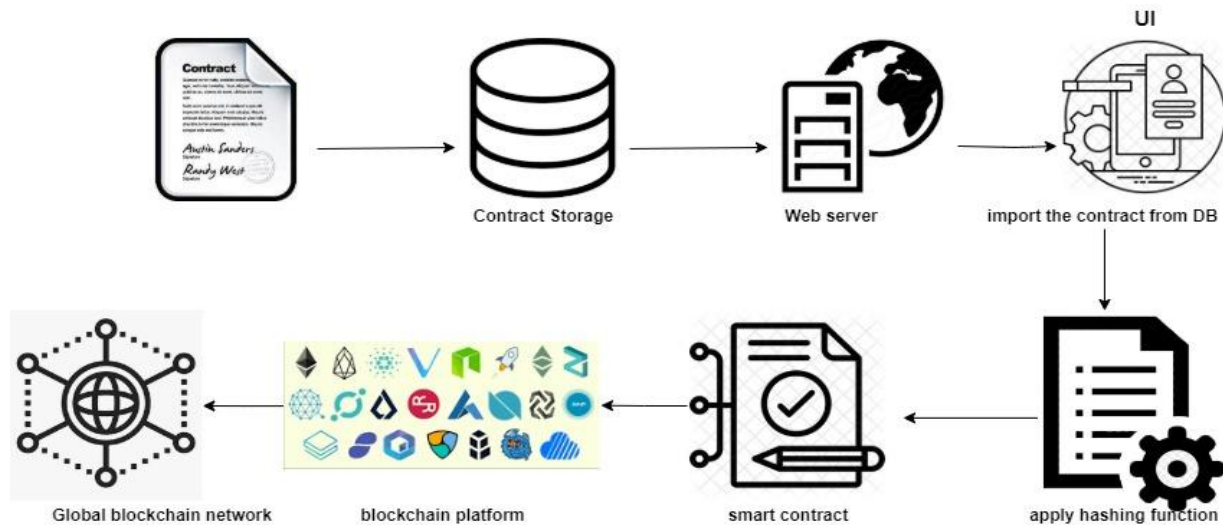


Figure 2.3: Blockchain Technology Mechanism [10]

After the completion of the previous process, each sale and purchase transaction will have a block in which the hash of the final contract resulting from the Operational is stored. In this way, the sale and purchase process is saved from the start of the process up to the Archiving stage, then the blocks are published on the network

Hashing

A hash function takes an input string (Contract No , ID No , Transaction No) of any length and transforms it into a fixed length. The fixed bit length can vary (like 32-bit or 64-bit or 128-bit or 256-bit) depending on the hash function which is being used

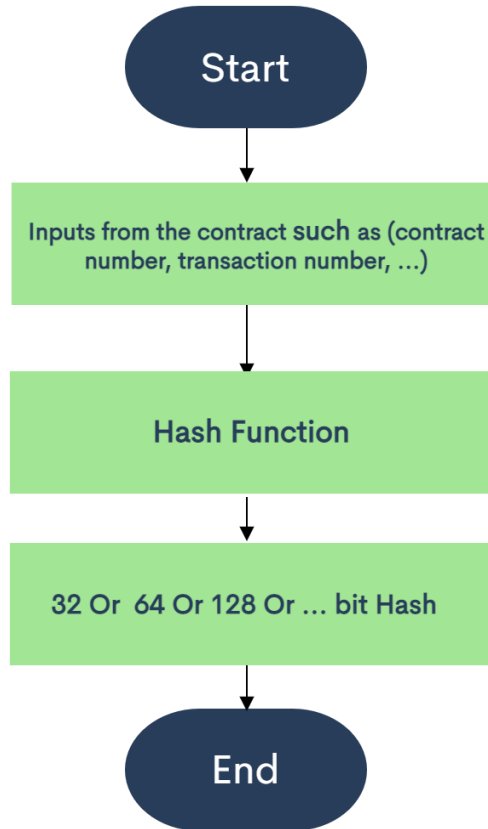


Figure 2.4: Hash Mechanism [6]

Storage process:

Proposed model will integrate with the current system in the Palestinian Territory Authority, where the final output will be taken from the buying and selling process (sales contract).

Where the most important information will be taken from the contract resulting from the purchase process, such as (land area, contract number, name of previous owners, name of owner ...) As the input hash will be taken and passed to the blockchain with this mechanism, contracts are saved in the blockchain.

Retrieval process

Note / The retrieval process and the search process are one process, so what will be done in the retrieval is the same as what will be dealt with in the search process

Will be created a function through the identity number of the citizen (the seller and the buyer) and the date of the transaction, so that this

Function retrieves the contract from the blockchain.

Retrieving a Contract from Blockchain

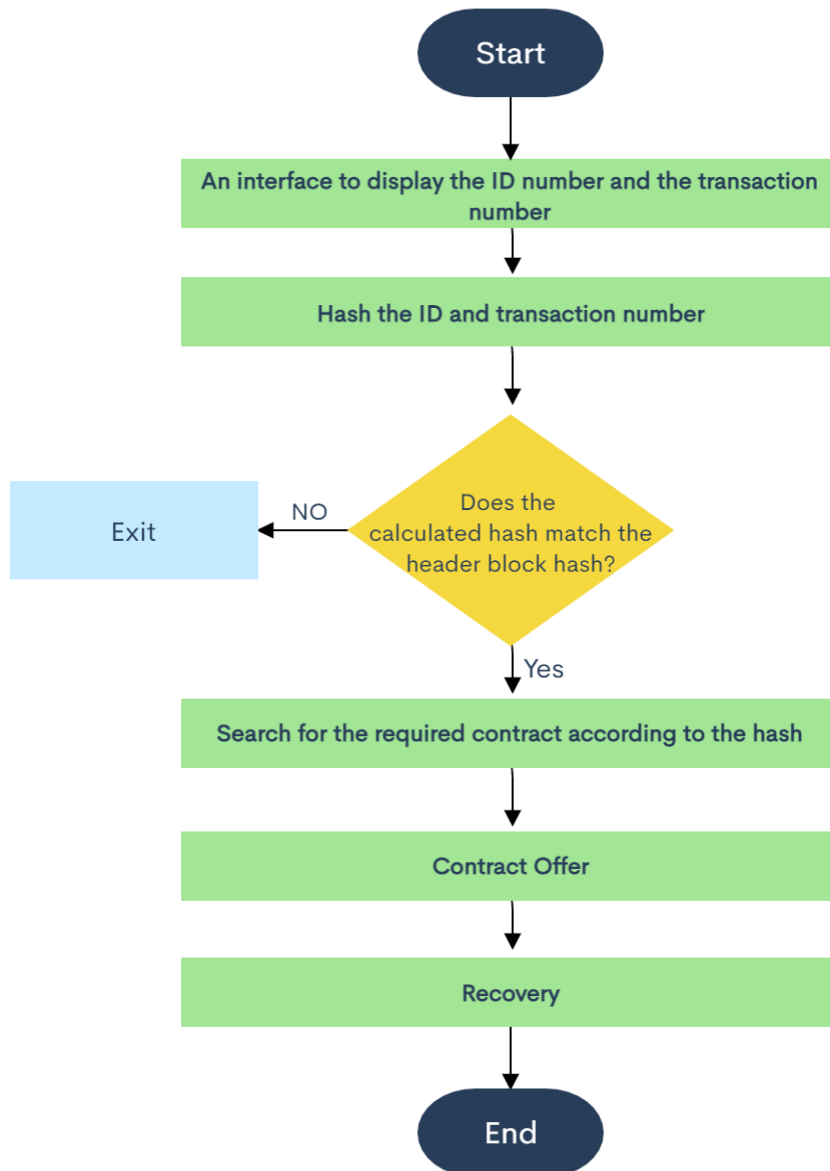


Figure 2.5: Retrieving a Contract from blockchain [6]

Verification process:

Let us check the contract in case of suspected fraud.

- First: There will be a specific input function as defined by the blockchain input and hash.
- Second: Will be created a function that is entered into the identity number of the citizen (seller and buyer) and the date of the transaction where you will extract the contract from the blockchain.
- Finally, Will be created a function that compares the hash output from the first function and the second function.

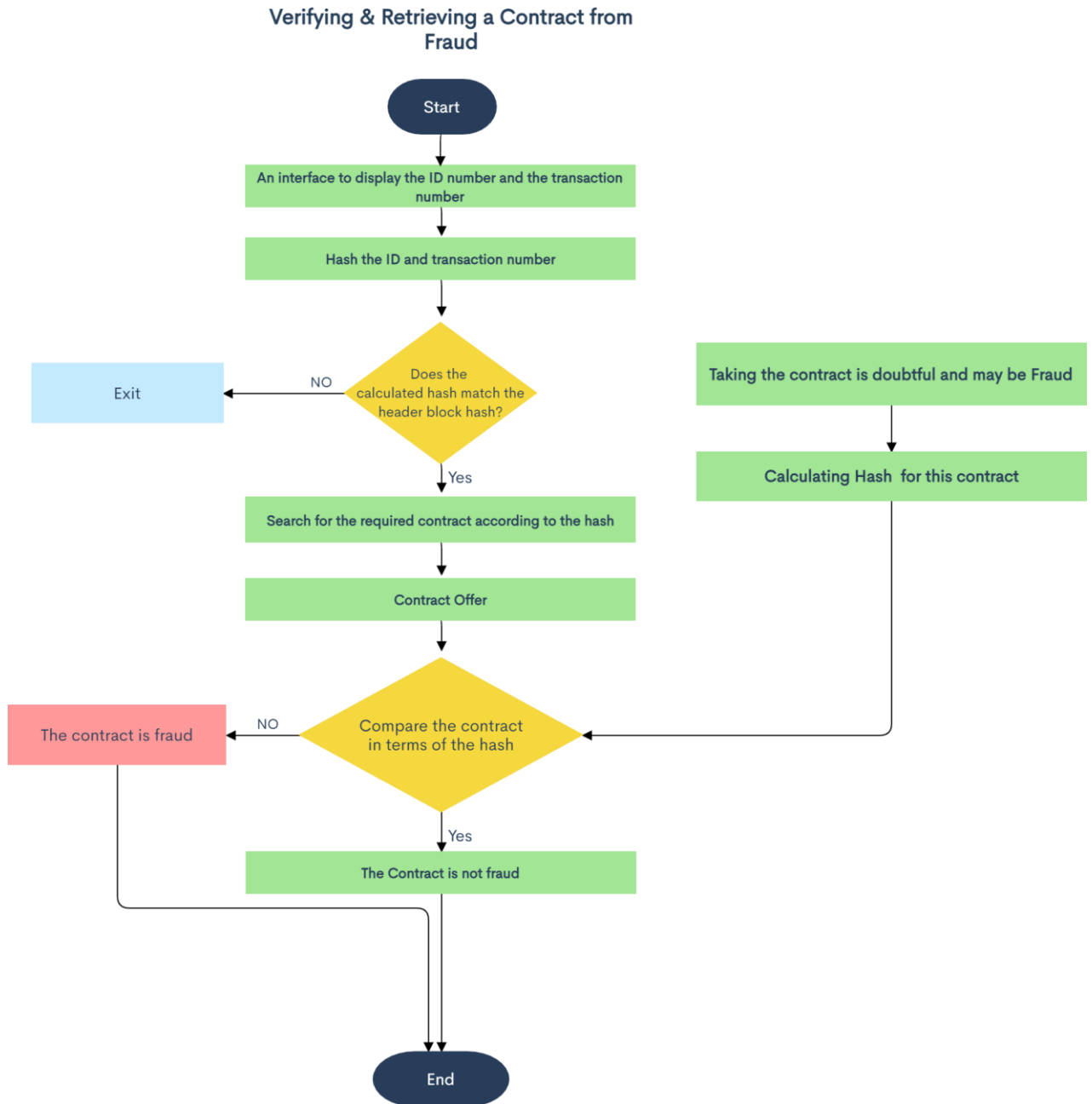


Figure 2.6: Verifying & Retrieving a Contract [6]

2.2 Implementation

Will be created a data base in which the contents of the final contract resulting from the sale and purchase process will be saved and then these contents will be migrated to a web interface that displays the final contract with some restrictions placed on the most important information.

Will be hash the required content and then store that in the blockchain.

To deep more in the usage and deployment of blockchain, this requires to install dependency that requires to build a blockchain application

- Installing Blockchain Platform Such as Ganache as Personal Blockchain For Ethereum development
- Connect to the blockchain network with our personal account using an Ethereum wallet extension for web browser inorder to interact with the web application.

2.3 Testing

To test the behavior of proposed model, real buying and selling processes are needed, so the final output from these contracts will be taken and the most important information detailed, as described above. proposed model maintains contract validity and verifies contract integrity.

And as proposed model will verify the contracts that were stored in the blockchain, where there is a need to do that contracts obtained or suspected fraud in order for these contracts to be detected and let us see whether proposed model will discover that or not.

Contracts will also be redeemed from the blockchain according to the above mechanism. the proposed model will be tested in terms of:

- Functional testing.
- Integrational testing.
- System testing.
- Test code to ensure correctness of smart contract.
- Test that blocks added to the Global Blockchain Platform

✚ Team members will do the testing (Functional & Integrational)

✚ In addition to the employees inside the institution (if needed).

2.4 Evaluation

After completing the testing process, proposed model must be evaluated to see whether or not it is achieving our goals. Also, there is a need to evaluate accuracy in addition to verifying its usability, as this is what the Palestinian Land Authority system will determine the success of this system and its effectiveness for them. The evaluation process will be through accuracy of integration Contracts, Delay time to add a new block, Delay time to Reverse Operation, Delay time to Investigation Operation, and Delay time of Calculating Hash.

3 Project Planning

3.1.1 Distribution of Work

Task	Manar	Sahar	Saja	Rola
Graduation Project Idea				
Search the internet for Blockchain Project Ideas	*	*	*	
Hold a brainstorming & discussion meeting with Eng. Ashraf Qssas	*	*	*	
Hold a brainstorming & discussion meeting with Dr. Tawfiq Barhoom	*	*	*	
Hold a brainstorming & discussion meeting with Dr. Mohammed Mushtaha	*	*	*	
Hold a brainstorming & discussion meeting with Dr. Ahmed Mahmoud	*	*	*	
Hold a brainstorming & discussion meeting with Eng.Ahmed Shaat	*	*	*	
Hold a brainstorming & discussion Email with Eng. Mosab Ayyad	*			
Hold a brainstorming & discussion meeting with Eng.Mohanad Amarnah	*	*		
Team discussions to choose idea and supervisor (choosed Dr. Tawfiq Barhoom)	*	*	*	
General Discussion with Dr. Tawfiq Barhoom	*	*	*	*
Information Gathering				
Information about Blockchain &Smart Contract	*	*	*	*
Land Authority Interview(1)	*	*	*	
Land Authority Interview(2)	*		*	*
Land Authority Interview(3)	*		*	
Land Authority Interview(4)	*			*
Understanding the Current System	*	*	*	*
Search For Related Work	*	*	*	*
Attend Online Blockchain Course (1)	*	*	*	*
Attend Practical Online Blockchain Course (2)	*	*	*	*
Read and Summarize information about blockchain and discuss with team	*	*	*	*
Building Model Of Blockchain				
System Flowchart	*			
System Use cases		*	*	
Draw Level (0)	*	*	*	
Draw Level (1)	*	*		
Progress Report	*	*		

Proposal Report				
Background	*	*	*	*
Introduction	*	*		
Related Works			*	
Methodology				
Design the General Figure	*	*	*	
Design the Archiving Figure	*	*	*	
Design the Structure of Block	*	*	*	
Flowchart for Recovery Contract	*	*		
Flowchart for Recovery & Verifying Contract	*	*		
Flowchart for Hash Function	*	*		
Implementation	*	*		
Testing	*	*		
Evaluation	*	*		
Project Planning				
Distribution of work	*			
Time of Table	*			
Software & Hardware Requirement	*	*		
References	*		*	

3.1 Time Table

Task	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June
Graduation Project Idea										
Searching graduation project ideas										
Finding graduation project idea										
Information Gathering										
Information about Blockchain & Smart Contract										
Palestinian Land Authority interviews										
Understanding the Current System										
Search For Related Work										
Information Gathering										
System Flowchart										
System Use cases										
Draw Level (0)										
Draw Level (1)										
Proposal Report										
Progress Report										
Prepare work environment										
Blockchain platform Selection & Usage dependences										
Web development Environment										
Coding and Programming										
Design web interfaces										
Coding Smart contracts										
Evaluation & Testing										
Testing the Model										
Documentation										
Final Report										

4 Required Hardware & Software

4.1 Hardware

- Development PC
- web server

4.2 Software

- Operating System Such as Windows
- Platform Such as Ethereum
 - Ganache
 - Node Package Manager Such as Node.js
 - Framework Such as Truffle, which provides a suite of tools for developing Ethereum smart contracts with the Solidity programming language.
 - Wallet extension Such as Metamask Ethereum

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