

A Block chain and Edge Computing-based Secure Framework for Government Tender Allocation

Submitted in partial fulfillment of the requirements for
the award of
Bachelor of Engineering degree in Computer Science and Engineering

by

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SATHYABAMA

**INSTITUTE OF SCIENCE AND TECHNOLOGY
(DEEMED TO BE UNIVERSITY)**

**Accredited with Grade "A" by NAAC
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CHENNAI – 600 119**

MARCH – 2021



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BONAFIDE CERTIFICATE

This is to certify that this project report is the bonafide work of **M SAI CHARAN REDDY (Reg. No. 37110477)** and **M SRINIVASULU (Reg. No. 37110468)** who carried out the project entitled “**A Block chain and Edge Computing-based Secure Framework for Government Tender Allocation**” under my supervision from August 2020 to March 2021.

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Head of the Department

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DECLARATION

I **M. SAI CHARAN REDDY** hereby declare that the Project Report entitled “**A BLOCK CHAIN AND EDGE COMPUTING-BASED SECURE FRAMEWORK FOR GOVERNMENT TENDER ALLOCATION**” is done by me under the guidance of **Dr. A.C SANTHA SHEELA, M.E., Ph.D.**, Department of Computer Science and Engineering at Sathyabama Institute of Science and Technology is submitted in partial fulfillment of the requirements for the award of Bachelor of Engineering degree in Computer Science and Engineering.

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ABSTRACT

Governments and public sector entities around the world are actively exploring new ways to keep up with technological advancements to achieve smart governance, work efficiency, and cost optimization. Blockchain technology is an example of such technology that has been attracting the attention of Governments across the globe in recent years. Enhanced security, improved traceability and lowest cost infrastructure empower the blockchain to penetrate various domains. Generally, governments release tenders to some third-party organizations for different projects. During this process, different competitor tries to eavesdrop the tender values of others to win the tender. The corrupt government officials also charge high bribe to pass the in favour of some particular third party. In this paper, we presented a secure and transparent framework for government tenders using blockchain. Blockchain is used as a secure and immutable data structure to store the government records that are highly susceptible to tampering. This work aims to create a transparent and secure edge computing infrastructure for the work-flow in government tenders to implement government schemes and policies by limiting human supervision to the minimal.

TABLE OF CONTENTS

ABSTRACT	v
LIST OF FIGURES	ix

CHAPTER No.	TITLE	PAGE NO.
1.	INTRODUCTION	1
	1.1 AIM	1
	1.2 PURPOSE OF PROJECT	1
	1.3 PROJECT SCOPE	1
2.	LITERATURE SURVEY	3
3.	MATERIALS METHOD AND ALGORITHM	6
	3.1 EXISTING SYSTEM	6
	3.2 PROPOSED SYSTEM	6
	3.3 REQUIRMENT SPECIFICATION	7
	3.3.1 INTRODUCTION	7
	3.3.2 HARDWARE AND SOFTWARE SPECIFICATION	8
4.	SYSTEM DESIGN & IMPLEMENTATION CONSTRAINTS	22
	4.1 CONSTRAINTS IN ANALYSIS	22
	4.2 CONSTRAINTS IN DESIGN	22
	4.3 CONSTRAINTS IN IMPLEMENTATION	22
	4.4 OTHER NON-FUNCTIONAL REQUIRMENTS	23
	4.5 SYSTEM DESIGN	23
	4.6 MODULES	24

5	5.1 ARCHITECTURE DIAGRAM	26
	5.2 SEQUENCE DIAGRAM	27
	5.3 USE CASE DIAGRAM	28
	5.4 ACTIVITY DIAGRAM	29
	5.5 COLLABORATION DIAGRAM	29
	5.6 DATA FLOW DIAGRAM	30
6	CODING AND TESTING	33
	6.1 CODING	33
	6.2 CODING STANDARDS	33
	6.2.1 NAMING CONVENTIONS	
	6.2.2 VALUE CONVENTIONS	34
	6.2.3 SCRIPT WRITING AND	34
	COMMENTING STANDARD	34
	6.2.4 MESSAGE BOX FORMATE	34
	6.3 TEST PRODUCER	35
	6.4 TEST DATA AND OUTPUT	35
	6.4.1 UNIT TESTING	35
	6.4.2 FUNCTIONAL TEST	35
	6.4.3 PERFORMANCE TEST	36
	6.4.4 STRESS TEST	36
	6.4.5 STRUCTURED TEST	36
	6.4.6 INTEGRATION TESTING	36
	6.5 TESTING TECHNIQUES –	37
	TESTINGSTRATEGIES	37
	6.5.1 TESTING	37
	6.5.1.1 WHITE BOX TESTING	38
	6.5.1.2 BLACK BOX TESTING	38
7	RESULTS AND DISCUSSION	42
	CONCLUSION	44
	CONCLUSION	44

REFERENCES	45
Appendix	
A. SOURCE CODE	48
B. PAPER WORK	50
C. PLAIGARISM REPORT	55

LIST OF FIGURES

FIGURE No.	FIGURE NAME	PAGE No.
5.1	ARCHITECHTURE DIAGRAM	26
5.2	SEQUENCE DIAGRAM	27
5.3	USE CASE DIAGRAM	28
5.4	ACTIVITY DIAGRAM	29
5.5	COLLABORATION DIAGRAM	29
5.6	DATA FLOW DIAGRAM	30
7.1	Output 1	42
7.2	Output 2	43
7.3	Output 3	44

CHAPTER 1

INTRODUCTION

1.INTRODUCTION TO THE PROJECT:

Governments and public sector entities around the world are actively exploring new ways to keep up with technological advancements to achieve smart governance, work efficiency, and cost optimization. Block chain technology is an example of such technology that has been attracting the attention of Governments across the globe in recent years. Enhanced security, improved traceability and lowest cost infrastructure governments release tenders to some third-party organizations for different projects. The corrupt government officials also charge high bribe to pass the tender in favor of some particular third party. In this paper, we presented a secure and transparent framework for government tenders using block chain. Block chain is used as a secure and immutable data structure to store the government records that are highly susceptible to tampering. This work aims to create a transparent and secure edge computing infrastructure for the work-flow in government tenders to implement government schemes and policies by limiting human supervision to the minimal.

1.1 AIM:

The main aim of this project is used to transparent and secure edge computing infrastructure for the work-flow in government tenders to implement government schemes and policies by limiting human supervision to the minimal.

1.2 PURPOSE:

The main aim of this project is used to transparent and secure edge computing infrastructure for the work-flow in government tenders to implement government schemes and policies by limiting human supervision to the minimal.

1.3 PROJECT SCOPE:

Government announces new projects, invites vendors to give quotations/tenders and approves the best candidate. The vendor is given the project and a Government officer is appointed to keep track of the status of project. A timeline

is defined for project and officer to keep a check on progress and to get it complete before deadline. Government officer often visit the site, to take an overview of the progress and report it to the officer. We are developing a very comprehensive system for this business process which will manage each and every aspect starting from vendor registration and tender submission and up to the completion of the project.

1.4 PRODUCT PERSPECTIVE:

A block chain is a public ledger or distributed database of records or transactions that are shared between multiple parties within the network. Keeping this in mind a block chain can be divided into two categories Permission- less (Public) and Permission (Private) based on whether participants are allowed to or not, join the network freely.

The smart contract is coded in the solidity language. The results of the smart contract are observed after deploying the smart contract in the Rink by test network of the ethereal block chain platform.

1.5 SYSTEM FEATURES:

The smart contract is coded in the solidity language. The results of the smart contract are observed after deploying the smart contract in the Rinke by test network of the Ethereum blockchain platform.

CHAPTER 2

LITERATURE REVIEW

Wazie M. Abdulkawi 1, *, Khaled Issa Year of Publish (2020):

There is a growing interest in chipless radio-frequency identification (RFID) technology for a number of Internet of things (IoT) applications. This is due to its advantages of being of low-cost, low-power, and fully printable. In addition, it enjoys ease of implementation. In this paper, we present a novel, compact, chipless radio- frequency identification (RFID) tag that can be read with either vertical or horizontal polarization within its frequency bandwidth. This increases the sturdiness and detection ability of the RFID system. In addition, the difference between the vertical and horizontal responses can be used for tag identification. The proposed tag uses strip length variations to double the coding capacity and thereby reduce the overall size by almost 50%. It has a coding capacity of 20 bits in the operating bandwidth 3 GHz–7.5 GHz, and its spatial density is approximately 11 bits/cm². The proposed tag has a 4.44 bits/GHz spectral capacity, 2.44 bits/cm²/GHz encoding capacity, a spatial density at the center frequency of 358.33 bits/_2, and an encoding capacity at the center frequency of 79.63 bits/_2/GHz. A prototype is fabricated and experimentally tested at a distance of 10 cm from the RFID reader system. Then, we compare the measured results with the simulations. The simulated results are in reasonable agreement with the simulated ones.

Vikas hassija 1, Vinay chamola2, Vikas saxena(2019):

Internet of things (IoT) is the next era of communication. Using IoT, physical objects can be empowered to create, receive and exchange data in a seamless manner. Various IoT applications focus automating different tasks and are trying to empower the inanimate physical objects to act without any human intervention. The existing and upcoming IoT applications are highly promising to increase the level comfort, efficiency, and automation for the users. To be able to implement such a world in an ever-growing fashion requires high security, privacy,

authentication, and recovery from attacks. In this regard, it is imperative to make the required changes in the architecture of IoT applications for achieving end-to-end secure IoT environments. In this paper, a detailed review of the security-related challenges and sources of threat in IoT applications is presented. After discussing the security issues, various emerging and existing technologies focused on achieving a high degree of trust in IoT applications are discussed. Four different technologies: Blockchain, fog computing, edge computing, and machine learning to increase the level of security in IoT are discussed.

Neşe Ganiç Sağlam^{1*}, A. Zerrin Yılmaz², Stefano P. Corgnati³(2019):

Cost-optimal and nearly-zero energy building (NZEB) levels are two interrelated concepts identified for upgrading energy performance of buildings in Europe. In parallel, many research activities on retrofitting existing buildings in Turkey follow the methodology framework introduced by the European Commission. However, in Turkey, there is a process called “urban transformation” due to the earthquake risk, but the practice is based on new construction after demolition of existing buildings. Especially in Istanbul, this process has been conducted rapidly. This specific aspect requires assessment of cost-optimal retrofit analyses considering the remaining lifespan of analysed buildings. This study presents a cost-optimality assessment method for retrofitting towards NZEB in Turkey. The method integrates payback period and investment cost assessment to the methodology in order to obtain whole picture for retrofit alternatives. In the paper, suggested method is applied to a reference residential building in Istanbul. After the initial cost-optimal analyses, payback periods and initial investment costs for selected retrofit packages are assessed considering the future lifespan of the building. Together with these, possible subsidy opportunities are also investigated. Results show that, if the expected future lifespan is higher than 10 years, retrofit actions achieving 56.2kWh/m²y primary energy consumption level are considerable. Subsidies are beneficial to obtain reasonable initial investment costs.

Lei Cui 1, Zonghua Zhang 1, Nan Gao 1, Zhaozong Meng (2019):

Radio Frequency Identification (RFID) sensors, integrating the features of Wireless Information and Power Transfer (WIPT), object identification and energy

client sensing capabilities, have been considered a new paradigm of sensing and communication for the futuristic information systems. RFID sensor tags featuring contactless sensing, wireless information transfer, wireless powered, light weight, non-line-of-sight transmission, flexible and paste able are a critical technology for future Internet-of-Things (IoT) applications, such as manufacturing, logistics, healthcare, agriculture and food. They have attracted numerous research resorts due to their innovative potential in the various application fields. However, there has been a gap between the in-lab investigations and the practical IoT application scenarios, which has motivated this survey of this research to identify the promising enabling techniques and the underlying challenges. This study aims to provide an exhaustive review on the state-of-art RFID sensor technologies from the system implementation perspective by focusing on the fundamental RF energy harvesting theories, the recent technical progresses and commercial solutions, innovative applications and some RFID sensor based IoT solutions, identify the underlying technological challenges at the time being, and give the future research trends and promising application fields in the rich sensing applications of the forthcoming IoT era.

CHAPTER 3

MATERIALS METHOD ALGORITHM

3.1 EXISTING SYSTEM

The allocation of tenders from government lenders to constructors. Initially, government lenders and constructors enter into the block chain network to construct a secure edge computing infrastructure. The government lender shares the tender details with all the relevant constructors. Further, double auctioning takes place between the constructors and government lenders. The target of the model is to efficiently handle the government tender process securely. The system mainly consists of three types of entities: government officials, external parties like construction companies or individual constructors, and banks.

Problem Definition:

The problem for dynamic pricing which is also aimed at enhancing the overall profit for the constructors and the government lenders. The government lenders get the best resources at the lowest prices, and the constructors get the best tenders matching to the resources they have.

3.2 PROPOSED SYSTEM

Government announces new projects, invites vendors to give quotations/tenders and approves the best candidate. The vendor is given the project and a Government officer is appointed to keep track of the status of project. A timeline is defined for project and officer to keep a check on progress and to get it complete before deadline. Government officer often visit the site, to take an overview of the progress and report it to the officer. We are developing a very comprehensive system for this business process which will manage each and every aspect starting from vendor registration and tender submission and up to the completion of the project.

Advantage:

A block chain is a public ledger or distributed database of records or transactions that are shared between multiple parties within the network. Keeping this in mind a block chain can be divided into two categories Permission-less (Public) and Permission (Private) based on whether participants are allowed to or not, join the network freely.

The smart contract is coded in the solidity language. The results of the smart contract are observed after deploying the smart contract in the Rink by test network of the ethereum block chain platform.

3.3 REQUIREMENT SPECIFICATIONS**3.3.1 INTRODUCTION:**

There has been a rapid growth in the use of blockchain technology in almost all domains and all parts of the world. Blockchain technology is a highly promising solution that can be employed in the government tender process to enhance the level of security, privacy, transparency, and speed of work. Blockchain can allow all the parties involved in a particular tender to be a part of the same network and to monitor the work-flow step by step [1]. Governments like Georgia, UK, UAE, Australia, China, Japan, and Russia are currently progressing at a rapid pace in adapting blockchain in their day to day functioning. The government of Dubai has an ambitious plan of becoming completely paperless through the widespread implementation of blockchain [2]. Governments of several developing countries like India have also been promoting various projects and policies for adaptation of blockchain technology in recent years [3]. There have been various attempts to implement technology to make government processes paperless and instantaneous, such as online ticketing systems, online issuing of tenders, filing tax returns, etc. Although most of these systems seem and well-implemented, all of them are based on the idea of a central server which has a single point of failure, as hackers can easily hack or disrupt its functioning by attacks, such as DOS,

Slow-loris, SYN Flooding, etc [4]. In most governments, complicated bureaucratic systems often result in highly inefficient work-flow fraught with corruption, mismanagement, and human errors. Some of the governance processes, such as government tenders include malpractices like information leaks, corruption, bribery, etc. Most of the existing electronic services and IT infrastructure have the above-mentioned limitations, however, new technologies such as blockchain have the potential to greatly ameliorate the existing problems [5], [6]. A permissioned blockchain network can provide the necessary transparency to effectively implement government policies for the benefit of the citizens of the country and fix responsibilities in case of abuse of the system.

3.3.2 HARDWARE AND SOFTWARE SPECIFICATION

3.2.2.1 HARDWARE REQUIREMENTS:

- Hard Disk : 250GB and Above
- RAM : 4GB and Above
- Processor : i3 and Above

3.2.2.2 SOFTWARE REQUIREMENTS:

- Windows 10
- JDK 1.8
- JDK 1.7
- My SQL 5.0
- Tomcat 9

3.3.3 TECHNOLOGIES USED:

- J2EE (JAVA, JSP, JSTL, JSON)
- JavaScript, HTML, CSS
- Spring MVC
- JDBC

3.3.3.1 JAVA

Java is an object-oriented programming language developed initially by James Gosling and colleagues at Sun Microsystems. The language, initially called Oak (named after the oak trees outside Gosling's office), was intended to replace C++, although the feature set better resembles that of Objective C.

3.3.3.1.1 INTRODUCTION TO JAVA:

Java has been around since 1991, developed by a small team of Sun Microsystems developers in a project originally called the Green project. The intent of the project was to develop a platform-independent software technology that would be used in the consumer electronics industry. The language that the team created was originally called Oak.

The first implementation of Oak was in a PDA-type device called Star Seven (*7) that consisted of the Oak language, an operating system called GreenOS, a user interface, and hardware. The name *7 was derived from the telephone sequence that was used in the team's office and that was dialed in order to answer any ringing telephone from any other phone in the office.

Around the time the First-Person project was floundering in consumer electronics, a new craze was gaining momentum in America; the craze was called "Web surfing." The World Wide Web, a name applied to the Internet's millions of linked HTML documents was suddenly becoming popular for use by the masses. The reason for this was the introduction of a graphical Web browser called Mosaic, developed by ncSA. The browser simplified Web browsing by combining text and graphics into a single interface to eliminate the need for users to learn many confusing UNIX and DOS commands. Navigating around the Web was much easier using Mosaic.

It has only been since 1994 that Oak technology has been applied to the Web. In 1994, two Sun developers created the first version of Hot Java, and then called Web Runner, which is a graphical browser for the Web that exists today. The browser was coded entirely in the Oak language, by this time called Java. Soon after, the Java compiler was rewritten in the Java language from its original C code, thus

proving that Java could be used effectively as an application language. Sun introduced Java in May 1995 at the Sun World 95 convention. Web surfing has become an enormously popular practice among millions of computer users. Until Java, however, the content of information on the Internet has been a bland series of HTML documents. Web users are hungry for applications that are interactive, that users can execute no matter what hardware or software platform they are using, and that travel across heterogeneous networks and do not spread viruses to their computers. Java can create such applications.

3.3.3.1.2 WORKING OF JAVA:

For those who are new to object-oriented programming, the concept of a class will be new to you. Simplistically, a class is the definition for a segment of code that can contain both data (called attributes) and functions (called methods).

When the interpreter executes a class, it looks for a particular method by the name of **main**, which will sound familiar to C programmers. The main method is passed as a parameter an array of strings (similar to the argv [] of C), and is declared as a static method.

To output text from the program, we execute the **println** method of **System.out**, which is java's output stream. UNIX users will appreciate the theory behind such a stream, as it is actually standard output. For those who are instead used to the Wintel platform, it will write the string passed to it to the user's program.

Java consists of two things:

- Programming language
- Platform

3.3.3.1.3 THE JAVA PROGRAMMING LANGUAGE:

Java is a high-level programming language that is all of the following:

- Simple
- Object-oriented and Distributed

- Interpreted
- Robust
- Secure
- Architecture-neutral
- Portable
- High-performance
- Multithreaded
- Dynamic

The code and can bring about changes whenever felt necessary. Some of the standard needed to achieve the above-mentioned objectives are as follows:

Java is unusual in that each Java program is both compiled and interpreted. With a compiler, you translate a Java program into an intermediate language called **Java byte codes** — the platform independent codes interpreted by the Java interpreter. With an interpreter, each Java byte code instruction is parsed and run on the computer. Compilation happens just once; interpretation occurs each time the program is executed. This figure illustrates how it works:

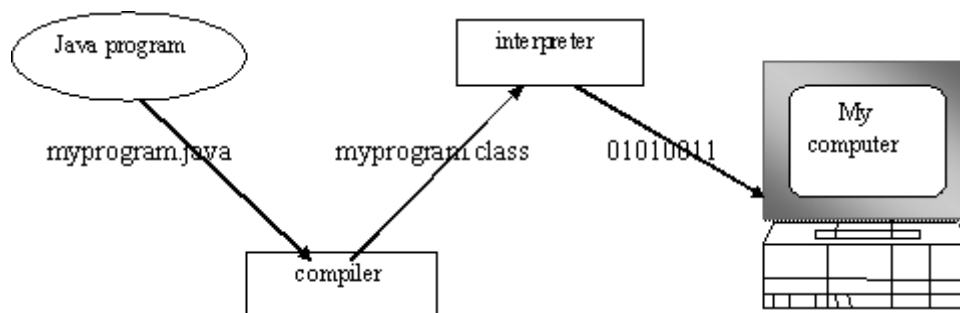
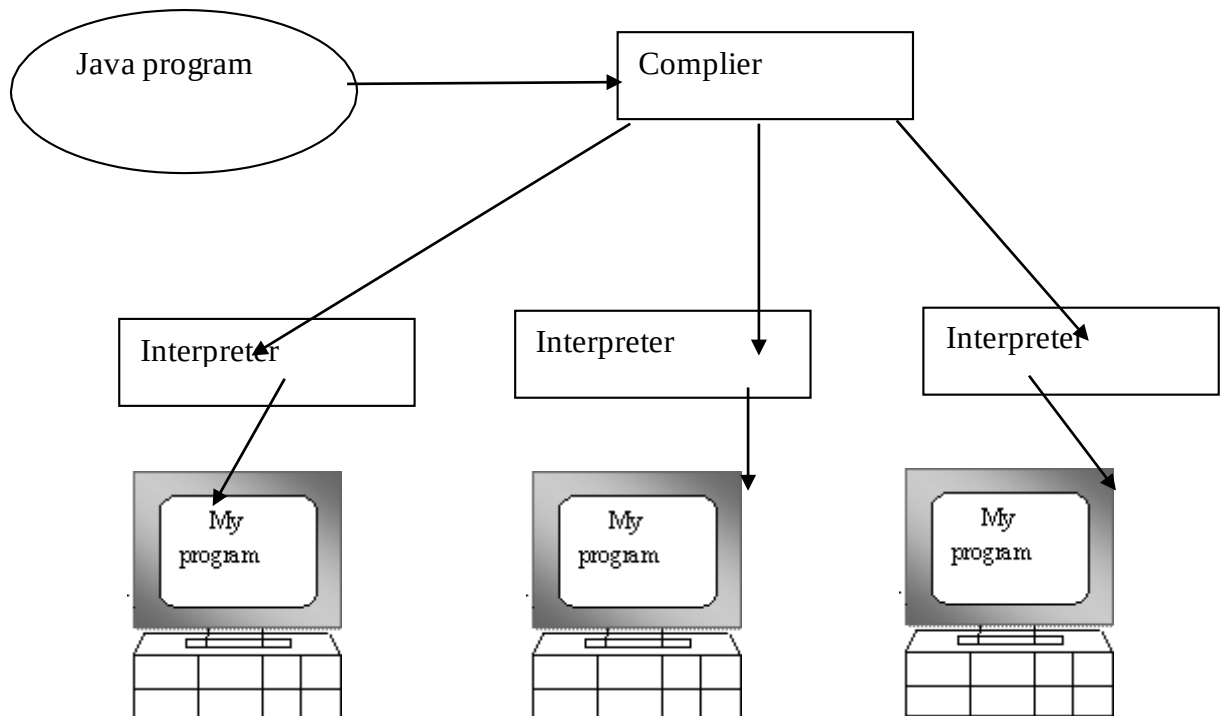


Fig.3.1

You can think of Java byte codes as the machine code instructions for the **Java Virtual Machine (JVM)**. Every Java interpreter, whether it's a Java development tool or a Web browser that can run Java applets, is

an implementation of JVM. That JVM can also be implemented in hardware. Java byte codes help make “write once, run anywhere” possible.

You can compile your Java program into byte codes on any platform that has a Java compiler. The byte codes can then be run on any implementation of the JVM. For example, that same Java program can be run on Windows NT, Solaris and Macintosh



3.3.3.14 THE JAVA PLATFORM:

A platform is the hardware or software environment in which a program runs. The Java platform differs from most other platforms in that it's a software- only platform that runs on top of other, hardware-based platforms. Most other platforms are described as a combination of hardware and operating system.

The Java platform has two components:

- The Java Virtual Machine (JVM)
- The Java Application Programming Interface (Java API)

You've already been introduced to the JVM. It's the base for the Java platform and is ported onto various hardware-based platforms.

The Java API is a large collection of ready-made software components that provide many useful capabilities, such as graphical user interface (GUI) widgets. The Java API is grouped into libraries (**packages**) of related components. The following figure depicts a Java program, such as an application or applet, that's running on the Java platform. As the figure shows, the Java API and Virtual Machine insulates the Java program from hardware dependencies.

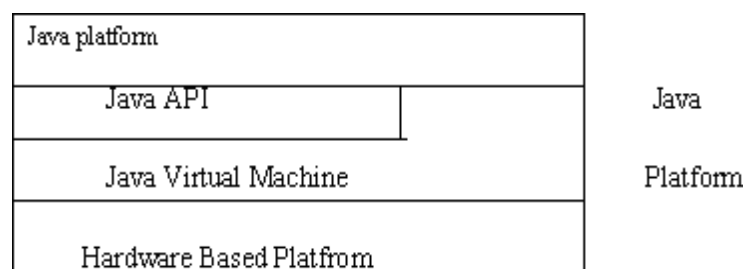


Fig.3.3

As a platform-independent environment, Java can be a bit slower than native code. However, smart compilers, weel-tuned interpreters, and just-in-time byte compilers can bring Java's performance close to that of native code without threatening portability.

3.3.3.2 APACHE TOMCAT SERVER:

Apache Tomcat (formerly under the Apache Jakarta Project; Tomcat is now a top level project) is a web container developed at the Apache Software Foundation. Tomcat implements the servlet and the JavaServer Pages (JSP) specifications from Sun Microsystems, providing an environment for Java code to run in cooperation with a web server. It adds tools for configuration and management but can also be configured by editing configuration files that are normally XML-formatted. Because Tomcat includes its own HTTP server internally, it is also considered a standalone web server.

ENVIRONMENT:

Tomcat is a web server that supports servlets and JSPs. Tomcat comes with the Jasper compiler that compiles JSPs into servlets.

The Tomcat servlet engine is often used in combination with an Apache web server or other web servers. Tomcat can also function as an independent web server. Earlier in its development, the perception existed that standalone Tomcat was only suitable for development environments and other environments with minimal requirements for speed and transaction handling. However, that perception no longer exists; Tomcat is increasingly used as a standalone web server in high-traffic, high-availability environments.

Since its developers wrote Tomcat in Java, it runs on any operating system that has a JVM.

PRODUCT FEATURES:

Tomcat 3.x (initial release)

- implements the Servlet 2.2 and JSP 1.1 specifications
- servlet reloading
- basic HTTP functionality Tomcat 4.x
- implements the Servlet 2.3 and JSP 1.2 specifications
- servlet container redesigned as Catalina
- JSP engine redesigned as Jasper
- Coyote connector
- Tomcat 5.x
- implements the Servlet 2.4 and JSP 2.0 specifications
- reduced garbage collection, improved performance and scalability
- native Windows and Unix wrappers for platform integration
- faster JSP parsing

HISTORY:

Tomcat started off as a servlet specification implementation by James Duncan Davidson, a software architect at Sun. He later helped make the project

open source and played a key role in its donation by Sun to the Apache Software Foundation.

Davidson had initially hoped that the project would become open-sourced and, since most open-source projects had O'Reilly books associated with them featuring an animal on the cover, he wanted to name the project after an animal. He came up with Tomcat since he reasoned the animal represented something that could take care of and fend for itself. His wish to see an animal cover eventually came true when O'Reilly published their Tomcat book with a tomcat on the cover.

3.3.3.3 INTRODUCTION TO IOT:

IoT refers to an Internet of Things (IoT). Connecting any device (including everything from cell phones, vehicles, home appliances and other wearable embedded with sensors and actuators) with Internet so that these objects can exchange data with each other on a network. It is interesting to note that there is a difference between IoT and the Internet; it is the absence of Human role. The IoT devices can create information about individual's behaviors, analyze it, and take action (IoT is smarter than Internet: D)

A question would arise in your mind that why we are concerned about IoT? Here is the answer that why you should be concerned about IoT. Say for example you are on your way to a meeting; your car could have access to your calendar and already know the best route to take. If the traffic is heavy your car might send a text to the other party notifying them that you will be late. What if your alarm clock wakes up you at 6 a.m. and then notifies your coffee maker to start making coffee for you? Being able to turn the lights on in your house or heating before coming home using your smartphone? Yes, all these things are possible because of IoT.

Smart System and the Internet of the Things are driven by a combination for:

1. Sensors & Actuators
2. Connectivity
3. People & Process

INTEROPERABILITY IN IOT:

- The Internet of Things (IoT) is an incredibly diverse space, encompassing a large variety of hardware form factors and software ecosystems unlike anything we have seen in technology. Smart watches, connected cameras, drones, thermostats, voice-enabled speakers, smart appliances and more—they all live together within the IoT.
- The diversity and innovation that excites many IoT fans is a big challenge not just for manufacturers and developers, but also (and most importantly) consumers. Which technology options should be used when designing or deploying IoT devices? How do they keep up with updated or new operating systems? What about new software and connectivity technologies coming up? Those are just some of today's challenges.
- Having a single, unified communication and software framework for the IoT seems like an ideal solution, but the diverse and fast-paced nature of the IoT makes this utopia a big challenge. Diversity in the IoT is not something to be solved, but an aspect that must be embraced and managed.

Application areas for the Internet of Things:



Smart Home

The concept of Smart Home is brought up to save time, energy and money. With the introduction of Smart Homes, we would be able to switch on air conditioning before reaching home or switch off lights even after leaving home or unlock the doors to friends for temporary access even when you are not at home.

Smart cities

Smart surveillance, automated transportation, smarter energy management systems, water distribution, urban security and environmental monitoring all are examples of internet of things applications for smart cities. IoT will solve major problems faced by the people living in cities like pollution, traffic congestion and shortage of energy supplies etc. By installing sensors and using web applications, citizens can find free available parking slots across the city. Also, the sensors can detect meter tampering issues, general malfunctions and any installation issues in the electricity system.

Wearable's

Wearable devices are installed with sensors and software's which collect data and information about the users. This data is later pre-processed to extract essential insights about user. These devices broadly cover fitness, health and entertainment requirements. The pre-requisite from internet of things technology for wearable applications is to be highly energy efficient or ultra-low power and small sized.

Healthcare

IoT in healthcare is aimed at empowering people to live healthier life and regular checkup by wearing connected devices. The collected data will help in personalized analysis of an individual's health and provide tailor made strategies to combat illness.

Challenges to IoT

In the era of IoT, everything is connected, linked up—much more than we see in and around us. IoT is certainly opening door to a lot of opportunities but also to many challenges.

Security Challenges

Security is a big issue with IoT devices. With billions of devices being connected together over Internet, how can people be sure that their information is secure? These security issues can be of the following kinds

Data Encryption

IoT applications collect tons of data. Data retrieval and processing is integral part of the whole IoT environment. Most of this data is personal and needs to be protected through encryption.

Encryption is widely used on the internet to protect user information being sent between a browser and a server, including passwords, payment information and other personal information that should be considered private. Organizations and individuals use encryption to protect sensitive data stored on computers, servers and mobile devices like phones or tablets.

Data Authentication

After successful encryption of data chances of device itself being hacked still exist. If there is no way to establish the authenticity of the data being communicated to and from an IoT device, security is compromised.

For instance, say you built a temperature sensor for smart homes. Even though you encrypt the data it transfers is there is no way to authenticate the source of data then anyone can make up fake data and send it to your sensor instructing it to cool the room even when its freezing or vice versa.

Side-channel Attacks

Encryption and authentication both in place still leave scope for side channel attacks. Such attacks focus less on the information and more on how that

information is being presented. For instance, if someone can access data like timing information, power consumption or electromagnetic leak, all of this information can be used for side channel attacks.

Privacy Challenges

Then we have the issue of privacy and data sharing. That is because these devices not only collect personal information like users' names and telephone numbers, but can also monitor user activities (e.g., when users are in their houses and what they had for lunch).

Connectivity Challenges—Billions of devices on a centralized server

One of the biggest challenges for IoT in the future is to connect large number of devices and massive amounts of data that all of these devices are going to produce. There will be need to find out a way to store, track, analyze and make sense of the vast amounts of data that will be generated.

Presently, we rely upon centralized, server/client model to authorize, authenticate, and connect several nodes present on the network. This model is sufficient for the number of IoT devices that are currently a part of the ecosystem. However, in the future, when hundreds of billions of devices will join the network, it will be difficult to manage all the data. Moreover, the capability of current cloud servers is so less that it can breakdown if it has to handle large amounts of information.

Compatibility and Longevity Challenges-Extra hardware and software

Different technologies like ZigBee, Z-Wave, Wi-Fi, Bluetooth and, Bluetooth Low Energy (BTLE) are all battling to become the dominant transport mechanism between devices and hubs. This becomes a major source of problems when a lot of devices have to be connected; such dense connectivity requires the deployment of extra hardware and software.

Conversations about the IoT are taking place all over the world as we are trying to understand how this will impact our lives. We are also trying to understand what the many opportunities and challenges are going to be as more

and more devices start to join the IoT. So, all that we can do is educate ourselves about what the IoT is and how it will be after some years.

Introduction Base 64:

Base64 is an encoding algorithm that allows you to transform any characters into an alphabet which consists of Latin letters, digits, plus, and slash. Thanks to it, you can convert Chinese characters, emoji, and even images into a “readable” string, which can be saved or transferred anywhere.

To figuratively understand why Base64 was invented, imagine that during a phone call Alice wants to send an image to Bob. The first problem is that she cannot simply describe how the image looks, because Bob needs an exact copy. In this case, Alice may convert the image into the binary system and dictate to Bob the binary digits (bits), after that he will be able to convert them back to the original image. The second problem is that the tariffs for phone calls are too expensive and dictate each byte as 8 binary digits will last too long. To reduce costs, Alice and Bob agree to use a more efficient data transfer method by using a special alphabet, which replaces every “six digits” with one “letter”.

Advanced Encryption Standard

The more popular and widely adopted symmetric encryption algorithm likely to be encountered nowadays is the Advanced Encryption Standard (AES). It is found at least six times faster than triple DES.

A replacement for DES was needed as its key size was too small. With increasing computing power, it was considered vulnerable against exhaustive key search attack. Triple DES was designed to overcome this drawback but it was found slow.

The features of AES are as follows - Symmetric key symmetric block cipher 128-bit data, 128/192/256-bit keys Stronger and faster than Triple-DES

Provide full specification and design details.

Software implementable in C and Java Operation of AES

AES is an iterative rather than Feistel cipher. It is based on 'substitution– permutation network'. It comprises of a series of linked operations, some of which involve replacing inputs by specific outputs (substitutions) and others involve shuffling bits around (permutations).

Interestingly, AES performs all its computations on bytes rather than bits. Hence, AES treats the 128 bits of a plaintext block as 16 bytes. These 16 bytes are arranged in four columns and four rows for processing as a matrix -

Unlike DES, the number of rounds in AES is variable and depends on the length of the key. AES uses 10 rounds for 128-bit keys, 12 rounds for 192-bit keys and 14 rounds for 256-bit keys. Each of these rounds uses a different 128-bit round key, which is calculated from the original AES key.

CHAPTER 4

DESIGN AND IMPLEMENTATION CONSTRAINTS

4.1 CONSTRAINTS IN ANALYSIS:

- ◆ Constraints as Informal Text
- ◆ Constraints as Operational Restrictions
- ◆ Constraints Integrated in Existing Model Concepts
- ◆ Constraints as a Separate Concept
- ◆ Constraints Implied by the Model Structure

4.2 CONSTRAINTS IN DESIGN:

- ◆ Determination of the Involved Classes
- ◆ Determination of the Involved Objects
- ◆ Determination of the Involved Actions
- ◆ Determination of the Require Clauses
- ◆ Global actions and Constraint Realization

4.3 CONSTRAINTS IN IMPLEMENTATION:

A hierarchical structuring of relations may result in more classes and a more complicated structure to implement. Therefore, it is advisable to transform the hierarchical relation structure to a simpler structure such as a classical flat one. It is rather straightforward to transform the developed hierarchical model into a bipartite, flat model, consisting of classes on the one hand and flat relations on the other. Flat relations are preferred at the design level for reasons of simplicity and implementation ease. There is no identity or functionality associated with a flat relation. A flat relation corresponds with the relation concept of entity-relationship modeling and many object-oriented methods. Therefore, it is advisable to transform the hierarchical relation structure to a simpler structure such as a classical flat one. A flat relation corresponds with the relation concept of entity-relationship.

4.4 OTHER NON-FUNCTIONAL REQUIREMENTS:

4.4.1 Performance Requirements:

The application at this side controls and communicates with the following three main general components.

- embedded browser in charge of the navigation and accessing to the web service;
- Server Tier: The server side contains the main parts of the functionality of the proposed architecture. The components at this tier are the following.

4.4.2 Safety Requirements:

1. The software may be safety-critical. If so, there are issues associated with its integrity level
2. The software may not be safety-critical although it forms part of a safety-critical system. For example, software may simply log transactions.
3. If a system must be of a high integrity level and if the software is shown to be of that integrity level, then the hardware must be at least of the same integrity level.
4. There is little point in producing 'perfect' code in some language if hardware and system software (in widest sense) are not reliable.
5. If a computer system is to run software of a high integrity level then that system should not at the same time accommodate software of a lower integrity level.
6. Systems with different requirements for safety levels must be separated.
7. Otherwise, the highest level of integrity required must be applied to all systems in the same environment.

4.5 SYSTEM DESIGN

A blockchain is a public ledger or distributed database of records or transactions that are shared between multiple parties within the network. Keeping this in mind a blockchain can be divided into two categories Permission-less (Public) and Permissioned (Private) based on whether participants are allowed to or not, join

the network freely. A Permissionless blockchain network allows anyone to participate in the transaction validating process by providing them with a unique address through which they can interact with the network like Bitcoin. A Permissioned Blockchain is a closed ecosystem, where users are not allowed to join the network, view the recorded ledger, or issue transactions of their own freely. One of the major drawbacks of Permissionless Blockchain which holds most of the enterprises from employing it is that it requires massive computing power to achieve consensus and the transaction history is visible to everyone.

4.6 MODULES

- Vendor Login and Register
- Government verification of vendors.
- Government Tender Allocation in Vendor.

Tender Details stored in block chain using Smart Contracts

4.6.1 MODULE EXPLANATION:

4.6.1.1 Vendor Login and Register:

Initially Vendor need to create an account in the Government tender Process

Government verification of vendors:

Government announces new projects, invites vendors to give quotations/tenders and approves the best candidate. The vendor is given the project and a Government officer is appointed to keep track of the status of project. A timeline is defined for project and officer to keep a check on progress and to get it complete before deadline. Government officer often visit the site, to take an overview of the progress and report it to the officer.

Government Tender Allocation in Vendor:

We are developing a very comprehensive system for this business process which will manage each and every aspect starting from vendor registration and tender submission and up to the completion of the project. Our system will automate this process and make it really smooth and will also provide a lot of intelligent features which are not possible in manual system. The system will provide an interface to the Government Administrator to define new projects and allocate to officers. The vendors will fill in tenders from the system itself and the tender approval process will also be facilitated by our system.

Tender Details stored in block chain using Smart Contracts:

Most importantly, we will also have an android based tracking module which will be used by officer to keep a live track on the progress by updating. This will assure the management that the photo presented is that of the actual site and not a dummy photo. The overall aim of system is to increase human efficiency and keep the vendors and officers on their toes which should help in on-time completion of Government Projects which is very rare in today's scenarios.

CHAPTER 5

5.1 ARCHITECTURE DIAGRAM:

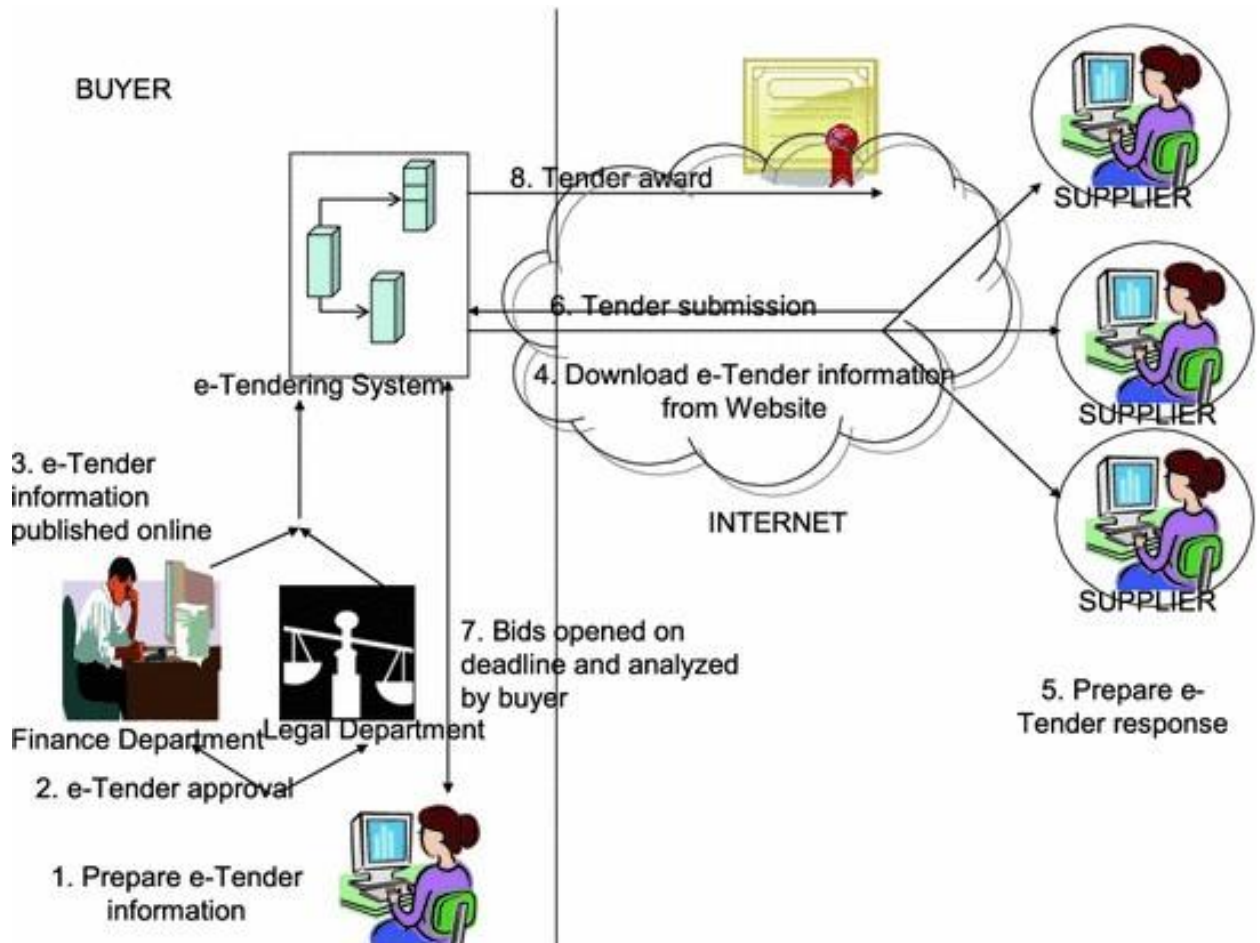
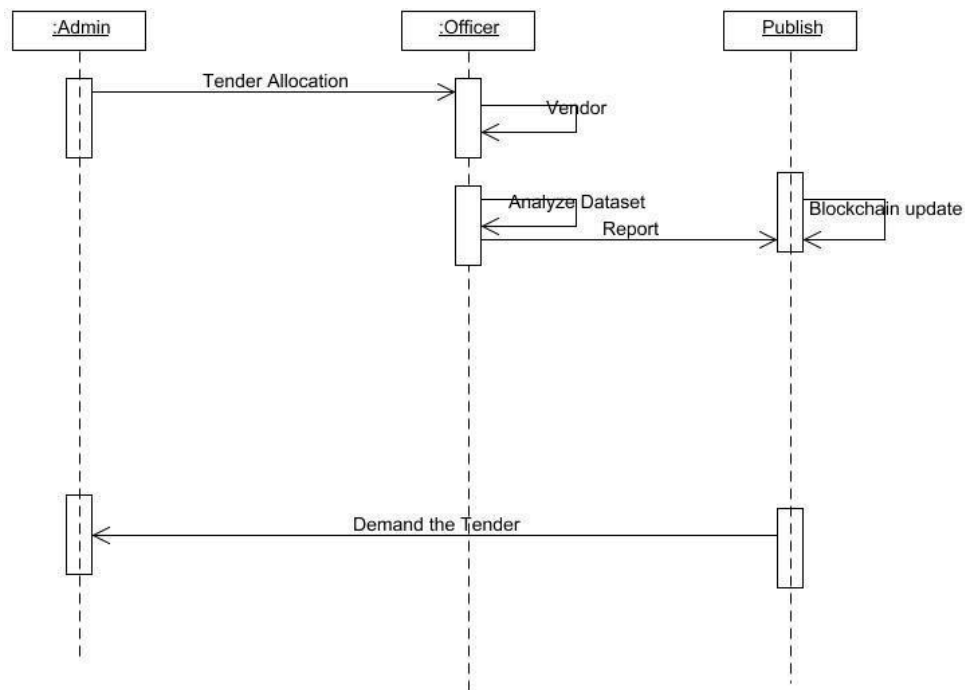


Fig: 5.1

5.2 SEQUENCE DIAGRAM:

A Sequence diagram is a kind of interaction diagram that shows how processes operate with one another and in what order. It is a construct of Message Sequence diagrams are sometimes called event diagrams, event sceneries and timing diagram.



5.3 USE CASE DIAGRAM:

Unified Modeling Language (UML) is a standardized general-purpose modeling language in the field of software engineering. The standard is managed and was created by the Object Management Group. UML includes a set of graphic notation techniques to create visual models of software intensive systems. This language is used to specify, visualize, modify, construct and document the artifacts of an object oriented software intensive system under development.

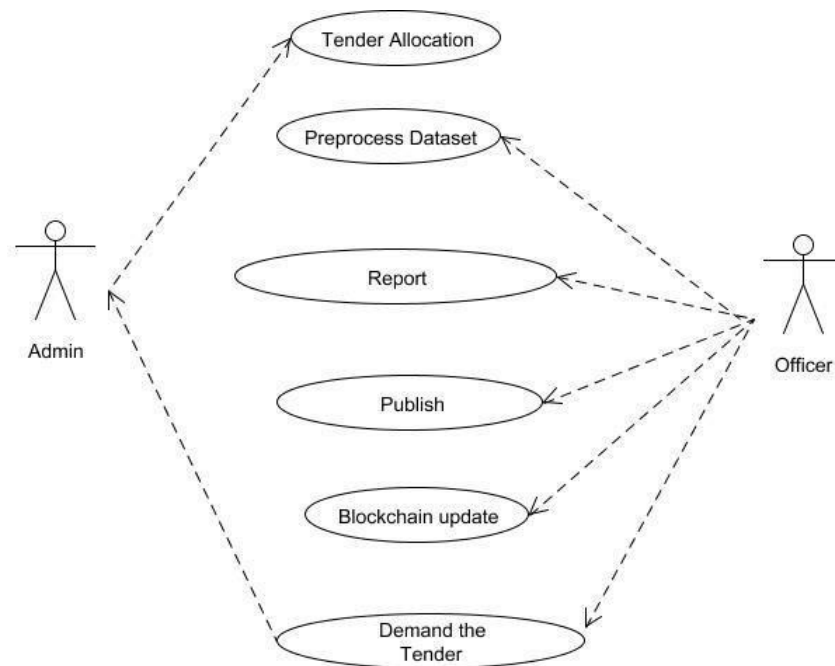
5.3.1. USECASE DIAGRAM:

A Use case Diagram is used to present a graphical overview of the functionality provided by a system in terms of actors, their goals and any dependencies between those use cases.

Use case diagram consists of two parts:

Use case: A use case describes a sequence of actions that provided something of measurable value to an actor and is drawn as a horizontal ellipse.

Actor: An actor is a person, organization or external system that plays a role in one or more interaction with the system.

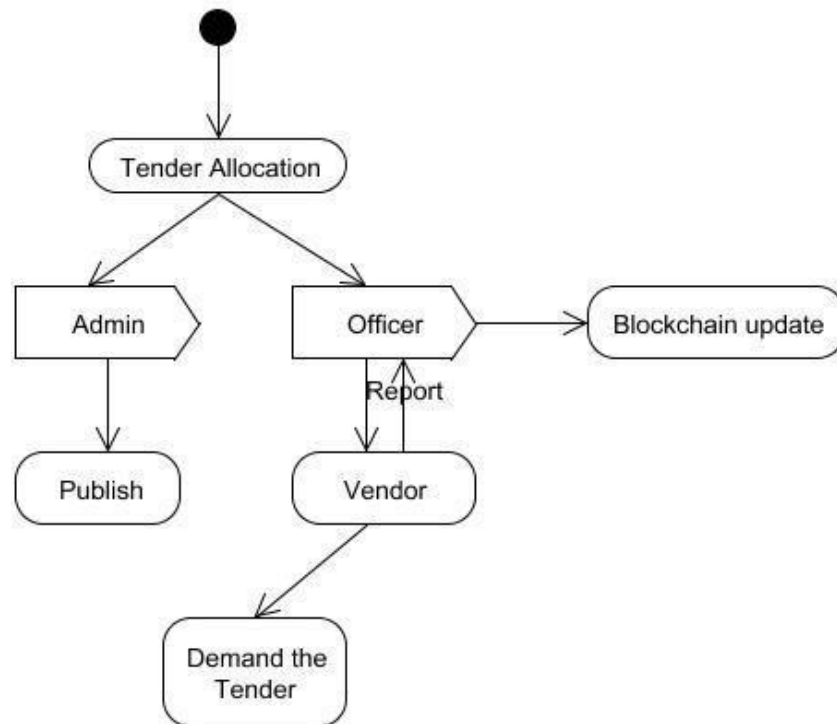


5.4 ACTIVITY DIAGRAM:

Activity diagram is a graphical representation of workflows of stepwise activities and actions with support for choice, iteration and concurrency. An activity diagram shows the overall flow of control.

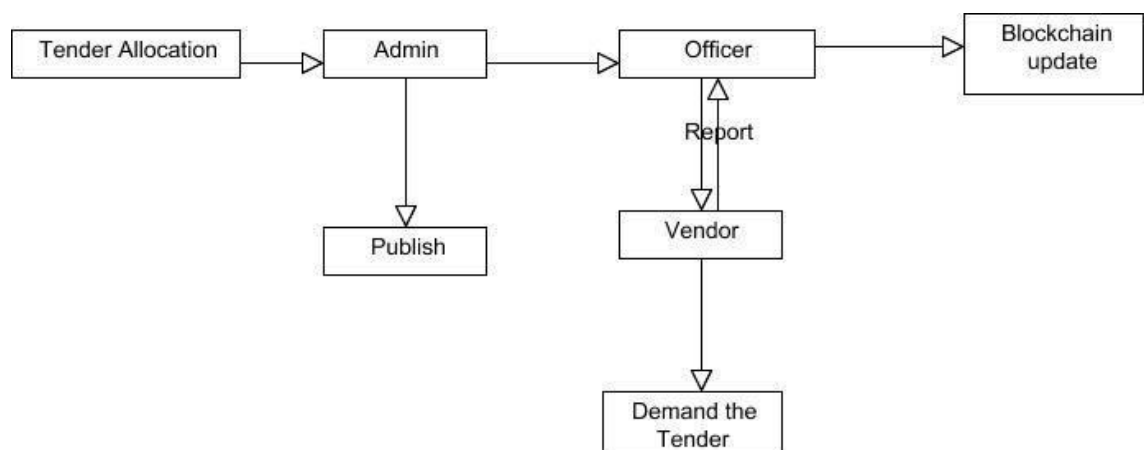
The most important shape types:

- Rounded rectangles represent activities.
- Diamonds represent decisions.
- Bars represent the start or end of concurrent activities.
- A black circle represents the start of the workflow.
- An encircled circle represents the end of the workflow.



5.5 COLLABORATION DIAGRAM:

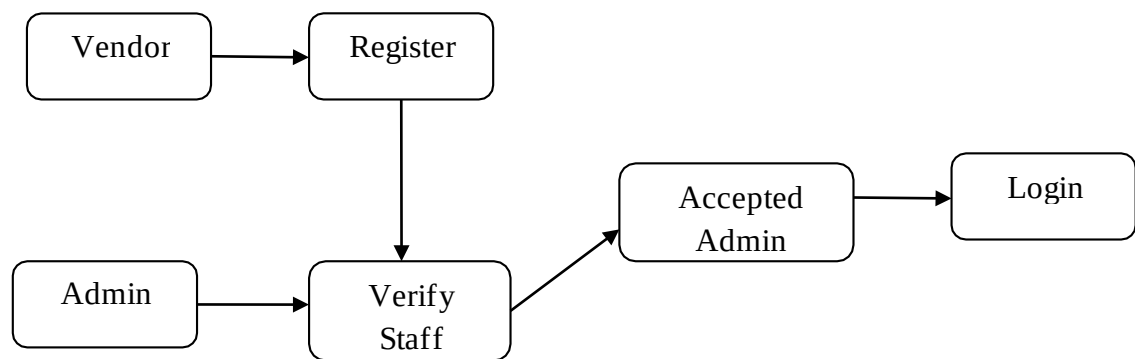
UML Collaboration Diagrams illustrate the relationship and interaction between software objects. They require use cases, system operation contracts and domain model to already exist. The collaboration diagram illustrates messages being sent between classes and objects.



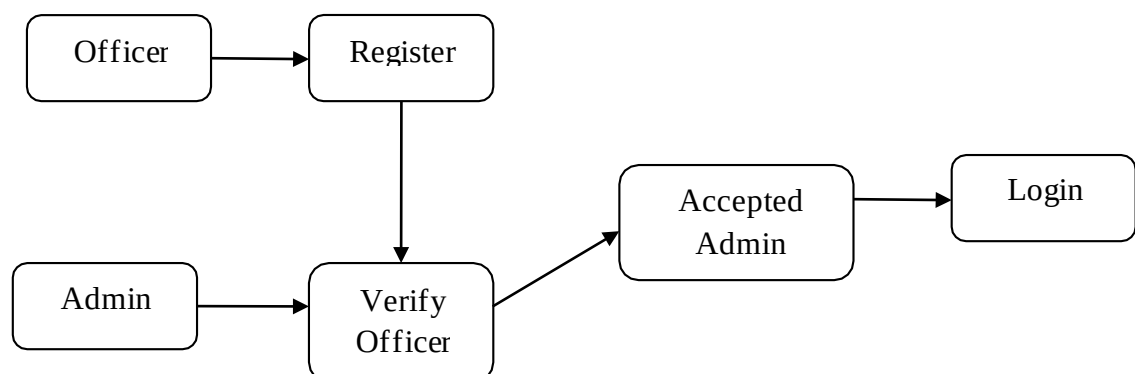
5.6 DATA FLOW DIAGRAM:

A Data Flow Diagram (DFD) is a graphical representation of the “flow” of data through an information system, modeling its aspects. It is a preliminary step used to create an overview of the system which can later be elaborated DFDs can also be used for visualization of data processing.

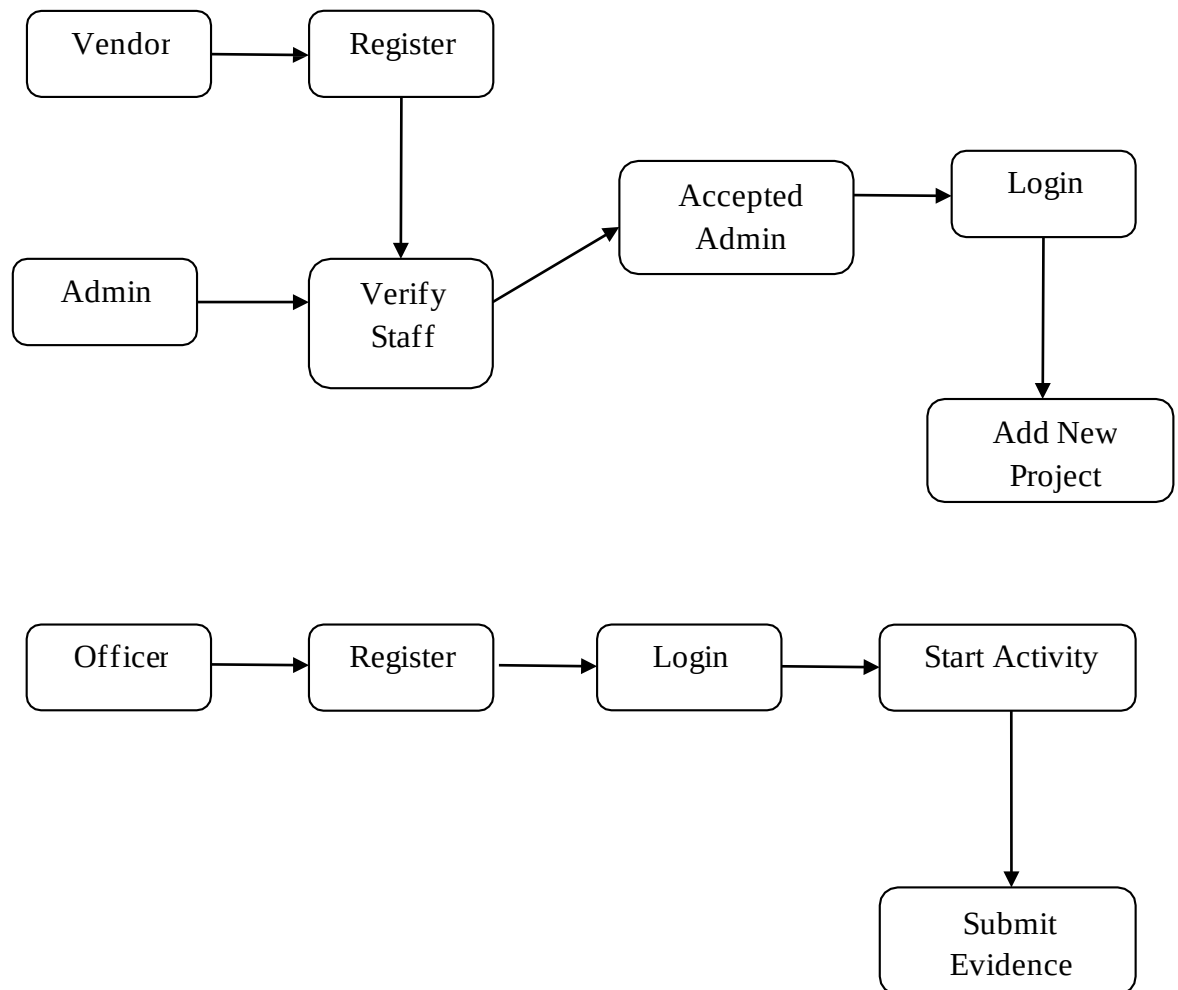
Level 0:



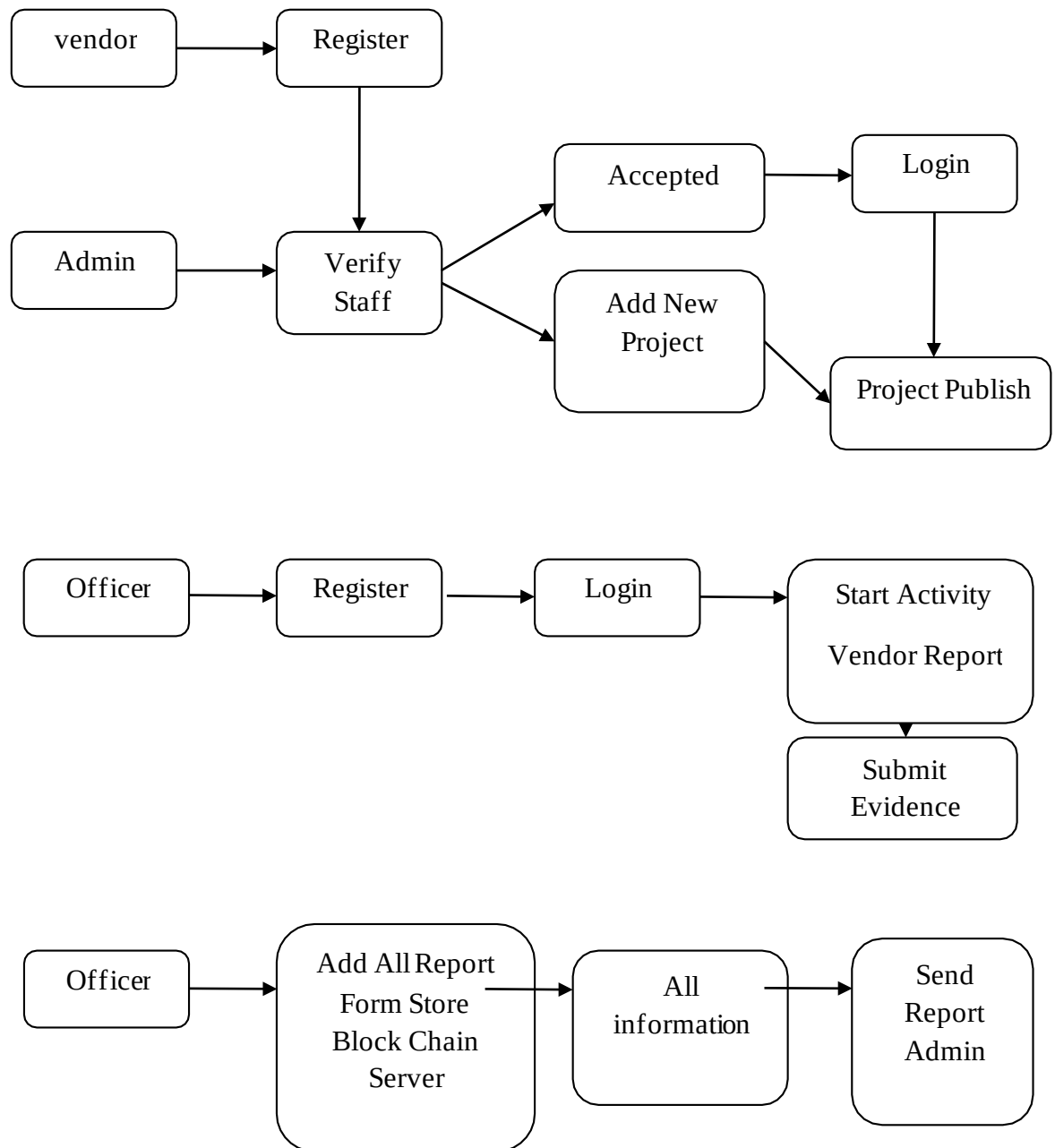
Level 1:



Level 2:



Level 3:



CHAPTER 6

CODING AND TESTING

6.1 CODING:

Once the design aspect of the system is finalizing the system enters into the coding and testing phase. The coding phase brings the actual system into action by converting the design of the system into the code in a given programming language. Therefore, a good coding style has to be taken whenever changes are required it easily screwed into the system.

6.2 CODING STANDARDS:

Coding standards are guidelines to programming that focuses on the physical structure and appearance of the program. They make the code easier to read, understand and maintain. This phase of the system actually implements the blueprint developed during the design phase. The coding specification should be in such a way that any programmer must be able to understand the code and can bring about changes whenever felt necessary. Some of the standard needed to achieve the above-mentioned objectives are as follows:

- Program should be simple, clear and easy to understand. Naming conventions Value conventions
- Script and comment procedure Message box format Exception and errorhandling

6.2.1 Naming Conventions:

Naming conventions of classes, data member, member functions, procedures etc., should be **self-descriptive**. One should even get the meaning and scope of the variable by its name. The conventions are adopted for **easy understanding** of the intended message by the user. So, it is customary to follow the conventions. These conventions are as follows:

Class names

Class names are problem domain equivalence and begin with capital letter and have mixed cases.

Member Function and Data Member name

Member function and data member name begins with a lowercase letter with each subsequent letters of the new words in uppercase and the rest of letters in lowercase.

6.2.2 Value Conventions:

Value conventions ensure values for variable at any point of time. This involves the following:

- Proper default values for the variables.
- Proper validation of values in the field.
- Proper documentation of flag values.

6.2.3 Script Writing and Commenting Standard:

Script writing is an art in which indentation is utmost important. Conditional and looping statements are to be properly aligned to facilitate easy understanding. Comments are included to minimize the number of surprises that could occur when going through the code.

6.2.4 Message Box Format:

When something has to be prompted to the user, he must be able to understand it properly. To achieve this, a specific format has been adopted in displaying messages to the user. They are as follows:

- X – User has performed illegal operation.
- ! – Information to the user.

6.3 TEST PROCEDURE:

SYSTEM TESTING:

Testing is performed to identify errors. It is used for quality assurance. Testing is an integral part of the entire development and maintenance process. The

goal of the testing during phase is to verify that the specification has been accurately and completely incorporated into the design, as well as to ensure the correctness of the design itself. For example, the design must not have any logic faults in the design is detected before coding commences, otherwise the cost of fixing the faults will be considerably higher as reflected. Detection of design faults can be achieved by means of inspection as well as walkthrough.

Testing is one of the important steps in the software development phase. Testing checks for the errors, as a whole of the project testing involves the following test cases:

- Static analysis is used to investigate the structural properties of the Source code.
- Dynamic testing is used to investigate the behavior of the source code by executing the program on the test data.

6.4 TEST DATA AND OUTPUT:

6.4.1 Unit Testing:

Unit testing is conducted to verify the functional performance of each modular component of the software. Unit testing focuses on the smallest unit of the software design (i.e.), the module. The white-box testing techniques were heavily employed for unit testing.

6.4.2 Functional Tests:

Functional test cases involved exercising the code with nominal input values for which the expected results are known, as well as boundary values and special values, such as logically related inputs, files of identical elements, and empty files.

Three types of tests in Functional test:

- Performance Test
- Stress Test
- Structure Test

6.4.3 Performance Test:

It determines the amount of execution time spent in various parts of the unit, program throughput, and response time and device utilization by the program unit.

6.4.4 Stress Test:

Stress Test is those tests designed to intentionally break the unit. A Great deal can be learned about the strength and limitations of a program by examining the manner in which a programmer in which a program unit breaks.

6.4.5 Structured Test:

Structure Tests are concerned with exercising the internal logic of a program and traversing particular execution paths. The way in which White-Box test strategy was employed to ensure that the test cases could Guarantee that all independent paths within a module have been have been exercised at least once.

- Exercise all logical decisions on their true or false sides.
- Execute all loops at their boundaries and within their operational bounds.
- Exercise internal data structures to assure their validity.
- Checking attributes for their correctness.
- Handling end of file condition, I/O errors, buffer problems and textual errors in output information

6.4.6 Integration Testing:

Integration testing is a systematic technique for construction the program structure while at the same time conducting tests to uncover errors associated with interfacing. i.e., integration testing is the complete testing of the set of modules which makes up the product. The objective is to take untested

modules and build a program structure tester should identify critical modules. Critical modules should be tested as early as possible. One approach is to wait until all the units have passed testing, and then combine them and then tested. This approach is evolved from unstructured testing of small programs. Another strategy is to construct the product in increments of tested units. A small set of modules are integrated together and tested, to which another module is added and tested in combination. And so on. The advantages of this approach are that, interface dispenses can be easily found and corrected.

The major error that was faced during the project is linking error. When all the modules are combined the link is not set properly with all support files. Then we checked out for interconnection and the links. Errors are localized to the new module and its intercommunications. The product development can be staged, and modules integrated in as they complete unit testing. Testing is completed when the last module is integrated and tested.

6.5 TESTING TECHNIQUES / TESTING STRATEGIES

6.5.1 Testing:

Testing is a process of executing a program with the intent of finding an error. A good test case is one that has a high probability of finding an as-yet — undiscovered error. A successful test is one that uncovers an as-yet- undiscovered error. System testing is the stage of implementation, which is aimed at ensuring that the system works accurately and efficiently as expected before live operation commences. It verifies that the whole set of programs hang together. System testing requires a test consists of several key activities and steps for run program, string, system and is important in adopting a successful new system. This is the last chance to detect and correct errors before the system is installed for user acceptance testing.

The software testing process commences once the program is created and the documentation and related data structures are designed. Software testing is essential for correcting errors. Otherwise the program or the project is not said to

be complete. Software testing is the critical element of software quality assurance and represents the ultimate review of specification design and coding. Testing is the process of executing the program with the intent of finding the error. A good test case design is one that has a probability of finding a yet undiscovered error. A successful test is one that uncovers a yet undiscovered error. Any engineering product can be tested in one of the two ways:

6.5.1.1 WHITE BOX TESTING:

This testing is also called as Glass box testing. In this testing, by knowing the specific functions that a product has been designed to perform, test can be conducted that demonstrate each function is fully operational at the same time searching for errors in each function. It is a test case design method that uses the control structure of the procedural design to derive test cases. Basis path testing is a white box testing.

Basis path testing:

- Flow graph notation
- Cyclomatic complexity
- Deriving test cases
- Graph matrices Control

6.5.1.2 BLACK BOX TESTING:

In this testing by knowing the internal operation of a product, test can be conducted to ensure that “all gears mesh”, that is the internal operation performs according to specification and all internal components have been adequately exercised. It fundamentally focuses on the functional requirements of the software.

The steps involved in black box test case design are:

- Graph based testing methods
- Equivalence partitioning
- Boundary value analysis

- Comparison testing

6.5.2 Software Testing Strategies:

A software testing strategy provides a road map for the software developer. Testing is a set activity that can be planned in advance and conducted systematically. For this reason, a template for software testing a set of steps into which we can place specific test case design methods should be strategy should have the following characteristics:

- Testing begins at the module level and works “outward” toward the integration of the entire computer-based system.
- Different testing techniques are appropriate at different points in time.
- The developer of the software and an independent test group conducts testing.
- Testing and Debugging are different activities but debugging must be accommodated in any testing strategy.

6.5.2.1 Integration Testing:

Integration testing is a systematic technique for constructing the program structure while at the same time conducting tests to uncover errors associated with. Individual modules, which are highly prone to interface errors, should not be assumed to work instantly when we put them together. The problem of course, is “putting them together”- interfacing. There may be the chances of data lost across on another’s sub functions, when combined may not produce the desired major function; individually acceptable impression may be magnified to unacceptable levels; global data structures can present problems.

6.5.2.2 Program Testing:

The logical and syntax errors have been pointed out by program testing. A syntax error is an error in a program statement that in violates one or more rules of the language in which it is written. An improperly defined field dimension or omitted keywords are common syntax error. These errors are shown through error messages generated by the computer. A logic error on the other hand deals with the incorrect data fields, out-off-range items and invalid

combinations. Since the compiler s will not deduct logical error, the programmer must examine the output. Condition testing exercises the logical conditions contained in a module. The possible types of elements in a condition include a Boolean operator, Boolean variable, a pair of Boolean parentheses A relational operator or on arithmetic expression. Condition testing method focuses on testing each condition in the program the purpose of condition test is to deduct not only errors in the condition of a program but also other a errors in the program.

6.5.2.3 Security Testing:

Security testing attempts to verify the protection mechanisms built in to a system well, in fact, protect it from improper penetration. The system security must be tested for invulnerability from frontal attack must also be tested for invulnerability from rear attack. During security, the tester places the role of individual who desires to penetrate system.

6.5.2.4 Validation Testing:

At the culmination of integration testing, software is completely assembled as a package. Interfacing errors have been uncovered and corrected and a final series of software test-validation testing begins. Validation testing can be defined in many ways, but a simple definition is that validation succeeds when the software functions in manner that is reasonably expected by the customer. Software validation is achieved through a series of black box tests that demonstrate conformity with requirement. After validation test has been conducted, one of two conditions exists.

- * The function or performance characteristics confirm to specifications and are accepted.
- * A validation from specification is uncovered and a deficiency created.

Deviation or errors discovered at this step in this project is corrected prior to completion of the project with the help of the user by negotiating to establish a method for resolving deficiencies. Thus, the proposed system under consideration has been tested by using validation testing and found to be working satisfactorily. Though there were deficiencies in the system they were not catastrophic.

6.5.2.5 User Acceptance Testing:

User acceptance of the system is key factor for the success of any system. The system under consideration is tested for user acceptance by constantly keeping in touch with prospective system and user at the time of developing and making changes whenever required. This is done in regarding to the following points.

- Input screen design.
- Output screen design.

CHAPTER 7

RESULTS AND DISCUSSION

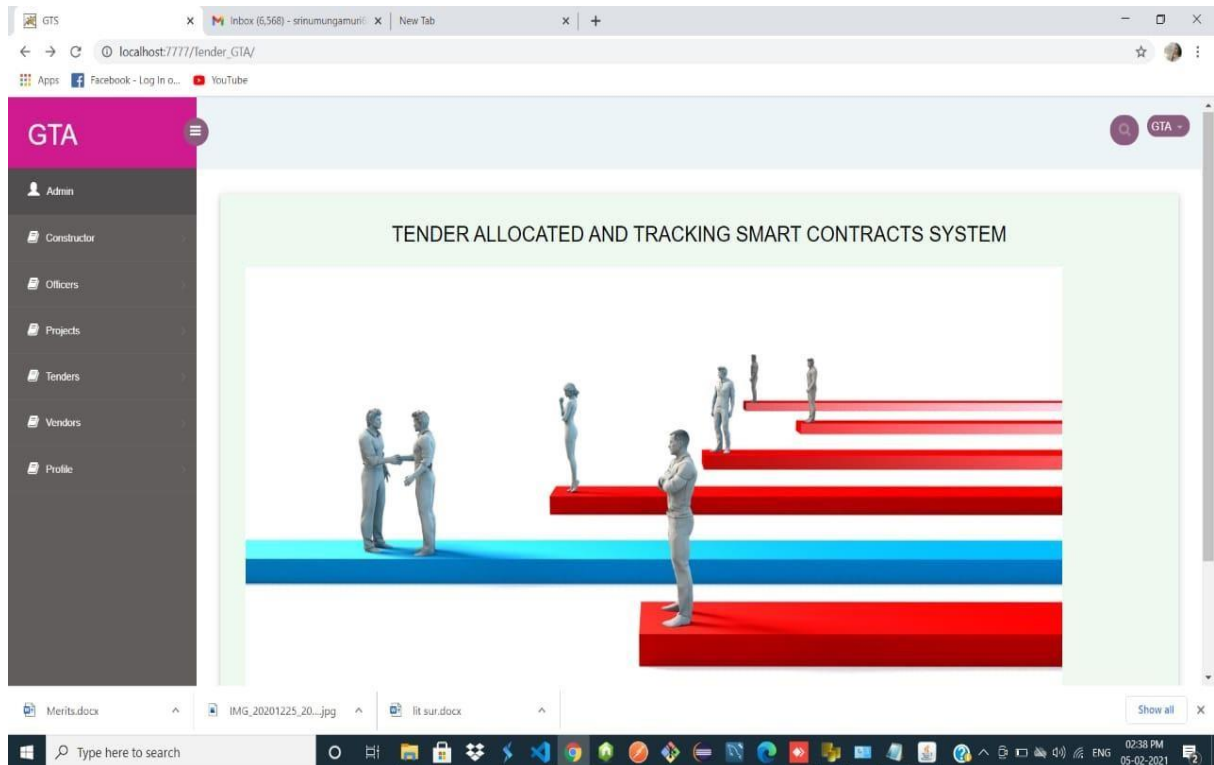


Figure no: 7.1

The above fig7.1 shows us the project status of every constructor after some duration of time. After certain the officers will check the status of the project at regular intervals of time for safety of the project. If any constructor is not doing the job properly then the officers will take the serious action and they will give the warning to them, then further it repeats then they will be removed from the project.

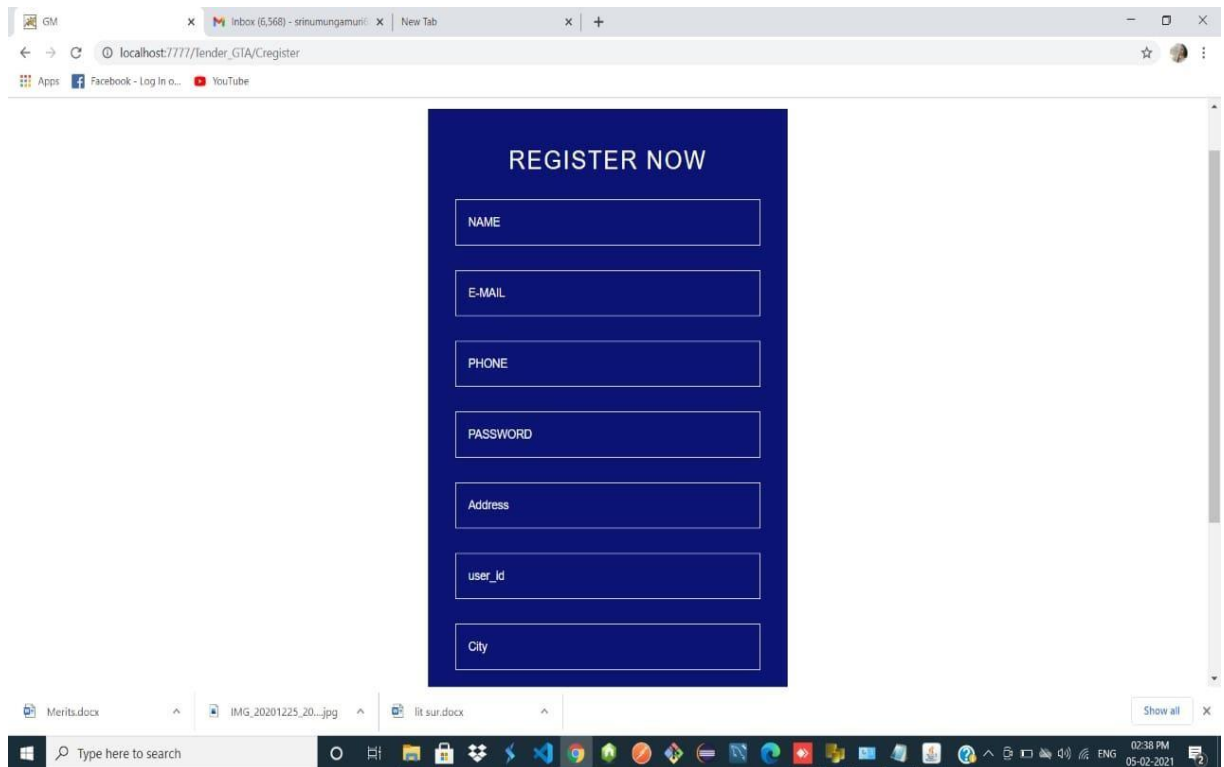


Figure no: 7.2

The above fig7.2 tells about the constructor registration process. First the interested constructor has to register in the following form giving his details and address. Then randomly they will choose the constructors and assign the project.

The screenshot displays a web browser window with the URL `localhost:8080/Tender_GTA/FillTender?user_name=manikandan&pro_Name=SoftwareProject&pro_Id=903418`. The application interface features a sidebar on the left with a pink header labeled 'GTA' and a menu with options: Projects, Tenders, Vendors, Officers, and Profile. The main content area is titled 'NEW PROJECT FORM' and contains the following fields:

- Project ID:** 903418
- Project Name:** SoftwareProject
- Description:** advanced Java topics for building an application in Java, this Java tutorial would definitely be useful for you. Let's start learning.
- Estimated Time:** 2Years
- Estimated Cost:** 9601254
- Plan:** advanced Java topics for building an application in Java, this Java tutorial would definitely be useful for you. Let's start learning.
- No. of Man Power Require:** 90
- Why should i got Project:** NO
- Project Doc File:** Choose File | No file chosen

At the bottom of the form are 'Save' and 'Cancel' buttons. The Windows taskbar at the bottom shows the time as 11:56 AM on 3/4/2021.

Figure no: 7.3

After the selection of the constructor, the government officers will assign the project based on the above skills mentioned in the form, so it is compulsory to fill the above form to allocate the project to the respective officer.

CONCLUSION:

In this paper, we have elaborated on the need and benefits of using blockchain technology in the government tender assignment process. We have used Ethereum to implement the end-to-end edge computing framework for government tender work-flow. Iterative auction algorithm is proposed to associate the best- suited constructors to the tender projects, thereby enhancing the profit of both the government lenders and the construction companies. We have also studied the performance evaluation of the proposed model. The proposed model proves to give better results in terms of different tender parameters as compared to its counterparts.

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APPENDIX

A. SOURCE CODE:

```
package com.cg.controller;

import org.springframework.beans.factory.annotation.Autowired; import
org.springframework.web.bind.annotation.CrossOrigin; import
org.springframework.web.bind.annotation.RequestBody; import
org.springframework.web.bind.annotation.RequestMapping; import
org.springframework.web.bind.annotation.RequestMethod; import
org.springframework.web.bind.annotation.RestController; import
com.cg.model.CustomerDetails;

import com.cg.model.TransactionDetails; import com.cg.service.BankService;
import com.cg.service.TransactionService;

@CrossOrigin (origins="http://localhost:4200", allowedHeaders="*")

@RestController

public class HomeController {int accountNo; @Autowired BankService bank;

    @Autowired

    TransactionService tService;
```

```
@RequestMapping(value="/",method=RequestMethod.GET) public String  
start() {  
  
    return "Hello";  
}
```

```
@RequestMapping(value="/registration",method=RequestMethod.POST)  
public int register(@RequestBody CustomerDetails customer) {  
  
    return bank.register(customer);  
}
```

```
@RequestMapping(value="/login",method=RequestMethod.POST) public  
CustomerDetails login(@RequestBody CustomerDetails c) {  
  
    CustomerDetails customer=new CustomerDetails();  
  
    customer=bank.login(c); accountNo=customer.getAccountNo();  
  
    return customer;  
}
```

```
@RequestMapping(value="/deposit",method=RequestMethod.PUT) public  
int deposit(@RequestBody int amt) {
```

```

        int amount = 0; if(accountNo != 0) {

            amount = tService.deposit(accountNo,amt);

        }

        return amount;

    }

```

```

@RequestMapping(value="/withdraw",method=RequestMethod.PUT) public int

withdraw(@RequestBody int amt) {

    int amount = 0; if(accountNo != 0) {

        amount = tService.withdraw(accountNo,amt);

    }


    return amount;

}

```

```

@RequestMapping (value="/showbalance", method=RequestMethod.GET)

public int showBalance() {

    int amount = 0; if (accountNo != 0) {

```

```

        amount = tService.showBalance(accountNo);

    }

    return amount;

}

@RequestMapping (value="/fundtransfer", method=RequestMethod.PUT)
public int fundTransfer(@RequestBody TransactionDetails transaction) {

    if(accountNo != 0) {

        transaction = tService.fundTransfer(accountNo,transaction);

        tService.insertTransaction(transaction);

        return 1;

    }

    else return 0;

}

```

B. PAPER WORK

A BLOCK CHAIN AND EDGE COMPUTING-BASED SECURE FRAMEWORK FOR GOVERNMENT TENDER ALLOCATION

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ABSTRACT: - Governments and public area elements around the globe are effectively investigating better approaches to stay aware of mechanical headways to accomplish keen administration, work productivity, and cost streamlining. Blockchain innovation is an illustration of such innovation that has been pulling in the consideration of Governments across the globe as of late. Upgraded security, improved discernibility and most reduced expense foundation engage the blockchain to enter different areas. By and large, governments discharge tenders to some outsider associations for various tasks. During this interaction, diverse contender attempts to listen in the delicate estimations of others to win the delicate. The bad government authorities additionally charge high pay off to pass the for some specific outsider. In this paper, we introduced a protected and straightforward structure for government tenders utilizing blockchain. Blockchain is utilized as a protected and permanent information construction to store the public authority records that are profoundly defenseless to altering. This work means to make a straightforward and secure edge registering framework for the work-stream in government tenders to carry out government plans and approaches by restricting human management to the insignificant.

I INTRODUCTION

Blockchain is mulled over a creating chain of realities associated with the helpful asset of the power of cryptography. Blockchain (BC) has gotten tremendous consideration because of its disseminated and broadly loosened up nature, and its ability for financial applications. Delicate is a strategy for welcoming offers for huge endeavor by means of govt then Private areas or trade is a formal give to supply devices or to do a particular interest, for example, takeover offer. Clearing incorporate, control of distribute offering, pre- understanding agreement with commercial center suggestions. The perfect portion of open delicate is drawn-out venture and spending plan on the reason of work completed is difficult to control and the delicate leeway gadget is drowsy in present day.

There have been different endeavors to carry out innovation to make government measures paperless and prompt, for example, internet tagging frameworks, web based giving of tenders, documenting assessment forms, and so on. Albeit the vast majority of these frameworks appear to be hearty and all around carried out, every one of them depend on the possibility of a focal worker which has a solitary place of disappointment, as programmers can undoubtedly hack or disturb its working by assaults, for example, DOS, Slow-loris, SYN Flooding, and so forth [4]. In many governments, convoluted administrative frameworks regularly bring about profoundly wasteful work process full of debasement, bungle, and human blunders. A portion of the administration measures, for example, government tenders incorporate acts of neglect like data spills, defilement, pay off, and so on. The vast majority of the current electronic administrations and IT framework have the

previously mentioned impediments, in any case, new advancements. A permissioned blockchain organization can give the vital straightforwardness to viably carry out government strategies to support the residents of the country and fix obligations if there should arise an occurrence of maltreatment of the framework [7], [8]. In the current computerized space, information control is quite possibly the main apparatuses that is being utilized by every one of the enemies and vindictive substancesto make hurt general society and the public authority bodies [9]. The greater part of the current frameworks depends on the information and assuming the actual information is far given corresponded or distorted, the total framework gets bad. The move from putting away information in actual records to putting away information in advanced structure is a change in perspective [10]. Notwithstanding, assuming the computerized information isn't secure, the mischief brought about by the deficiency of advanced information would be considerably more than the damage that was looked because of the deficiency of actual documents [11]. Advanced Identity burglary is one of the significant wellsprings of information penetrates. It is assessed that 74% of the information breaks are brought about by personality robberies across the world. The United States leads different nations with very nearly 85% of computerized characters taken overall [12]. Aside from information penetrates, pay off and pointless deferrals in the cycles is another issue being explicitly looked in government measures. Government authorities will in general abuse their regulatory powers and request high pay-offs to pass the tenders.

In this paper, we expect to deliver these issues to fabricate a straightforward and secure edge figuring framework for the allotment of government tenders which not just kills the requirement for human

management or mediation yet additionally makes it simple for the public authority to follow along and update its arrangements as time advances. To settle this

issue, we propose the structure to utilize blockchain innovation for making a decentralized framework to perform government offering measures easily, straightforward, auditable, and permanent.

II RELATED WORK

Abdallah et al[2] The model might be another theoretical model of thoroughly machine-controlled, computerized and online offering means of the offering technique and including all associated division framework is performed utilizing cryptographic natives and the convention is confirmed on the off chance that it agrees effectively with the security capacities through an execution in Maple numerical programming. The principle objective is to keep up the uprightness, confirmation, non-disavowal and secrecy of the archives required as suitable.

Chao et al[4] The Chinese government sagaciously authorized the surgery (Public-non-public Partnership) surgery comes, partner degree natural cycle ith the examination of the game conduct determinations the comparing ideas like expanding the punishment force of lease chasing, viable proposes that of course and decreasing bearing cost were recommends. It gives logical premise to the course of the surgery project delicate.

Surya et al[5] Clearing and settlement strategy in Asian country is exploitation NSCCL for its working. The record that utilizes reasonable go for its working and just exchange's information all through every one of the individuals' blessing in network. The snappy exchange of information between entirely unexpected elements lessens the settlement time.

Hou et al[8] have expounded on the chances and advantages of utilizing blockchain

innovation to diminish the time and exertion needed to manage and keep up government works. Savvy contracts are acquainted as a promising arrangement with maintain a strategic distance from debasement and pay- offs in government office work process. Additionally, they radically decrease the time taken to finish a help and further starts new administrations and improves Quality of Service (QoS) to the residents.

Svein et al. [9] has presented the idea of straightforwardness improvement among government and residents utilizing blockchain. The information can be anonymized and the general exchange can be examined and observed to upgrade the general equity and proposed to use the permanent idea of blockchain and store monetary information on the blockchain to improve the general nature of the credit framework. Amani Dello et al. [10] has proposed the e-obtainment approaches in Tanzania bringing about an effective e-offering framework.

Hiroshi Fukui et al. [11] has proposed the technique where government delicate is apportioned to the worker for hire based on their various credits like value, quality, finish time, and so on Character the board is one of the significant regions that has acquired a ton of center as of late. *Noizat et al [12]* proposed different blockchain-based strategies and structures to create a safe, single, and changeless personality, everything being equal. Different secure E-casting a ballot prospects to make the way toward casting a ballot secure and simple are proposed. The decentralized idea of blockchain can relieve the danger of a solitary unified authority getting vindictive and making a danger to the democratic framework. Proposed a model that encourages government data the executives and sharing dependent on the blockchain network.

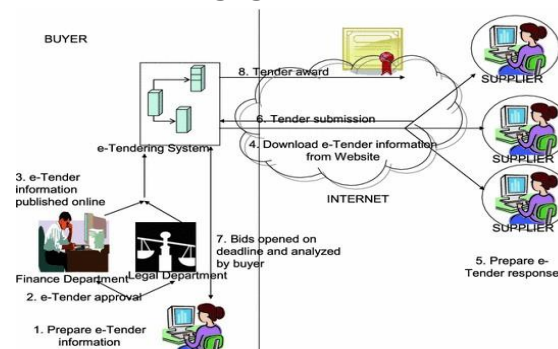
III EXISTING SYSTEM

The distribution of tenders from government banks to constructors. At first, government loan specialists and constructors go into the block chain organization to develop a protected edge registering foundation. The public authority loan specialist imparts the delicate subtleties to every one of the significant constructors. The objective of the model is to proficiently deal with the public authority delicate cycle safely. The framework essentially comprises of three kinds of substances: government authorities, outside parties like development organizations or individual constructors, and banks. The issue for dynamic estimating which is additionally pointed toward improving the generally profit for the constructors and the public authority loan specialists.

IV PROPOSED SYSTEM

Government declares new ventures, welcomes sellers to give citations/tenders and supports the best up-and-comer. The merchant is given the venture and a Government official is designated to monitor the situation with project. A timetable is characterized for undertaking and official to keep a beware of progress and to get it complete before cutoff time. Government official regularly visit the site, to take an outline of the advancement and report it to the official. We are building up a far-reaching framework for this business cycle which will deal with every single angle beginning from seller enrollment and delicate accommodation and up to the consummation of the task.

FIG 1 OVERVIEW OF THE PROPOSED SYSTEM



A block chain is a public record or circulated information base of records or exchanges that are divided among numerous gatherings inside the organization. Remembering this a block chain can be partitioned into two classes Permission-less (Public) and Permission (Private) in light of if members are permitted to, join the organization uninhibitedly. The shrewd agreement is coded in the robustness language. The consequences of the keen agreement are seen subsequent to conveying the savvy contract in the Rink by test organization of the ethereal block chain stage.

V MODULES DESCRIPTION

5.1 VENDOR LOGIN AND REGISTER

At first Vendor need to make a record in the Government delicate Process.

5.2 GOVERNMENT VERIFICATION OF VENDORS

Government declares new ventures, welcomes sellers to give citations/tenders and affirms the best applicant. The seller is given the task and a Government official is named to monitor the situation with project. A course of events is characterized for venture and official to keep a mind progress and to get it complete before cutoff time. Government official frequently visit the site, to take an outline of the advancement and report it to the official.

5.3 GOVERNMENT TENDER ALLOCATION IN VENDOR

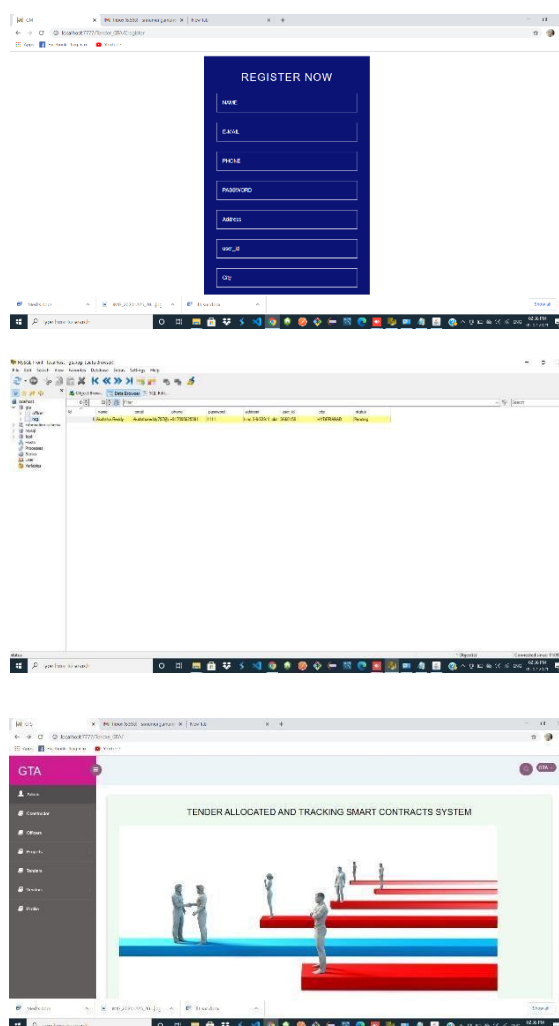
We are building up an extremely exhaustive framework for this business cycle which will deal with every single perspective beginning from merchant enrollment and delicate accommodation and up to the culmination of the task. Our framework will robotize this interaction and make it truly smooth and will likewise give a great deal of smart highlights which are impractical in manual system. The

framework will give an interface to the Government Administrator to characterize new ventures and distribute to officials. The merchants will fill in tenders from the actual

5.4 TENDER DETAILS STORED IN BLOCK CHAIN USING SMART CONTRACTS

In particular, we will likewise have an android based following module which will be utilized by official to keep a live track on the advancement by refreshing. This will guarantee the administration that the photograph introduced is that of the real site and not a faker photo. The generally point of framework is to expand human effectiveness and cause the sellers and officials to remain alert which should help in on-time fruition of Government Projects which is extremely uncommon in the present situations.

VI RESULT AND DISCUSSION



VI CONCLUSION

The Proposed work, we have explained on the need and advantages of utilizing blockchain innovation in the public authority delicate task measure. We have utilized Ethereum to execute the start to finish edge figuring system for government delicate work process. Iterative sale calculation is proposed to relate the most appropriate constructors to the delicate undertakings, in this way upgrading the benefit of both the public authority moneylenders and the development organizations. We have additionally contemplated the exhibition assessment of the proposed model. The proposed model demonstrates to give better outcomes as far as various delicate boundaries when contrasted with its partners.

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C. PLAGIARISM REPORT

