

A SURVEY FOR BLOCK CHAINING BASED CYBER SECURITY SYSTEM FOR FISCAL DEVICE NETWORK

BOBBY K SIMON¹, ANJANA P NAIR²

¹BOBBY K SIMON, M.Tech Computer Science & Engineering. Sree Buddha College of Engineering, Ayathil, Elavumthitta Pathanamthitta, Kerala, India.

²Ms. ANJANA P NAIR, Assistant Professor Computer Science & Engineering. Sree Buddha College of Engineering, Ayathil, Elavumthitta, Pathanamthitta, Kerala, India

Abstract - GPRS terminals are utilized as inward or outside specialized gadgets, sending charge related data from financial money registers and monetary printers to an expense organization server, so cyber security is of fundamental significance. This paper examines cyber security of GPRS terminals, which are utilized in numerous nations. All this information from transmitter section is transmitted to the receiver section by using Zigbee transceiver. The received information from transmitter section is given to microcontroller. The information is stored and displayed in PC. Then the official data has been uploaded into server internet by using GPRS terminal.

Key Words: Block Chaining, GPRS, Fiscal Devices, IOT, RFID

1. INTRODUCTION

Financial money registers and monetary printers (in further content: monetary gadgets) give comparative printing and human interfacing usefulness as non-monetary money registers and non-financial printers, however with the expansion of a financial memory, recording turnovers and expenses of merchandise per each assessment rate, and also the estimations of assessment rates. The financial memory is non erasable, also physically ensured by a self-destructible monetary seal, which can be lawfully evacuated just by an approved serviceman before a duty overseer. Fiscal cash gadgets with GPRS terminals are associated with organization server and exchange chosen information from financial memory to the expense organization server every day to once per a few days. They can be treated as an early Internet of Things (IoT) gadgets, working in a non-real time mode.

A current fiscal gadget with GPRS terminal uses an inner or an outer specialized gadget. The current monetary gadget utilizing plaintext (PT), i.e. non-encoded information, passing through the current GPRS terminal and media transmission administrator's hubs supporting VPN (virtual private system). The troubles and expenses of executing encryption on in fact restricted IoT gadgets are a notable issue. Specialists who contemplated IoT encryption found that numerous IoT gadgets traded totally decoded data with servers. Scientists likewise concur that encryption is essential in all regions of the IoT condition, including at the gadget level, for information in travel, and at the stage or administration level.

The duty organization server speaks with the enhanced existing or new financial gadget utilizing ciphertext (CT), i.e. scrambled information, going through the new inward specialized gadget, discretionary PCs, servers, switches, switches and media transmission administrator's hubs supporting discretionary VPN without unscrambling of information in travel.

2. LITERATURE SURVEY

2.1 Certification and Legislation

In an undeniably aggressive worldwide market, the accomplishment of an accreditation by free and dependable bodies could be an instrument of extraordinary sparing and social advantage. In a few business conditions the affirmation is compulsory before an item is advertised. This is the instance of the monetary meters, i.e. electronic gadgets for putting away, overseeing and following business exchanges. More often, the accessible financial meters can be characterized into two distinct elements: money enrols and robotized ticketing frameworks. The requirement used for certification and legislation is SSEC and the main technique employed is offline testing. If in case the printing device is separated the following problems can occur.

- 1) Any issuing of monetary archives by the money enrol must be repressed
- 2) Congruent admonitions must be accounted for.

2.1.1 SSEC Experience

SSEC has likewise set an action of working up a database of information gathered by the confirmations as of now performed with the end goal to set up and lead experimental research considers. These information could be of enthusiasm for other accreditation bodies or included on-screen characters. Gathered information are centered for programming attributes like practicality and dependability of the financial programming or security of the monetary information, and so on. The gathered information are, for example, Mean Time Between Failure (MTBF) or blame examples and repetition as unwavering quality measures, or additionally a number of given validation techniques and number of information defilement cases really happening as safety efforts.

The accumulation information is an imperative and nonstop work in advancement of the SSEC due to the various regulating updates and mechanical advancements that have profoundly altered the item to be affirmed throughout the years. Ceaseless changes in the database inputs raise issues of information consistency what's more, make troublesome having long terms measurable investigation. In all case, the database advances the methodology of enhancement and working up of best rehearses for the monetary programming confirmation.

2.1.2 Off-line Testing

The methodology included is offline testing. The steps included are:

1. Documentation: It predominantly comprises an engineering model, i.e. the depiction of the equipment and programming segments of the money enlist; a practical model, i.e. the detail of functionalities executed in the source code; an end client manuals: the portrayal of the interface and the functionalities accessible to the last client. The documentation incorporates the upkeep strategies vital amid the cycle life of money enlist.

2. Additional Information: This can be used as a function of obligatory documentation.

3. Source Code: The source code of the money list finished with the libraries that could be utilized amid the on-line testing action.

4. Requirements Repository: The gathering of money enlist prerequisites, both frame the equipment what's more, programming perspective, as required by the Italian enactment.

5. Test Case Database: Gathering of test cases and relating right outcomes valuable for the assessing of the money enrol amid the on-line testing session. Specifically an arrangement of particular test cases and reactions is related to each of the necessities gathered in the prerequisites records.

2.2 Certification and legislation of On-line Testing Activity

In on-line testing movement the documentation gathered in the disconnected movement is misused. In specific inside the SSEC aggregate the exercises can be partitioned into the accompanying advances. In this mainly two concepts are used financial and non financial. The product of a financial meter include additional functions not specifically identified with the salaries record (the supposed financial capacities), such programming part is classified "non-monetary" programming.

The non-financial programming more often than not completes assignments related to merchandise administration, bookkeeping capacities and so on. For this situation it must not influence the right financial conduct of

the staying monetary programming and the non-monetary programming isn't a question for the confirmation. About the monetary programming, it is likewise ideal to indicate that it keeps running on two kinds of financial meters: money enrolls and robotized ticketing frameworks. The various sections included in the online testing activity are:

1. Documentation Analysis: The data contained in the "Documentations and Additional Data" envelopes are investigated with the end goal to recognize qualities and functionalities executed into the money enrol under accreditation.

2. Prerequisites Selection: On the bases of the engineering and useful models, the subsets of equipment and programming prerequisites are distinguished from the "Prerequisites Repository".

3. Test Objective Selection: For each of the chosen prerequisite subsets, the test goals are distinguished. Specifically the SSEC includes five diverse testing conditions. It includes Initialization, Fiscal Working, Anomalous Conditions, Boundary Condition, Breaking down.

4. Test Plan Definition: According to the distinguished test goals for any prerequisite subsets, one or more experiments are chosen among those accessible into the Test Cases Database. If there should be an occurrence of the test cases are feeling the loss of the correct ones are specially appointed created and the Test Case Database advanced likewise. Along these lines a modified test plan is gotten.

5. Test Plan Execution: The required test condition is set up and experiments are executed. Amid this stage the test outcomes are gathered and contrasted and the right outcomes related to every one of the executed experiment. If there arises a blunder the source code is asked for the money designers and a discretionary period of relapse testing is considered.

6. Affirmation Results: The last result of the affirmation process is the Compliance Certificate, that is the gathering the documents, then make test report and check whether it is effective. If necessary, comments and remarks can be provided. The system can also be enhanced if certain requirements are needed.

2.3 Improving tax governance and ensuring data security

Assessment Governance in these days is an essential part of Electronic Administration. The basic job includes data innovation and financial. In addition, money related information is also implied.

2.3.1 Ripple effects of anti-fraud measure in the Baltic States.

The point was to guarantee VAT-discounts with false applications. In doing that, the culprits attempted to translate the money related breaking point. These measures

are activated every day and likewise utilized a 'hand brake' - a specialized move enabling us more opportunity to dissect the applications. The by and large point was to recognize deceitful applications and ensure agreeable organizations.

2.3.2 Biometric identification and unique identities may offer a solution.

A counterfeit or stolen character makes it conceivable to stay away from authority obligations like expense installments or even criminal procedures. By manhandling the phony or stolen personality one can acquire tricky rights, for example, social advantages, social welfare, medicinal services or benefits. For experts, it is troublesome to identify and research the character fakes identified with the maltreatment of these advantages, expenses and standard business activities.

As it were, character cheats can be viewed as readiness for the genuine fakes. The break of individual space for an individual or organization is, obviously, a genuine wrongdoing. Be that as it may, the genuine cheats, where monetary benefits are regularly in play, can be viewed as the alleged "genuine" extortion. Run of the mill models are VAT discounts, buy and buy orders, VAT capturing, monetary cheats, state remittance fakes (for the most part at organization level) and social advantage fakes (chiefly at an individual level).

Many of those arriving are jobless uneducated, with trusts in a superior life, however, wind up having their characters stolen and used to erroneously guarantee social advantages. The culprits would likewise commonly take fast credits, lease vehicles and do web-based shopping with the assistance of stolen personalities.

Criminal procedures regularly take quite a while, and misfortunes of cash might be lasting notwithstanding when the culprits are recognized. Consistent people and organizations ought not pay a high cost for the escape clauses left in the framework, manhandled by those just intrigued by taking favorable position of the system.

2.4. First Generation of Turnover Control Devices

The issues unraveled by the original turnover control gadgets utilizing GPRS terminals for sending information from monetary electronic money registers and monetary printers to the server of Tax Organization. The examination with common monetary money registers and non-monetary money registers is used here. The execution gadgets give critical impacts to the financial plan of a few nations.

2.4.1 Non-Fiscal Registers

Information security and information genuineness in non-monetary registers is negligible because there is no obligation of producers, merchants, vendors and servicemen to government foundations, and additionally their craving for greater deals, i.e. benefits, which causes the presence of alleged "prevalent" money enlists in the market, which

straightforwardly or by implication permit numerous methods for abuse amid turnover enlistment.

- Printing non-monetary receipts (non-financial solicitations, kitchen requests and bar orders) with individual names furthermore, costs of articles, with the end goal to misdirect clients to trust that they have genuine receipts;

- Printing copies of receipts, and offering them to different clients, commonly receipts with single article on every one of them, with statement of regret for the absence of information in real money enlist, with the end goal to misdirect clients to trust that they have genuine receipts;

- Non-printing, changing or clearing information about individual sold articles that have just been composed into the diary memory or a hard plate;

- Non-printing, changing or clearing counters and names of individual sold articles;

- Non-printing, changing or clearing synopsis turnover of articles that have just been built into an information memory or a hard circle;

2.4.2 Non-Fiscal Registers with External Fiscal Module

The expansion of outside financial modules for putting away turnover of articles gives the accompanying extra abuses notwithstanding the previously mentioned abuses:

- Putting away officially changed (falsified) turnover and exchange information because of produced program in the non fiscal enlist and additionally POS, which specifically gives abuse.

- Change of program for interfacing with the outside monetary module into a program empowering abuse, since programs in non-monetary enroll are not ensured against change.

- Charge monitors must peruse the outer financial module because of the nonappearance of programmed sending of information to TAS, which implies that field work may be influenced by defilement, apathy and the absence of information.

2.4.3 Fiscal Registers

Average information insurance and information legitimacy in monetary registers are given by the mix of mechanical gadgets and programming implies, characterized by a proper law containing:

- Avoidance of opening the monetary enlists fenced in area what's more, access to electronic parts of the monetary enlist by the administration seal.

- Assurance of the program memory against expulsion, change or clear by the program seal.

- Insurance of the financial memory against expulsion, change or clear by the monetary seal what's more, covering with an epoxy solidifying compound.
- Putting away synopsis turnovers of articles in the financial memory.
- Printing information about individual sold articles on the diary tape, or putting away in the diary memory.

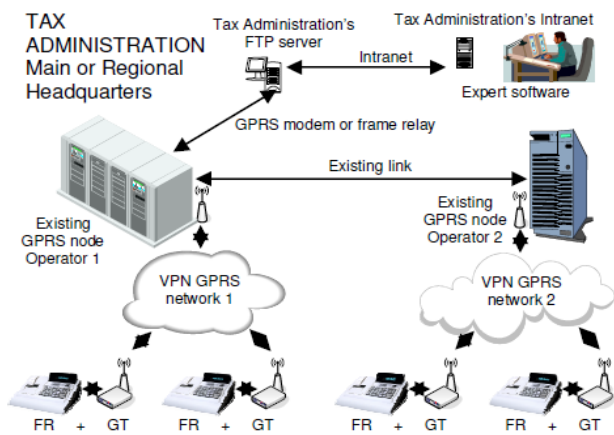


Fig -1: Fiscal register with GPRS terminal

2.4.4 Fiscal Registers With GPRS Terminals

Proper laws and principles stipulating the expansion of GPRS terminal to financial registers with the end goal to:

- Send day by day report information to TAS utilizing FTP convention;
- get recognized from TAS;
- perused order from TAS with time and date (or period) and in addition the sort of information it will send next time;
- Attempt correspondence another multiple times on that day, or 3 time on the following day if there should arise an occurrence of a mistake.

Monetary registers with GPRS terminals as indicated by business-running costs in examination with usage of monetary registers or non-financial registers, when all expenses are figured.

2.5. Improved Fiscal Devices without Additional Services

This proposes an enhanced or new monetary money registers and financial printers with enhanced existing or new inner or outer specialized gadgets without extra administrations, sending scrambled expense related data to a duty organization server. Monetary money registers and financial printers are like non-fiscal cash registers and non-financial printers, yet they have one key trademark that recognizes them: a monetary memory that records key expense information.

2.5.1 Improvement without Additional Services

A first enhanced existing or new financial money enroll or the financial printer including an enhanced existing or new inner specialized gadget (normally GPRS, WiFi, USB or Ethernet) without extra administrations is uncovered. The assess organization server speaks with the primary progressed existing or new monetary money enroll or financial printer utilizing cipher text (CT) going through the enhanced existing or new an inside specialized gadget, discretionary PCs, servers, switches, switches and media transmission administrator's hubs supporting discretionary VPN without decoding.

The principal enhanced existing or new monetary money enlists and monetary printers have the exchange (diary) memory at the fundamental motherboard. The second enhanced existing monetary money enroll and financial printers have the exchange (diary) memory at the extra printed circuit leading body of the new inward (or outer) specialized gadget.

The primary enhanced existing financial printer and the second enhanced existing financial printer are made JavaPOS good as unveiled. The rundown of printer related JavaPOS gadgets (striking) and regularly utilized JavaPOS gadgets area contains a list of less used JavaPOS supported devices. The requirements include Belt, Biometrics Bill Acceptor, Bill Dispenser, Bump Bar, Cash Changer, CAT - Credit Authorization Terminal, Check Scanner, Coin Acceptor, Electronic Value Reader / Writer, Gate, Hard Totals, Item Dispenser, Key lock, Lights, MICR - Magnetic Ink Character Recognition, Motion Sensor, Signature Capture, Tone Indicator.

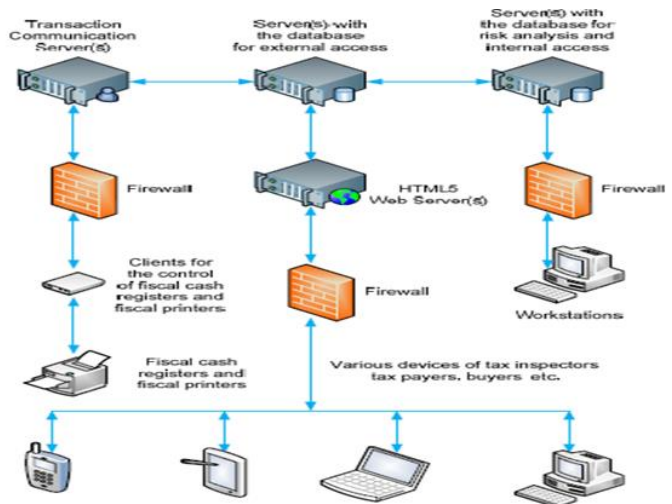


Fig -2: Tax administration server

The enhanced existing or new financial money registers and monetary printers satisfy every fundamental necessity, including information security amid both on-line (close constant and non ongoing) what's more, disconnected activities, and in addition cost adequacy. In this way, it is normal that they can have imperative job in diminishing the shadow economy, VAT hole and tax avoidance around the

world, and particularly in EU nations, since they are safe to the two deals concealment and duty critics.

2.6 Fostering the Advancement of Internet of Things

The imminent advantages of IoT to individual comfort, open security, productivity, and the earth are clear. IoT can possibly make our expressways more secure by empowering associated vehicles to communicate with one another to forestall mishances, to make quality medicinal services more open through remote observing gadgets and telehealth rehearses for the individuals who can't undoubtedly travel, and to lessen squander and enhance effectiveness both in industrial facility supply chains and in the running of urban communities. It even can possibly make new ventures and shopper merchandise that presently can't seem to be envisioned. For the maximum capacity to be acknowledged, be that as it may, the vital framework and arrangements must be set up, including methodologies to react to the difficulties brought up in territories, for example, cybersecurity and security.

▪The Department will lead efforts to ensure the IoT environment is **inclusive and widely accessible** to consumers, workers, and businesses.

▪The Department will recommend policy and take action to support a **stable, secure, and trustworthy** IoT environment.

▪The Department will advocate for and defend a **globally connected, open, and interoperable** IoT environment built upon industry-driven, consensus-based standards.

▪The Department will encourage IoT **growth and innovation** by encouraging expanding markets and reducing barriers to entry, and by convening stakeholders to address public policy challenges.

2.6.1 Crafting Balanced Policy and Building Coalitions

Analysts point by point a few discrete arrangement zones that will require composed commitment by all partners – government, common society, the scholarly world, the specialized network, and the private division, all inclusive and locally – to guarantee forward-looking, versatile, and adjusted strategy that encourages advancement while tending to dangers and difficulties.

In the mean time, the normal universality of and reliance on IoT amplifies the security hazard on every space, regardless of whether it is the power framework, our cars, or youngsters' toys. The disseminated forswearing of administration (DDOS) assault in October 2016 on a Domain Name Service (DNS) supplier's query benefit that utilized a multitude of IoT gadgets secured just by industrial facility default passwords is a case of how Internet-associated gadgets have changed the cybersecurity environment.¹⁰⁷ The occurrence was the most noticeable and extensive case of the potential dangers that must be alleviated while

thinking about IoT. The dangers for IoT frameworks that help the economy's mechanical divisions are significantly all the more difficult, as indicated by IBM. Modern gadgets are associated with the Internet to consider more extensive perceivability, control, and support, yet these gadgets can likewise end up potential assault targets.

2.6.1.1 Need for Flexible, Risk-based Solutions

Dangers and vulnerabilities are always advancing. Predefined arrangements rapidly turned out to be outdated or even furnish awful performing artists with a guide for assault, the U.S. Council of Commerce noted.¹¹² Many analysts expressed that controllers must permit engineers the adaptability to make forefront upgrades to guard their items and benefits and secure their users.¹¹³ Overly prescriptive directions could hinder partners' capacities to react to consistently evolving dangers, AT&T commented.¹¹⁴ Cisco expressed that legislatures should work inside existing administrative structures, and spotlight on result arranged ways to deal with oversee recently distinguished dangers related with the utilization of specific innovations, rather than managing the basic technologies.

2.6.1.2 Security by Design

While numerous analysts grasped this idea, there is no unmistakable accord or direct way on the most proficient method to actualize such an idea over the wide IoT space. The product business has spent numerous years creating instruments, procedures, and norms for coordinating security into the advancement lifecycle. These range from methodologies created by particular organizations to those created by open norms organizations.¹³⁷ The Information Technology Industry Council recommends beginning at the equipment level with implicit safeguards.¹³⁸ Other systems for working in security incorporate considering validation apparatuses, utilizing present day, very much tried programming bundles, and having a total testing convention set up. Architects, designers, and integrators must comprehend security from an underlying stage. Further apparatuses to engage less demanding security basic leadership might be important as IoT develops.

The last obstacle to security-by-plan is the test of how to convey the viability of security practices to clients, significant controllers, and people in general. This issue isn't extraordinary to IoT, yet is important to cultivate open trust and market rewards for security speculation.

2.6.1.4 Privacy

Potential protection concerns emerging from the utilization of IoT gadgets were second just to cybersecurity in number of remarks got. While plainly buyer trust is fundamental to the development of IoT, ¹⁵⁵ and that guaranteeing the security of clients is a key part of building that trust, analysts were separated on whether IoT presents novel protection challenges and on the proper reaction to these difficulties. Obviously associated gadgets are not all equivalent in their

relative impacts on protection. As per some analysts, mechanical, agrarian, and other non-customer confronting employments of IoT for the most part would not likely gather data that could be considered actually identifiable information. There is likewise a threat in making too much "area particular" administrative prerequisites.

2.7. GPRS Terminals for Reading Fiscal Registers at Toll Gates

Information security in non-monetary money registers and non-financial printers is negligible. Be that as it may, information security in monetary money registers and financial printers is likewise not attractive. This depicts turnover control gadgets dependent on GPRS terminals for sending information from financial electronic money registers and monetary printers to the server of Tax Administration with the end goal to avoid tax avoidance, preoccupation of unique merchandise from the dissemination framework and invasion of duplicated or unique products into the conveyance framework without instalment of traditions, duty and extract obligations. The correlation with customary financial money registers and non-monetary money registers is given.

2.7.1 Board Hardware Resources Features

2.7.1.1 RFID

Numerous kinds of RFID exist, however at the most abnormal amount, RFID gadgets can be isolated into two classes dynamic and passive. Active labels require a power source i.e., they are either associated with a controlled framework or utilize vitality put away in a coordinated battery. In the last case, a label's lifetime is constrained by the put away vitality, adjusted against the quantity of perused activities the gadget must experience. Nonetheless, batteries make the cost, size, and lifetime of dynamic labels unreasonable for the retail exchange.

7.1.2 GPRS

GPRS (General Packet Radio Service) is a packet-based data bearer service for wireless communication services that is delivered as a network overlay for GSM, CDMA and TDMA (ANSI-136) networks. GPRS applies a packet radio principle to transfer user data packets in an efficient way between GSM mobile stations and external packet data networks. Packet switching is where data is split into packets that are transmitted separately and then reassembled at the receiving end. GPRS supports the world's leading packet-based Internet communication protocols, Internet protocol (IP) and X.25, a protocol that is used mainly in Europe. GPRS enables any existing IP or X.25 application to operate over a GSM cellular connection. Cellular networks with GPRS capabilities are wireless extensions of the Internet and X.25 networks.

2.8 How does Blockchain used in fiscal Cash Register

Blockchain is the fundamental innovation whose primary basic objective is extremely like a working framework introduced on any PC. The essential term for seeing how a Blockchain functions is getting a handle on the meaning of what P2P, or Shared systems are. P2P alludes to PC organizes that utilization scattered what's more, appropriated engineering, implying that all PCs and gadgets have a certain share in the system. Every gadget (alluded to as a companion) is equivalent to different associates, and no focal chairman of the system exists. As a rule, this implies each asset also, information accessible in a P2P arrange is shared between associates, skirting the need for a focal server. The primary objective of this organize is to empower for the PCs and gadgets inside to work cooperatively. Peer to-Peer systems are most regularly utilized for sharing different documents on the web, enabling the associates in the system to get also, send records all the while.

2.8.1 How does block chain works

A Blockchain is a record of data that is recreated over PCs that are participated in a Peer-to Peer arrange. As specified previously, Blockchain isn't Bit coin, so the data put away isn't really cash or cash, yet may likewise be an assortment of other information types too. The correspondence inside the system utilizes cryptography to give secure ID of who sends the data and who gets it. At the point when a companion needs to include a bit of information to the record, different associates must affirm the accuracy of the data, which is added to a square. Each square contains a one of a kind hash (going about as a computerized unique finger impression) of the past square, connecting them together to make a chain of squares. The innovation kills the need of centralization through a mediator, enabling gatherings to share data what's more, execute specifically with one another in a safe way. In addition, utilizing Blockchain innovation takes into account finish unchanging nature of the record, as adjusting the data put away on a square isn't conceivable without modifying its hash.

2.8.2 Blockchain Implications for Tax

Blockchain has the ability to disturb and firmly redesign bookkeeping and the way assess instalments are prepared. As the innovation is still in its earliest stages, presenting Blockchain to the expense experts would require an unrest in both legislative databases and system frameworks. The compelling usage of Blockchain for expenses isn't just constrained to this region what's more, requires thinking about each territory of legislative movement. Asides from coordinating IT frameworks on numerous dimensions, plainly actualizing Blockchain would likewise require extensive changes to the lawful framework, changing laws on databases, licensed innovation and lawful personality. In any case, the advantages of Blockchain innovation on an administrative level are difficult to disregard. In the long run, Blockchain can be a driving variable in actualizing

continuous, mechanized charge forms for both little and substantial ventures.

2.8.3 Pay Roll of Tax

In the dominant part of created nations, matters identified with finance are for the most part digitalized. In any case, the frameworks for finance charges have a critical defect: there are numerous administration establishments included and every one holds their own enlist, true copying information held by different organizations. Actualizing a Blockchain - based to a circumstance where businesses won't require to go about as middle people, in charge of computing and exchanging expense and social security instalments from representative pay rates to significant foundations. This can be done for example by embedding smart contracts that fully automate the process, which could be done in the following steps:

1. The employer inserts the gross amount of salary into the system.
2. Within the Blockchain system (limited only to the tax administration, banks and the other necessary parties), tax data is matched with the payment by smart contract technology and calculates the correct tax and social security amounts.
3. The net salary is automatically transferred to the employee's account and the calculated tax to the government.
4. As a result, the payroll tax process is faster and less costly and cash-flow is more efficient.

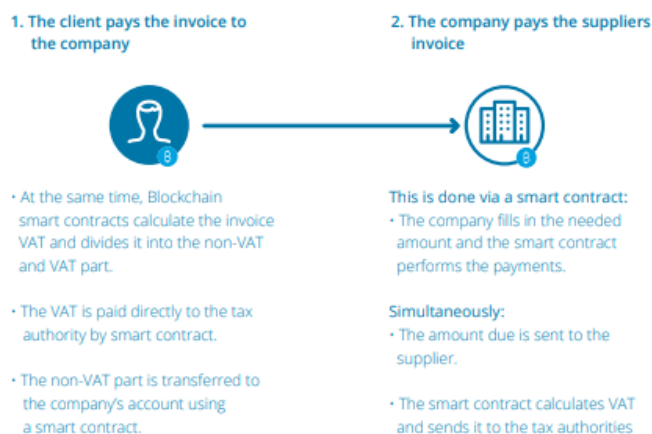


Fig -3: VAT processed using block chain

3. CONCLUSION

The advancement of Blockchain is still at early stage and numerous issues have yet to be settled. It is an undisputable reality that eight years after the presentation of Bit coin, digital forms of money remain the sole case of a typical Blockchain framework. The fundamental issues Blockchain still can't seem to defeat are the multifaceted nature of the framework what's more, a lacking number of IT masters with the capacity to make a business Blockchain. In addition, as regular Blockchain innovation is utilized in digital

currencies, the issue of exchanging it onto a more complex framework, i.e. charges, is as yet a work in advancement. Innovation improvement is a progressing procedure, and progressive innovations like the Internet would not be what they are today without significant improvement and conceptualizing. All things considered, Blockchain is now demonstrating numerous benefits and keeping in mind that the fundamental promotion and buzz is thought around budgetary administrations also, saving money, in quite a while point of view it is additionally encouraging in the realm of tax assessment.

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BIOGRAPHIES

Bobby K Simon, He is currently pursuing his Masters degree in Computer Science and Engineering in Sree Buddha College Of Engineering, Kerala ,India. His area of interest include Security, Network and Data Mining.

Anjana P Nair, She is an Assistant Professor in the Department of Computer Science and Engineering, Sree Buddha College Of Engineering. Her main area of interest is Core Computers and published more than 10 referred papers.