International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 07 Issue: 04 | Apr 2020 www.irjet.net p-ISSN: 2395-0072

Precise and Efficient Processing of Data in Permissioned Blockchain

Damaraju S Sailendra[1], Sumeet Ranjan Parida[2], Addanki Venkata Naga Sashank[3], K. Meenakshi[4]

[1]Student, Dept. of CSE, SRM Institute of Science & Technology, Tamil Nadu, India
[2]Student, Dept. of CSE, SRM Institute of Science & Technology, Tamil Nadu, India
[3]Student, Dept. of CSE, SRM Institute of Science & Technology, Tamil Nadu, India
[4]Asst.Professor, Dept. of CSE, SRM Institute of Science & Technology, Tamil Nadu, India

---

Abstract - *A blockchain, is a growing list of records, called blocks, that are linked using cryptography. Each block contains a cryptographic hash of the previous block, a timestamp, and transaction data (generally represented as a Merkle tree). Using blockchain in the claiming process of insurance the blockchain would help to obtain efficient gains, cost saving, transparency, faster pay-outs, and fraud mitigation while allowing for data to be shared in real-time without data being compromised. In this paper, we propose a Hyperledger based Blockchain Insurance Framework for Insurance Claiming and Adjudication for purchased goods that involves participation of multiple organizational peers. PEPD-PB uses Hyperledger fabric and also instantiates the smart contract for processing data and claiming insurance contract.*

***Key Words*: Blockchain, Hyperledger, Insurance**

1. INTRODUCTION

Hyperledger Fabric is a "permissioned" blockchain architecture, providing a consistent distributed ledger, shared by a set of "peers". As with every blockchain architecture, the core principle of Hyperledger Fabric is that all the peers must have the same view of the shared ledger, making it challenging to support private data for the different peers [12]. Block chain is a distributed ledger involving network nodes, which records executable transactions between nodes. Information integrated in the blockchain cannot be modified or erased. Smart contracts are saved on blockchain which are directly written into lines of code. The objective of this paper is to help companies operate in the insurance sector to an overview of blockchain based use cases in such specific sector, and by highlighting strengths, weaknesses, opportunities and threats for this technology. Insurance claim processing supports traditional cloud platform for data integrity & confidentiality.

2. OBJECTIVE

The objective of this project is to design a blockchain based insurance use case to offer different set of endorsers for each smart contract. Insurance policies have different set of endorsers, which is replicated by creating different smart contracts for different policies. We implemented insurance blockchain framework based on Hyperledger fabric. We have conducted experiments by scaling up the network to test the robustness of the system.

3. LITERATURE SURVEY

There are several use cases of blockchain technology in the vehicle industry. We have presented the variety, benefits, and issues of these solutions in a survey format in order to understand the industry as well as the blockchain adoption [3]. Blockchain technology facilitates better service where all participants need a transparent and accessible environment to share information. When a blockchain has the record, its tamper-free feature protects all parties. Insurance companies, individuals or any other third party cannot change the records once recorded. Since the records in a blockchain are persistent indefinitely, this system can be a perfect driving history to be used for years to come. Individuals can present their public keys or signature to a new insurance company to get better discounts. Young driver programs may consider the ledger to prove the maturity of the driver. Driver's license renewal can consider this history. It can be transferable between states to aid license exchange in case the owner moves to another state. In further cases, the records can assist the court in cases related to the behavior pattern of the drivers. The same blockchain can be used to record alcohol levels of the driver with proper accessories provided. A further use-case would be recording full event logs including details like breaking and signaling behavior for further analysis. We believe all these new features can be developed on top of our current implementation of the insurance record blockchain.

4. EXISTING SYSTEM

In existing system, Insurance claim processing supports traditional cloud platform for data integrity & confidentiality. Existing system is a manual, long and time taking process as it involves participation of multiple organizations in processing insurance claims. This results to delay in processing as the status has to be checked by each organization involved. During this process, data can be erased, modified or stolen.

5. PROPOSED SYSTEM

In proposed system, we propose an effective and flexible insurance claim processing scheme involving multiple organizations in the permissioned blockchain network based on Hyperledger. In proposed system, we are implementing smart contracts in order to ensure the claims are stored into the blocks of the network. Each claim is stored into the block containing transactions in the blockchain network. Shop

peer utilizes the insurance contracts created by Insurance peer for the products to be purchased by Ordered peer. Ordered peer can purchase the product in order to claim insurance based on the contract. This results in time saving and also data cannot be modified or erased.

6. COMPARISON BETWEEN EXISTING AND PROPOSED SYSTEM

In existing system, there is no mechanism to audit the data and it requires multiple cloud platforms to fetch status from each organization to process insurance claims. This results in claim delays and also no proper mechanism to secure the data from being erased or modified. But in proposed system, one network is sufficient to involve all the peers in the system to fetch status in order to process claims. This results in time-saving and data cannot be modified or erased.

7. SYSTEM ARCHITECTURE

A. System Architecture Diagram

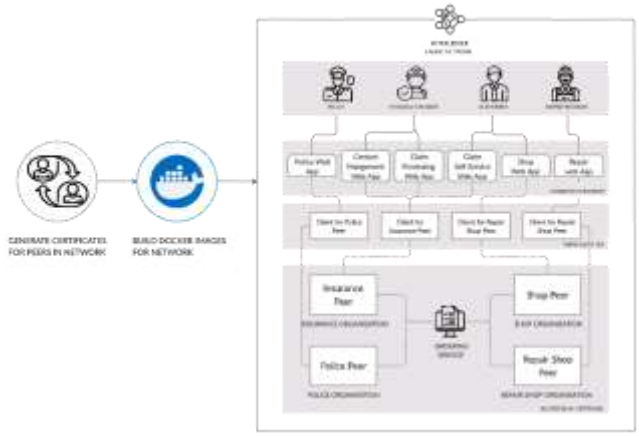

Fig -1: System Architecture

8. MODULES

a) *Authentication*

b) *Inventory Management*

c) *Process Validation*

d) *Verification*

A. Authentication

Customers register themselves using the form with all the required credentials and login using the mail id and password that is auto-generated.

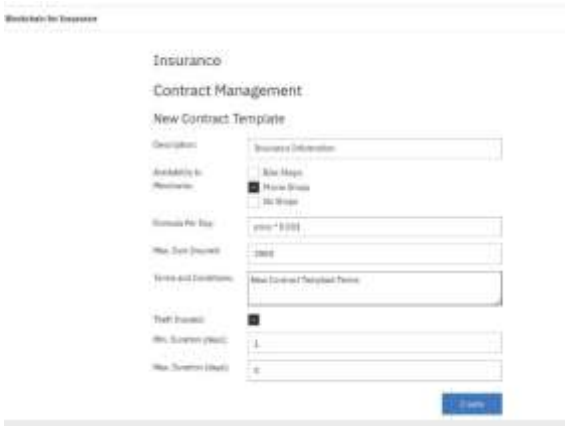

Fig 2.1: Registry

Fig 2.2: Authentication

B. Inventory Management

Inventory module is used to register the product under insurance schemes that vary with their benefits.

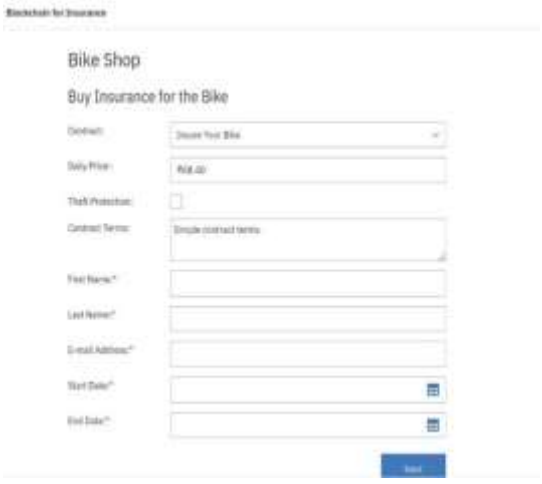

Fig 2.3: Inventory

Fig 2.4: Claim

C. Process Validation

The insurance company has the access to process the requests/claims that are raised by the customers.

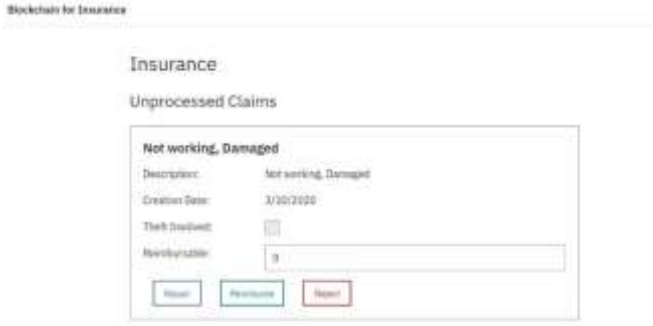

Fig 2.5: Process Status

D. Verification

In case of theft the verification is done by police and then the process is carried over by the insurance company.

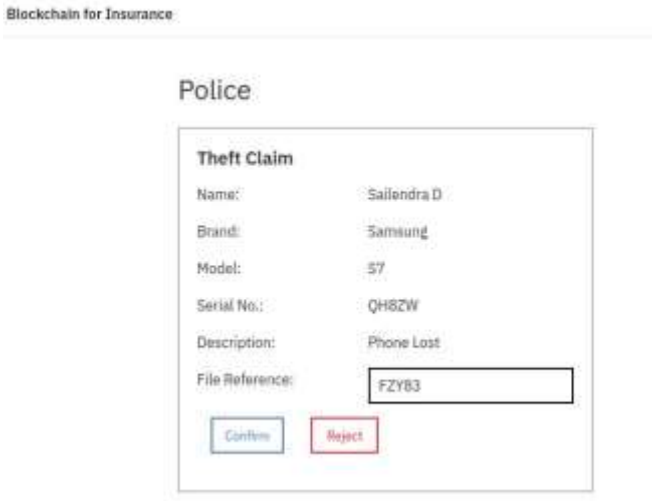

Fig 2.6: Verification

Fetch Claims: Ordered inputs the Username & Key that is generated. This checks for the contract that is instantiated & it matches the ordered Username with the Claim Index Value to show the results of claims that ordered has initiated.

If Inputted Username > 0 then

Claims checks for Contract Claims

& then ClaimIndex = Username (String) & It generated the Claims initiated by ordered else it generates as "Error: No Claim Found"

```
if len(input.Username) > 0 {

result.Claims, err = result.Contract.Claims(stub)

if err != nil {

return shim.Error(err.Error())

}

}

result.ClaimIndex = []string{} // Remove internal data

results = append(results, result)

}
```

Claim Status Check: When the Claims are Fetched with the above algorithm then the below algorithm is used to fetch the status of the listed claims. List Claims instantiates access response from Insurance Peer Chaincode to provide the result of Status of each listed Claim.

Function listClaims is instantiated to Chaincode of InsurancePeer (Recording the Response)

Checks Arguments > 0 then Updates the Claim Status based on the Response given by Insurance Peer {status = Accepted / Rejected}.

Else if there are no Claims present then it displays "Error: No Claim Found"

```
func listClaims(stub shim.ChaincodeStubInterface, args []string) pb.Response {

var status ClaimStatus

if len(args) > 0 {

input := struct {

Status ClaimStatus `json:"status"`

}{}

err := json.Unmarshal([]byte(args[0]), &input)

if err != nil {

return shim.Error(err.Error())

}
```

```
status = input.Status

}
```

9. CONCLUSION

The process such as integrity & confidentiality of the data stored in blockchain can be maintained using the Hyperledger platform which is a private ledger that gives access to those registered only. Unlike the public platform the security of the data owner is not compromised. If any modifications are initiated on the data. Hyperledger wouldn't allow the organization/person to do so, unless until given access rights. Smart contracts not only validate transactions but also makes the transaction process efficient and hustle free.

ACKNOWLEDGEMENT

We would like to express our gratitude to our guide, Mrs. Meenakshi, who guided us throughout this project. We would also like to thank our friends and family who supported us and offered deep insight into the study. We wish to acknowledge the help provided by the technical and support staff in the Computer Science department of SRM Institute of Science and Technology. We would also like to show our deep appreciation to our supervisors who helped us to finalize our project.

REFERENCES

[1] DYang Yang, Hongrui Lin, Ximeng Liu, Wenzhong Guo, Xianghan Zheng and Zhiquan Liu**,** Blockchain-Based Verifiable Multi-Keyword Ranked Search on Encrypted Cloud with Fair Payment," 24 Septembe, 2019.

[2] Zhiguo Wan, Zhangshuang Guan and Xiuzhen Cheng, PRIDE: A Private and Decentralized Usage-Based Insurance Using Blockchain", 03 June 2019.

[3] Mehmet Demir, Ozgur Turetken, PhD and Alexander Ferworn, PhD, Blockchain Based Transparent Vehicle Insurance Management," 25 July 2019.

[4] C. Oham, R. Jurdak, S. S. Kanhere, A. Dorri and S. Jha, "B-FICA: BlockChain based Framework for Auto-insurance Claim and Adjudication," 16 June 2018.

[5] C. Troncoso, G. Danezis, E. Kosta, J. Balasch, and B. Preneel, "Pripayd: Privacy-friendly pay-as-you-drive insurance," IEEE Transactions on Dependable and Secure Computing, vol. 8, pp. 742–755, September 2011.

[6] C. Oham, R. Jurdak, S. S. Kanhere, A. Dorri and S. Jha, "B-FICA: BlockChain based Framework for Auto-insurance Claim and Adjudication," 16 June 2018. [Online]. Available: https://arxiv.org/abs/1806.06169.

[7] "Criminal Penalties for Using Fake Proof of Insurance," 14 June 2013. [Online]. Available: https://www.carsdirect.com/carinsurance/criminal-penalties-for-using-fake-proof-of-insurance.

[8] T. McConaghy, R. Marques, A. Mu¨ller, D. D. Jonghe, T. McConaghy, G. McMullen, R. Henderson, S. Bellemare and A. Granzotto, "BigchainDB: A Scalable Blockchain Database," [Online]. Available: https://mycourses.aalto.fi/pluginfile.php/378362/mod_resource/conten t/1/bigchaindb-whitepaper.pdf. [Accessed 10 November 2018].

[9] Chinmay Saraf, Siddharth Sabadra, "Blockchain Platforms: A Compendium," 11-12 May 2018, IEEE International Conference on Innovative Research and Development (ICIRD).

[10] M. Hearn, "Corda: A distributed ledger," November 29, 2016

[11] V. Q. Pierre-Louis Aublin Sonia Ben Mokhtar, "Rbft: Redundant byzantine fault tolerance," 2013.

[12] F. Benhamouda, S. Halevi, and T. Halevi. Supporting private data on Hyperledger Fabric with secure multiparty computation. https://shaih. github.io/pubs/bhh18.html, 2018.

[13] Welcome to Hyperledger Fabric. https://hyperledger-fabric.readthedocs. io/, accessed Jan 2018.

[14] L. Mearian. What is blockchain? the most disruptive tech in decades. Computerworld,Dec,2017 https://www.computerworld.com/article/3191077/security/ what-is-blockchain-the-most-disruptive-tech-in-decades.html, 2017.

[15] S. Nakamoto. Bitcoin: A peer-to-peer electronic cash system. https: //bitcoin.org/bitcoin.pdf, 2008.

[16] Mayank Raikwar, Subhra Mazumdar, Sushmita Ruj, Sourav Sen Gupta, Anupam Chattopadhyay, and Kwok-Yan Lam, "A Blockchain Framework for Insurance Processes," 2018.

[17] Cachin and Christian, "Architecture of the hyperledger blockchain fabric," 2016.

[18] J. Sousa, A. Bessani and M. Vukolie, "A Byzantine Fault-Tolerant Ordering Service for the Hyperledger Fabric Blockchain Platform," 2018.

[19] Michael Abramowicz, "Blockchain – based insurance, in blockvhain and the constitution of a new financial order; Legal and political challenges." (paper.ssm.com/sol3/papers.cfm?abstract_id=3366603, 2019

[20] M. Vukolic, "The quest for scalable blockchain fabric: Proof-of-work ´ vs. BFT replication," in Open Problems in Network Security - IFIP WG 11.4 International Workshop, Zurich, Switzerland, 2015

[21]] V. Buterin, "Ethereum platform review: Opportunities and challenges for private and consortium blockchains," 2016. [Online]. Available: http://r3cev.com