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Proposal of Blockchain framework for Automated Insurance Claim

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Abstract:

In today's digital world security and real time transaction are very important need. These needs will be fulfilled by Blockchain solutions. The aim of this paper is to provide blockchain solution for automatic insurance claim processing in secure way. Purposed blockchain framework gives the overall details of channel artifacts, types of peer node which will participate in blockchain network, and network architecture for car theft insurance, health insurance, crop insurance and life insurance.

Keywords: *Blockchain, Insurance, Smart Contract*

I. INTRODUCTION:

At the time of claim processing insurance client have to follow all the steps and also have to provide required documents, in short it is document driven process which takes lot of time and effort. Smart contract and blockchain go hand in hand technologies which work in distributed environment. Automatic claim processing will be achieved by smart contracts, these are nothing but small programs which will triggers out on satisfaction of some specific conditions. To provide security in untrusted environment these smart contracts are written on top of the blockchain. Blockchain is chain of blocks which are linked by hash value of previous and next block because of this no one can alter the data in any block, as it will break the chain, fails to achieve the consensus. Here block is piece of data which will be created only after creation of new data. The purposed Blockchain framework in this paper provides solution for crop insurance, life insurance, health insurance, car theft insurance as

these are the mostly purchased and needy insurance policies at this time.

II. LITERATURE REVIEW:

Fraud detection and prevention, providing automated assistance, actuarial science, building risk predicting model and enhancing claim processing these are some areas where researchers are interested in improving insurance industry [1]. Implementing blockchain technology for insurance is very difficult as it is in its infancy stage, and there is lack of papers which will provide technical details which will help in further research [2].

IOT based on demand car insurance is purposed in [3]. Which collects information about car location and its movement by specific hardware and web app installed on client side for minimizing fraud. Integrating AI with blockchain will provide Fraud Detection and Risk Measurement for automated insurance. SISBAR [4] is framework which predicts customers future behaviour and their future claims amount. Which will decrease claim refund losses and improve the performance. Etherisc is words first decentralized insurance for flight delay [5], the insurance client must purchase flight delay insurance and submit his geographical location, information about reserved flight and date of departure. If flight will be delayed pay-outs will done automatically depending on GPS location of flight.

Estonia is foremost country in development of blockchain solution for government. Bike Id, Black Insurance, Cachet, Crowd sure, Inzmo, Ignite etc. some Fintech companies which uses blockchain solution for insurance domain [7].

III. DESIGN OF PURPOSED BLOCKCHAIN FRAMEWORK:

The main participants in blockchain network for claim processing are, insurance peer, client peers and validating node. Depending on type of insurance policy one or more number of participant nodes are required. As in crop insurance node which collects whether information based on GPS location, police node in car theft, hospital node in health insurance, and death registry node in life insurance acts as participant. These nodes are considered as other entities in Figure 1.

Figure 1 shows the Blockchain architecture for insurance claim processing. For participating blockchain network, all peers have to register. Then as per the access control permissions participants can make transactions. These transactions are stored in blockchain only after validation process. All the transaction record are stored in state database, Couch DB in our case. The particular state of transaction is responsible for firing claim.

Claim will be fired when transaction record reaches at particular state. Smart contracts in this case are code for fine grain transaction processing, which have to bedeployed on blockchain network.

In this way claim processing will be automated with secure blockchain network in real time.

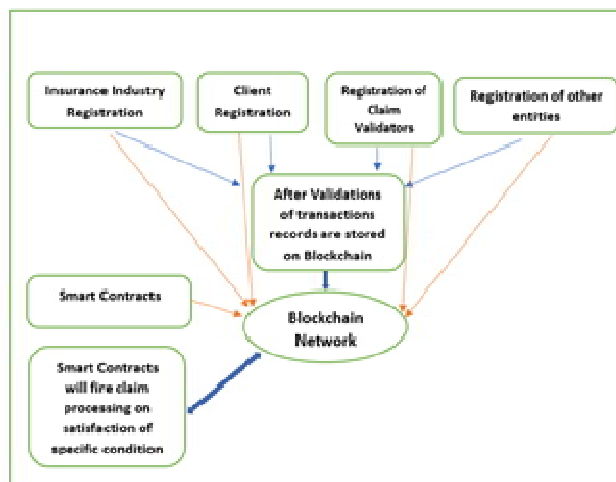


Figure. 1 Blockchain Architecture for Claim Processing

A. Crop insurance:

According to purposed framework the crop insurance claim will be fired if whether information of specific location will be crossed some predefined threshold value. Insurance client does not have to fill any form and submit it to insurance company, not have to keep and provide proof and all required documents for claim processing. Claim will be approved after the validation process.

B. Car Theft Insurance:

In car theft insurance, an insurance client first has to report FIR online for car theft. claim will be fired when police peer node verifies and gives approval for car theft insurance. The insurance client does not have to wait for longer period of time.

C. Health Insurance:

Health care insurance will be automatically fired after the data entered or approved by hospital peer node.

D. Life Insurance:

When authorized peer in death registry changes the life status as dead, specific notification will be sent to validator peer for validation purpose. Validator verifies the cause of death. Depending on cause of death, validating node make status as valid or invalid. claim will be fired if cause of death is valid.

IV. METHODOLOGY FOR IMPLEMENTING PURPOSED BLOCKCHAIN FRAMEWORK:

Implementation details of purposed Blockchain framework is based on Hyperledger Fabric [6]. Hyperledger fabric is project led by IBM under the Linux Foundation. Hyperledger fabric is open-source platform for developing private blockchain.

Process of claim firing is state based. The state diagram is shown in figure 2. When client purchase any insurance policy it is in purchased state, after this state a client has to pay premium

regularly while any claim satisfying event will not be happened. State will be transit from purchased to claim processing state when any certain event occur for which client have purchased insurance policy. Validating node when gives approval as valid the claim processing state will be transit to valid state, and claim will be fired.

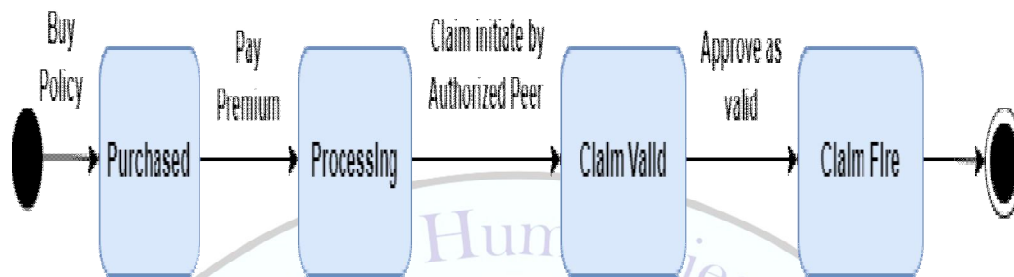


Figure 2 State Diagram of Purposed Claim firing process

V. IMPLEMENTATION OF PURPOSED BLOCKCHAIN FRAMEWORK:

Purposed blockchain network composed of two main organizations as insurance and validator. death registry, police, weather Reader, hospital are included in other organizations. Each organization has one certificate authority, and two peers as peer 0 and peer 1 as shown in Figure 3. For ordering mechanism raft ordering with three nodes and one certificate authority is used.

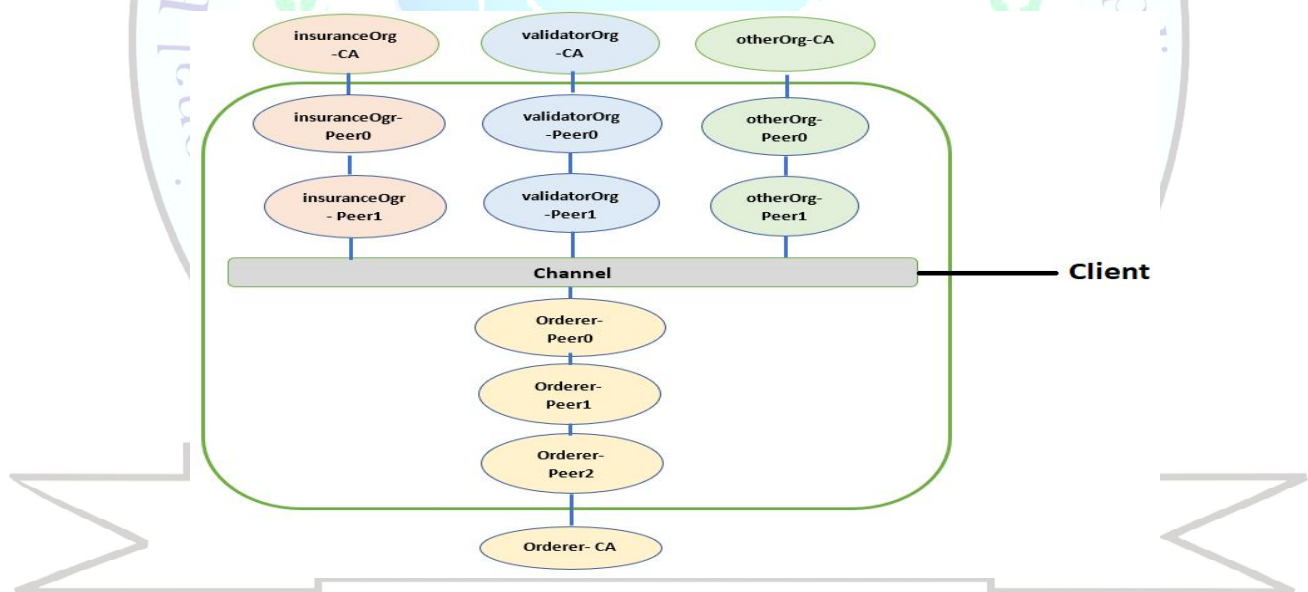


Figure 3 Fabric network with participating organizations and orderers

For implementing purposed blockchain solution we have to follow steps given below.

1. creating channel artifacts as shown in Figure 3.
2. Create channel.
3. Write Chaincode.
4. deploy Chaincode on channel.
5. create API interface to interact with channel and Chaincode.

6. interact blockchain framework through Nodejs app.

these steps clears the idea about implementing purposed blockchain solution for automated insurance.

VI. CONCLUSIONS:

This paper purposes Blockchain framework for insurance. Purposed framework will fire insurance claim in real time, in highly secure environment, no need to submit any documents as the reason of proof, also cuts the cost overhead of intermediate agents. This paper discusses the blockchain enabled insurance use cases for crop insurance, health insurance, car theft insurance and life insurance. but it will be extended for other insurance policies also. This paper is helpful for other researchers for implementing other use case scenarios in insurance industry also in other state-based enterprise applications.

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