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INSURANCE CLAIMS PERFORMANCE IMPROVEMENT USING BLOCKCHAIN

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Abstract- : In this work focused the application of blockchain technology in insurance claims. There are four parties involved in insurance claim process, the police, insurance, workshop, and retail shop. Additionally, every participant will have a peer node of their own. The insurance firm that insurances the products and handles claim handling is known as the insurance peer. It is the duty and responsibility of the police peer to confirm the theft allegations. While re peer offers the products to customers, repair shop peer is in charge of product repairs. Operating this network on the IBM (International Business Machines) Blockchain Platform has the advantage of allowing you to easily alter the network infrastructure as needed. This includes changing the nodes' locations, the hardware's CPU (Central processing unit) and RAM (Random access memory), the endorsement policy required to reach consensus, and the ease with which new organizations and members can be added to the network.

1. *INTRODUCTION:*

In the world of handling insurance claims, things are changing faster with blockchain technology. Our project is all about showing how we the integration of blockchain technology emerges as a transformative force. This project represents a pioneering endeavor, spotlighting the convergence of blockchain within the insurance domain specifically geared towards streamlining claim processing. At its core, this innovative application brings together four pivotal participants: the insurance provider, law enforcement represented by the police, repair services offered by designated repair shops, and the pivotal retail entity, the shop.

Each participant operates as an autonomous node within the blockchain network, contributing to a cohesive ecosystem aimed at enhancing the efficiency and transparency of the insurance claims process. The Each participant operates as an autonomous node within the blockchain network, contributing to a cohesive ecosystem aimed at enhancing the efficiency and transparency of the insurance claims process. The insurance peer, serving as the central orchestrator, holds the reins in managing both insurance policies and the intricate web of claim adjudication. This collaborative framework, bolstered by the robust capabilities of the IBM Blockchain Platform, offers unparalleled flexibility in tailoring the network infrastructure to suit dynamic requirements.

Amidst this landscape of digital transformation, envision a future where traditional barriers and inefficiencies in insurance claims processing are dismantled. With the police scrutinizing theft claims, the shop dispensing products, and the repair shop seamlessly rectifying damages, this blockchain-powered system not only fortifies security and clarity but also offers a tantalizing glimpse into an era where insurance operations transcend conventional boundaries.

Embarking on this journey, our project is poised to delve deep into the ramifications of this paradigm shift, elucidating how blockchain technology holds the promise to revolutionize the insurance industry's modus operandi. Through meticulous exploration and practical demonstrations, we aim to unravel the intricate tapestry of possibilities inherent in this cutting-edge approach to insurance claims processing. Join us as we navigate the contours of this transformative landscape, envisaging a future where insurance operations are redefined by the seamless integration of blockchain technology.

2. *LITERATURE SURVEY:*

The cited works offer a multifaceted exploration of blockchain technology and its applications across different sectors. Berryhill et al. (2018) collaborate to provide a comprehensive guide on blockchain's integration into the public sector, aiming to address

concerns regarding its technical complexity and security while empowering government officials to make informed decisions. Bourgeon and Picard (2020) delve into the role of insurance law in mitigating moral hazard, emphasizing the importance of aligning incentives through costly audits to promote fair and effective insurance practices. Boyle et al. (2021) focus on the implications of blockchain technology in the development of peer-to-peer insurance models, highlighting collaborative resource pooling for mutual aid and the need for a comprehensive analysis from both technological and product perspectives. Gatteschi et al. (2018) caution against premature adoption of blockchain in insurance, advocating for a balanced evaluation of its fundamentals, pros, and cons to navigate the decision-making process, particularly for insurers, within the context of potential risks and broader applicability across domains. Gencer et al. (2018) contribute to the discourse by examining the decentralization metrics of leading cryptocurrencies Bitcoin and Ethereum, offering insights into their network robustness and protocol requirements, with actionable insights for enhancing their respective properties. Finally, Krichen et al. (2022) provide a comprehensive survey of blockchain applications across various fields, highlighting challenges and opportunities for optimal utilization beyond its origins in cryptocurrencies like Bitcoin, spanning finance, healthcare, IoT, and more. Together, these works contribute to a nuanced understanding of blockchain technology's evolving role and its potential impact on various sectors, underscoring the importance of informed decision-making and alignment of incentives for its effective integration.

3. *OBJECTIVE*

Our project aims to show how using blockchain can make insurance claims easier and more secure. By setting up a special network with the police, insurance, repair shop, and store, we want to make the whole process smoother. We'll use the IBM Blockchain Platform to make it flexible and easy to change. Our Aim is to prove that this new way can make insurance work better for everyone involved, making things more easy.

4. *EXISTING SYSTEM:*

Our project is a tangible demonstration of the practical application of blockchain technology within the domain of insurance claims processing. The framework involves the active participation of four key parties, each playing a distinct role: the police, insurance provider, repair shop, and the retail establishment. Furthermore, every participant in this system is equipped with an individual peer node tailored to their specific function. The insurance entity, responsible for both insuring the products and overseeing claim procedures, is denoted as the insurance peer. The police peer assumes the critical role of verifying theft allegations, while the store peer facilitates product distribution to customers.

Simultaneously, the repair shop peer is entrusted with the responsibility of product repairs.A notable aspect of our project is the utilization of the IBM Blockchain Platform, providing a robust foundation for the network. Operating within this platform affords the project several advantages, primarily the flexibility to modify the network infrastructure as necessitated by evolving requirements. This adaptability encompasses alterations to the nodes' geographical locations, adjustments to the hardware specifications such as CPU and RAM, modifications to the endorsement policy necessary for achieving consensus, and the seamless incorporation of new organizations and members into the network. The distinctive roles and responsibilities assigned to each participant, coupled with the decentralized nature of the blockchain network, contribute to a more transparent and efficient insurance claims processing system.

The insurance peer ensures the integrity of the insurance process, the police peer acts as an impartial verifier, the store peer facilitates the distribution process, and the repair shop peer undertakes the crucial task of product repairs. By integrating blockchain technology into the insurance claims workflow, our project aims to enhance security, reduce fraud, and streamline the entire claims process. The peer nodes assigned to each participant further reinforce the decentralized and transparent nature of the network, fostering trust among the involved parties. As technology continues to evolve, the ability to easily modify and adapt the network infrastructure ensures that this blockchain-based insurance claims system remains resilient and responsive to emerging needs and challenges in the insurance industry.

❖ *PROBLEM OF EXISTING SYSTEM:*

Lack of Transparency Policyholders often have limited visibility into the status of their claims, leading to uncertainty and frustration. Inefficiency Manual paper work and document handling can result in slow and error processes, causing delays in claim settlements. High Administrative Costs: The need for extensive paperwork and personnel involvement increases administrative overhead for insurance companies.

5. *PROPOSED SYSTEM:*

The proposed system is a blockchain-based solution aimed at transforming the insurance claim processing workflow. It introduces decentralization, transparency, and efficiency into the process, with key features including a blockchain network hosted on the IBM Blockchain Platform, the use of smart contracts for automated claim validation and settlement, user-friendly interfaces for all stakeholders, decentralized identity management for secure access, immutable records for transparency and auditability, and customizable endorsement policies to ensure consensus among participants. This system offers advantages such as reduced fraud, enhanced collaboration among insurance companies, police departments, repair shops, and retail stores, and streamlined claim processing, making it a significant step toward modernizing and improving the efficiency and trustworthiness of insurance claim processing

❖ *ADVANTAGE OF PROPOSED SYSTEM:*

Enhanced Transparency: Blockchain ensures real- time access to claim data, reducing disputes. Fraud Prevention: Blockchain's security features minimize fraudulent claims. Efficient Automation: Smart contracts streamline processing, reducing time and costs. Blockchain technology revolutionizes the insurance domain by offering enhanced transparency, crucial for real-time access to claim data, thereby mitigating disputes through immutable records. Its inherent security features act as a bulwark against fraudulent claims, safeguarding the integrity of the entire process. Moreover, the utilization of smart contracts within the blockchain ecosystem automates and accelerates claim processing, significantly reducing both time and costs associated with traditional methods.

6. *SYSTEM ARCHITECTURE & FLOW CHART*

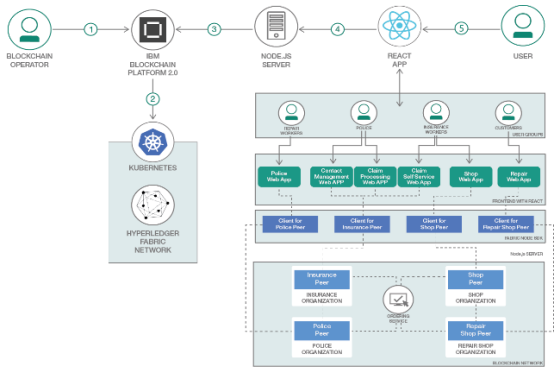

Fig:NO:1 Architecture Diagram

The deployment process initiates as the blockchain operator sets up an IBM Kubernetes Service cluster with specific specifications such as 32 CPU, 32 RAM, and 3 workers, alongside provisioning IBM Blockchain Platform 2.0. This platform is pivotal in establishing a Hyperledger Fabric network, a permissioned blockchain framework, within the Kubernetes environment, ensuring secure and efficient operations. The next step involves the installation and instantiation of smart contracts within the Fabric network by the operator, defining the logic governing transactions and interactions within the network. Concurrently, a Node.js application server is deployed to serve as an intermediary between the Fabric network and external systems, leveraging the Fabric SDK for seamless communication and integration. This application server acts as the backend infrastructure, facilitating the execution of business logic and the handling of transaction requests.

Meanwhile, a React UI is developed to provide a user-friendly interface, enabling users to interact with the underlying blockchain network via the Node.js application API. This frontend interface facilitates transaction submission, query execution, and ledger updates, enhancing user accessibility and experience. Through the React UI, users can initiate and monitor transactions, view real-time updates on the blockchain ledger, and retrieve relevant information as required. The integration of the React UI with the Node.js backend ensures smooth communication and data flow between the frontend and backend components, enabling seamless interaction with the underlying blockchain network.

As the React UI communicates with the Node.js application API, users gain access to the functionalities offered by the blockchain application, including transaction submission and query execution. Users can input relevant data, initiate transactions, and retrieve information from the blockchain ledger, thereby facilitating efficient data management and transaction processing. Overall, the end-to-end deployment process encompasses the provisioning of infrastructure, establishment of blockchain network, installation of smart contracts, deployment of backend and frontend components, and facilitation of user interaction, culminating in a comprehensive blockchain-based insurance application with robust functionality and user accessibility.

7. *IMPLEMENTION:*

fig:no:2: home page

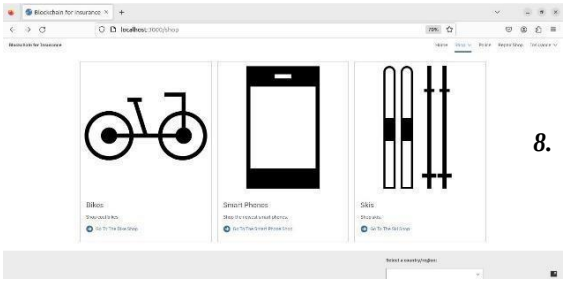

fig:no:3: shop

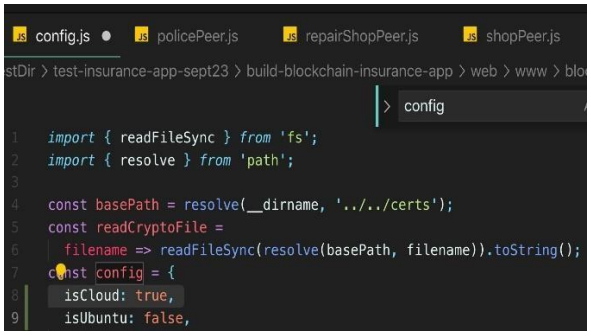

fig:no:4: is cloud

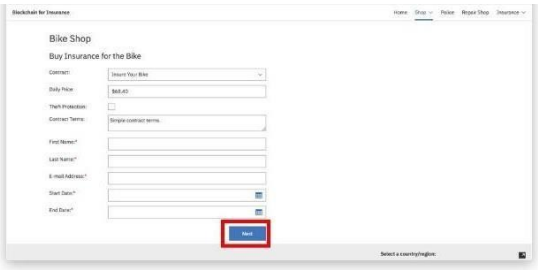

Fig:No:5: product insurance

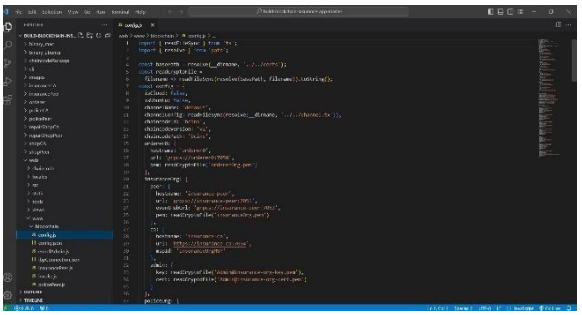

Fig:No:6: blockchain config

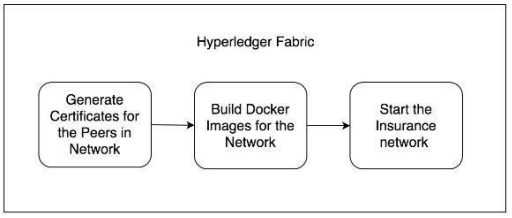

Fig:No:7: workflow

8. *MODULES:*

INSURANCE COMPANY PEER: Represents the insurance company within the blockchain network, responsible for managing policies, processing claims, and maintaining consensus on claim validity.

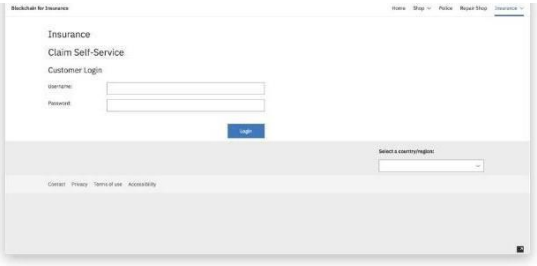

Fig:No:8: insurance company peer

POLICE PEER: An independent entity on the blockchain network tasked with verifying theft- related claims and providing evidence for validation.

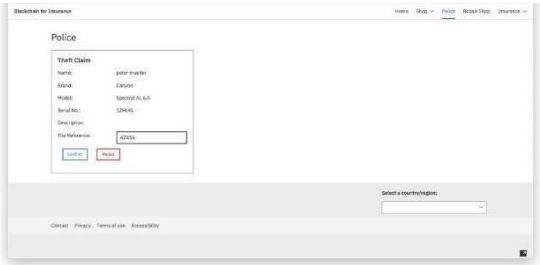

Fig:No:9: POLICE PEER

REPAIR SHOP PEER: Manages product repair claims, inspects damaged items, estimates repair costs, and collaborates with other peers to validate claims.

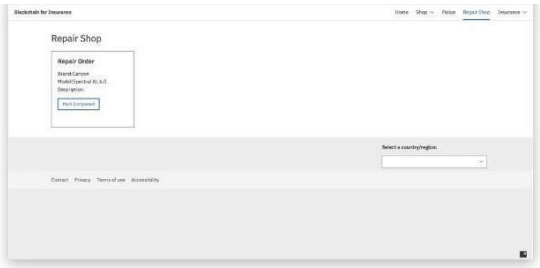

Fig:No:10: PRODUCT

SHOP PEER: Represents product vendors, handling product sales and customer inquiries related to insurance while participating in claim validation when necessary.

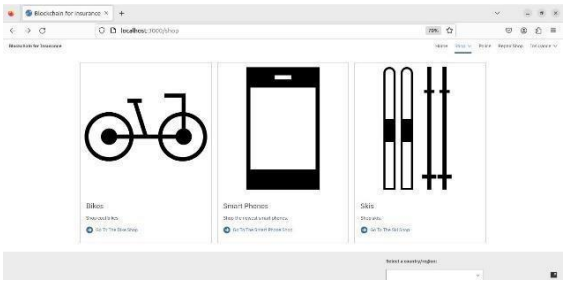

Fig:No:12: SHOP PEER

CONSENSUS MECHANISM AND NETWORK MANAGEMENT: Manages the blockchain network's consensus mechanism, network infrastructure, endorsement policies, and the addition of new organizations and members for scalability and customization.

9. RESULT AND DISCUSSION:

The integration of blockchain technology into insurance claims processing, involving the active participation of the police, insurance, repair shop, and store, has delivered promising outcomes. Each participant, equipped with individual peer nodes, has played a crucial role within the decentralized framework.

The insurance peer, responsible for product coverage and claims handling, operated seamlessly, ensuring transparency and immutability in key processes. This significantly reduced the susceptibility to fraudulent claims. The police peer, tasked with confirming theft allegations, leveraged the decentralized nature of the blockchain for a trustworthy verification process. The store peer contributed to the system's efficiency by facilitating transparent product distribution, enhancing customer confidence in product authenticity.

The repair shop peer, responsible for product repairs, seamlessly operated within the secure blockchain environment, adding accountability to repair-related transactions. Operating on the IBM Blockchain Platform provided strategic advantages, allowing flexibility in altering the network infrastructure. This includes changes in node locations, hardware specifications, and the ease with which new organizations and members can be added.

Decentralization ensured transparency, with each participant's actions recorded in an immutable ledger, reducing the risk of fraud. Enhanced security was achieved through blockchain's cryptographic principles, making the system resistant to unauthorized access. In summary, the results highlight the effectiveness of blockchain in insurance claims processing, offering transparency, security, and efficiency, especially when utilizing platforms like IBM Blockchain for increased flexibility and adaptability.

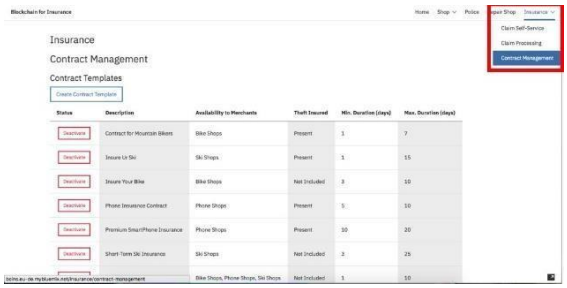

Fig:No:13: RESULT AND DISCUSSION

10. CONCLUSION:

Our Work illustrates the practical utility of blockchain technology in the insurance sector, specifically for streamlining claim processing. With four distinct participants - insurance companies, police authorities, repair shops, and product retailers

- each operating their own peer nodes, the network ensures decentralization, transparency, and enhanced security. Blockchain's inherent features, such as immutable records and customizable endorsement policies, facilitate efficient, secure, and adaptable claims management. Additionally, the IBM Blockchain Platform's scalability and geographic flexibility offer a versatile foundation for accommodating evolving industry needs, ultimately contributing to improved trust and efficiency in insurance claim processing.

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