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Insurance Industry and Block Chain Technology: An Analysis of Opportunities and Challenges

Srivalli Ch[1*], Rajeshwari G[2], Geetla Preethi[3], Ravi Praksah Achanta[4]

[1]Assistant Professor, Institute of Insurance and Risk Management, Hyderabad, India.*
[2,3]Assistant Professor, St.Francis College for Women, Hyderabad, India.
[4]Assistant Professor, Sikkim University, Sikkim, India.

Email: [2]raj2genti@sfc.ac.in, [3]preethicsc@sfc.ac.in, [4]raviachanta10@gmail.com
Corresponding Email: [1]srivalli.ch@theiirm.ac.in*

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Abstract: Blockchain is incorporated into our distributed platform design as a system service to facilitate the execution of transactions in insurance procedures. The insurance sector is highly reliant on several procedures between parties engaged in a transaction for opening, retaining, and closing various types of policies. Our view of data management and security has undergone a paradigm shift as a result of the emergence of blockchain technology. Blockchain technology is essential to the insurance industry for optimization of claims processing and policy automation, resulting in lower costs and greater efficiency. Additionally, the ability of blockchain to increase transparency and reduce fraudulent activity promotes credibility and trust between the insured and insurer. This paper explains how the insurance sector might profit from blockchain technology investments. We review the fundamentals of blockchain technology, major platforms currently in use, and offer a simple explanation of the insurance sub-processes that blockchain might enhance. This paper also discuss about the challenges that must be overcome for blockchain solutions to be completely adopted in the insurance industry.

Keywords: Blockchain, Insurer, Policy Automation.

1. INTRODUCTION

Technologies that are developing primarily aid in changing the forces that underpin societal, commercial, and economic advancements. [1,2]. Blockchain was created and released in 2008 by a researcher or group, whose identity has remained secret up to this point [3,4]. Recently blockchain gained tremendous attention among the academic community [5], researchers and industry. As of September 17, 2020, the estimated transaction value of transactions on the blockchain is 158.932k, and the output value of Bitcoin per day is 4.144 Million, according to

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[6]. Blockchain can be classified into three generations. The first iteration, known as blockchain 1.0, was released in 2009 and was primarily focused on digital currency using hardcoded special-purpose protocols and provided services to possibly harmful members of the public [3,7]. The second generation, known as Blockchain 2.0, started in 2014 and focused on creative ways to employ Smart Contracts in a variety of contexts and fields. Ethereum [8], which offers user-defined digital assets and partially turns full functionality [9], led the charge. Blockchain 3.0 was introduced in 2017 with the help of Hyperledger projects (such as Fabric, Composer, etc.), which offer a permissioned decentralised application system that may be used for any purpose. Significant systems in logistics, certifications, and finance were established during the second generation of the blockchain. Significant systems in logistics, certifications, and finance were established during the second generation of the blockchain [10,11]. Education, health, agriculture, Data centre networking, the smart grid, the intelligent transportation system, the electronic voting system, and other technologies, Internet of Things (IoT), and governance are currently included in the domain applications[12,13]. Insurance is form of transformation of income into investment portfolios. The pooling of the premiums from the individual payers and replan amount to investment portfolios like Gold Bonds, Stock Markets, Mutual Funds, Cash investment, Trade Exchange. The insurance companies plan schemes for Motor, Health, Travel and Home Insurance. The Insurance policies are mutual agreement between Person and Company, which assures you loss of it, will reimburse amount for nominee of policy bond. The biggest difficulty facing the industry is figuring out how to spot fake documents, protect against them, and put a stop to the bad intentions of pretend players. When a crisis strikes, insurance firms act as a source of cash for their customers, which results in a lot of paperwork and inefficiency. Many insurance companies use centralized databases and software applications to manage their underwriting, pricing, claims processing, and customer service activities as shown in figure 1(a). Some insurance companies are experimenting with decentralized blockchain systems as in figure 1(b), to improve the efficiency, security, and transparency of their operations, as well as to

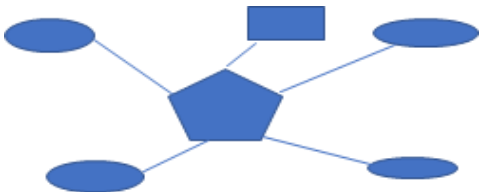

Figure 1(a): Centralized architecture

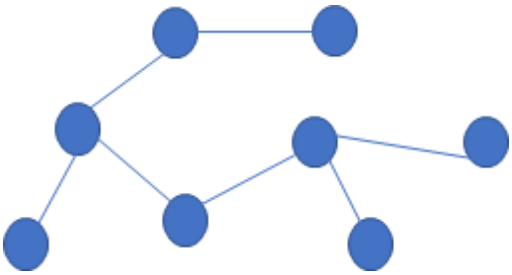

Figure 1(b): Distributed architecture

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Insurance Business Models

Pay-As-You-Drive Auto Insurance is a business model, any business model is not liable for Intellectual Property(IP) rights as they are dynamic in nature. Th novel framework can be designed making profits can be IP strategical. The Small changes can make a new complementary model. The business approach can be Trademark and Patent. The long-term Competitors are will reframe to complementary model and design the new framework. Some Time Framework design at the beginning will not be same as it is not in final version. The advantages may increase or decrees [14]. There is Digital Revaluation in Insurance Business Model (DRIB) due to changes in Products, Relationship with Consumers, Culture etc. The three new changes are New Technology used to communicate with customer, New Technology used to standardise the business process and Update with business process [15]. AI Powered Insurance model will help to smaller part of Value chain and larger in AI based, AI effectiveness is improved by Fully Automated with new data sources and customer-based AI [16].

The STOF Business Framework model has Service Domain, Technological Domain, Organizational Domain and Financial Domain. These are the modules of the business process. The technical development uses web services and UMTS. The market opportunities for individual and aging. The Financial values are economic values and customer values are in Cost Structure and Organization Arrangement. The Development are learner government and Information and Communication Technology (ICT). The Application Service Provider has set of Insurance Dealers and ASP communicate with Customer and Intermediator System. Purchasing of the documents through intermediatory system. The supervisor Monitors the Insurance companies and third-party services [17].

Blockchain technology can be used in the business of insurance to provide security in data processing, transactions of payments, improve the security in processing document, claim process, protocols, Identification of people, Application processing. The blockchain will increases efficiency of the amount transaction. The other disciplinaries of blockchain are management of health records, Identification of a person, Supply chain in factories and playing video games. The major platforms in blockchain are Ethereum, AZURE Blockchain workbench, IBM blockchain, Corda, Platform 6 and Coin base Institutional , Hyperledger Sawtooth [18].

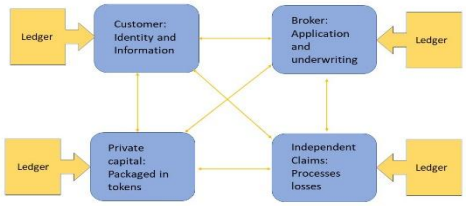

Figure 2: Block Diagram for Insurance Business Model

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Table 1: Major Blockchain platform

Platform	Launching year	Consensus Algorithm supported	Ledger Type	Smart Contract
Ethereum	2013	Proof of Work	Permissionless	Yes
Hyperledger Fabric	2015	Pluggable Framework	Permissioned	Yes
R3 Corda	2016	Pluggable Framework	Permissioned	Yes
Quorum	2016	Majority Voting	Permissioned	No
Hyperledger Sawtooth	2019	Pluggable Framework	Permissioned	Yes
Azure	2018	Proof of Work (PoW), Proof of Authority (PoA), and Byzantine Fault Tolerance (BFT).	Permissioned	Yes
OpenChain	2015	Digital Asset Management	Partitioned Consensus	Yes

Literature Survey

Blockchain Technology is used in home Appliances, the service providers use block chain technology to initiate the various services like smart homes, Smart Lights, Personal Computers, IoT Gateway's for various users. Smart devices interact with own system, but can't interact with neighbour systems. The advance metering Infrastructure is used in building blockchain network in commercial building, Micro-grid_N and smart homes. The Blockchain network used in the Electric Vehicles and communicate among the nearest access points and all the blockchain network are communicate with transport departments [19].

Blockchain technology used in agriculture for monitoring the different phases from producer to consumer stages. Smart agriculture consists of ICT tools, modern data collection and latest technologies like IoT devices, Aerial Vehicles and Machine learning, E- Commerce is used in agriculture product business like details about the, Product, verification about the product authentication and data statistical analysis. The blockchain technology provides solution to the Information Security, Supply Chain Management, Payment Methods, Consumer Confidence and Reduce the Cost of the Farmers [20].

Blockchain in healthcare system requires fast communications, action and quick plans in treatment. Advancement in medical treatment and new technologies helps to transform into blockchain. Avoid repetitive information in health system and managing healthcare system using centralized database. Enhancement in security system, Exchange Data, integration of system and real time data processing. The advance requirements are in medical field using blockchain technology are data protection, personal health updates, wearable medical devices. The patient's communication among doctors and patients are safe secured channel and resolve the issues [21].

Blockchain technology used in insurance Claim Process for claim management is used in claim process in managing the insurance claims, payment and eliminate drawbacks in policy protocols. Claim process help in Peer-to-Peer Insurance, Microinsurance, Insurance prices are changing based on the usage, Analysis of EcoSystem on interdisciplinary industries. The

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financial Roles in business and society will reduce the economy. The insurance companies using block chain technology to enhancement of the core business.[21].

2. METHODOLOGY

Blockchain technologies helps to address the challenges in insurance industry. The coordination among the execute transactions, helps to interact with stakeholders and maintain the data records. The blockchain efficiency and fast are the key concerns in insurance industry. The Insurance using blockchain has added advantages like transparency in processing data, Risk factors can be managed, customer services support, extend the business, the maintaining cost is reduced. The use cases in insurance blockchain are

- Electronic Health Record Summery
- Smart Contract – report generation
- Detecting the intruder
- Directory Level Access
- Client Oriented and
- Client Relation.

Proposed Model is used to build application to process insurance from policy inception phase to Claim or Life time of Policy. The jobs of the application are to create the insurance product, Process the Claim, Identify the wrong claim applications, Changes in the policy products in peer to peer business customization, Application Running in EOSIO Blockchain Framework. Kubernetes Cluster are created to balance the load, Scale -Up as per need and traffic. We are building Kubernetes using EOSIO Framework. Write the service programs for customer profile creation, Customized Policy Document, Claim Policies, Claim Inspector, Customer Support. Communication between stake Holders like Authentication Certificate, Customer Membership, Peer Stakeholders, Repositors etc. The packages are Deployed on the EOSIO Framework and create an admin profile for sanction permission and tracking. Create the transaction for business process.

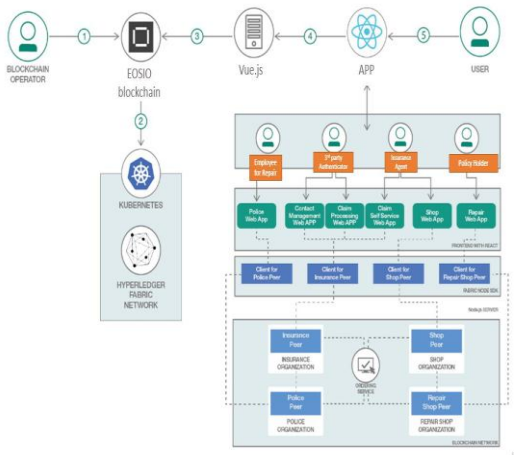

Figure 3: The EOSIO Framework

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Node Blockchain Operator: The Key person of Insurance Application and Highly Authenticated person in the business. Who maintains the full featured Copy of Blockchain Software and broadcast application over network. The EOSIO Framework is use to design the Framework using Kubernetes clusters.

Challenges in Insurance Department

The insurance sector is a convoluted and constantly evolving industry that confronts a plethora of impediments. Insurers must skilfully manoeuvre through an array of obstacles, encompassing shifting customer expectations and adherence to regulatory mandates, in order to remain viable and lucrative. Technological advancements and the emergence of novel digital avenues have also revolutionized the insurance domain, posing a duality of prospects and hurdles for insurers. In such a scenario, it is imperative for insurers to remain cognizant of the latest trends and advancements in the sector, and to devise nimble strategies that can aid them in navigating the obstacles that lie ahead.

There are various challenges that the insurance industry faces today and few of them are:

- Increased competition
- Changing customer expectations
- Regulatory compliance
- Technological innovation
- Cybersecurity
- Climate change
- Economic uncertainty
- Demographic changes
- Talent management
- Data management
- Reputation management
- Disruptive innovations
- Political and economic instability.

The insurance industry is encountering a multitude of challenges that are revolutionizing the way insurers conduct business. The emergence of new technological advancements, such as artificial intelligence and machine learning, has considerably transformed the industry, presenting both prospects and hurdles for insurers. The insurers must keep up with technological advances to provide seamless, tailored experiences for their customers while also safeguarding their systems against cyberattacks. Another challenge that insurers must contend with is regulatory compliance, which is heavily regulated and strictly governed, from pricing to underwriting practices. Insurers must comply with these regulations, which can be time-consuming and costly. Moreover, insurers face increasing competition as the industry is becoming overcrowded with new entrants every day. This can make it arduous for insurers to attract and retain customers, particularly as changing customer expectations and the rise of disruptive innovations transform the industry.

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Climate change is also an important challenge facing the insurance industry. Insurers must be ready to confront an upsurge in natural disasters and other climate-related events, which can be expensive and difficult to manage. This involves considering the impact of climate change on their investment portfolios and underwriting practices. Economic uncertainty is another obstacle that can make it difficult for insurers to predict risk and set pricing. Insurers must be prepared to adjust their pricing and risk management strategies in response to changing economic conditions, including changes in interest rates, inflation, and other economic factors. Demographic changes are also transforming the insurance industry, with an aging population and changing family structures posing new challenges for insurers. Insurers must be prepared to offer products and services that meet the distinctive needs of diverse demographic groups, including products that cater to seniors or families with young children.

Talent management is another significant challenge for the insurance industry, with many baby boomers set to retire in the coming years. Insurers must be prepared to attract and retain the best talent in a highly competitive job market, offering competitive salaries and benefits, as well as opportunities for career development and advancement. Effective data management is also essential in the insurance industry, given the vast amounts of data generated by insurers. Insurers must ensure that they have the necessary systems and processes in place to collect, store, and analyze this data effectively, which can be used to improve underwriting practices and enhance customer experiences. Reputation management is also a critical challenge facing the insurance industry, with maintaining high levels of trust and transparency with customers, regulators, and other stakeholders being of utmost importance. This may involve investing in corporate social responsibility initiatives or providing transparent pricing and claims processes. Furthermore, the insurance industry is confronted with the advent of disruptive innovations introduced by unconventional participants in the field. In order to maintain their competitiveness in the swiftly evolving landscape, insurers must not only acclimate to these innovations but also surmount the hurdles associated with the adoption of blockchain technology, encompassing aspects such as security, regulatory compliance, interoperability, scalability, and talent management. Only by taking a proactive stance in addressing these challenges can insurers anticipate flourishing amid the disruptions and establish themselves as pioneers in the industry.

Threats in Insurance Department

The insurance sector encounters an array of challenges, including but not limited to fraud, operational inefficiencies, lack of transparency, interoperability, and talent management. These threats can be tackled effectively through the incorporation of blockchain technology, which provides several advantages. Fraudulence poses a significant menace to the insurance industry, leading to losses amounting to billions of dollars annually. Nonetheless, blockchain's distributed ledger technology can curb fraudulent activities by providing a tamper-proof record of all transactions, thereby making it more difficult for unscrupulous actors to tamper with or falsify data. Operational inefficiencies are a pressing issue that the insurance industry must address, as they result in delays, errors, and increased costs. However, blockchain's shared, transparent, and automated platform for conducting transactions can streamline processes and reduce inefficiencies, thereby increasing operational efficiency and reducing costs.

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Lack of transparency can cause mistrust and undermine confidence among customers. Nevertheless, blockchain's decentralized, transparent, and immutable ledger can mitigate this issue by providing a clear and auditable record of all transactions, which fosters trust and confidence among customers. Interoperability challenges are rampant in the insurance industry, where different insurers use distinct systems and processes. Nevertheless, blockchain technology can promote interoperability by providing a common platform and shared standards for transacting, resulting in increased communication efficiency, reduced costs, and improved industry effectiveness. Lastly, the insurance sector experiences a dearth of talent, particularly in blockchain expertise. However, insurers can address this talent gap by investing in training and development programs to cultivate a skilled blockchain workforce. This solution will ensure that the insurance industry has the requisite talent to adopt blockchain technology successfully and thrive amidst disruption.

3. RESULTS

The present existing models in the insurance industry which use blockchain technology are B3i, a consortium of insurers and reinsurers that uses blockchain technology to improve the reinsurance market. Secondly, Insurwave is blockchain-based platform that provides end-to-end insurance solutions for the marine industry. The AIG and Standard Chartered which is partnered to develop a smart contract-based insurance policy for international trade finance using blockchain technology. The most famous in contracts is Ethereum known for being a flexible and versatile open source blockchain platform for building decentralized applications using smart contracts. Chain That is a permissioned blockchain platform designed for the insurance industry to provide secure and transparent transactions, data sharing, and policy management.
B3i, Insurwave, and Chain that are specifically designed to cater to the needs of the insurance industry, whereas Ethereum and AIG/Standard Charterer’s platform have a more extensive range of applications. The primary focus of B3i and ChainThat is to augment efficiency and transparency in the reinsurance market. Insurwave provides comprehensive insurance solutions for the marine industry, and AIG/Standard Chartered employs blockchain technology to automate insurance related to trade finance. Ethereum is a decentralized platform that allows developers to build decentralized applications, primarily utilized in decentralized finance and the launch of new cryptocurrencies. Each platform offers distinctive benefits to the insurance industry, but their deployment and adoption levels vary.

4. CONCLUSION AND FUTURE WORK

Since the public's interest in blockchain increased, academics have built and suggested a wide range of frameworks, systems, and applications. As we can say Blockchain has had a momentous impact on the insurance industry, affording a secure and decentralized platform for data management and dissemination. Insurers can leverage blockchain technology to expedite claims processing, automate policies and claims, and obtain a more comprehensive comprehension of their customers' risk profiles. By providing a transparent and auditable record of all transactions, blockchain has the capacity to augment trust between insurers and

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their customers, all while reducing expenses and advancing operational efficiency. Moreover, blockchain technology has the potential to mutate, maybe create new insurance brands, and also improve existing ones. The prospects for blockchain in the insurance sphere are immense, encompassing innovative applications, including sophisticated risk assessment and bespoke policies, along with refined fraud detection and amplified data privacy. Blockchain 3.0 has not been used to its full potential in the insurance industry. All of the insurance sector participants' initiatives are just getting started, as indicated. As technology continues to advance, one can anticipate the emergence of progressive applications, which are poised to revolutionize the insurance industry and optimize customer experiences. And also decentralization of the whole ledger may technically be inconsequential in private blockchain systems since not all data are needed by all nodes, which may exacerbate the storage, scalability, and performance difficulties. As a result, in order to improve performance, we are to investigate the best ways to extract and store contextually relevant data, particularly in a private blockchain.

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