

CLOUD AND BLOCKCHAIN INTEGRATION – ASSISTANCE OF BLOCKCHAIN TO CLOUD TECHNOLOGY

ABSTRACT:

Cloud Computing, one of the successfully thriving technology enables organizations all across the world to store their essential data remotely in the enormous data space known as Cloud. It is a distributed computing paradigm that tends to reduce the hardware for the extensive storing of big data for companies, providing them cost-effectiveness to a great extent. When we talk about Cloud security, it is one of the biggest challenges in Cloud Computing. However, through the latest technology, it has been assured to provide enhancements in cloud security as much as possible. The role of an emerging technology of Blockchain has become vital these days as it is itself extremely secure. For Cloud Security Augmentation, Cloud and Block-chain integration can only be a possible combination that could help out. In this context, we shall get to know some basics of Blockchain technology in addition to its trials and challenges. Later on, we shall also put an eye on the Cloud and Block-chain Integration and how it analytically solves the security issue to increase Cloud robustness.

KEYWORDS: Cloud Computing Technology, Blockchain Technology, Cloud and Blockchain Integration

INTRODUCTION:

Block-chain, one of the enhanced and spectacular technology provides a concept of the chain. It is a distributed data storage and ledger technology that permits to pool data in multiple servers globally. The key difference between an ordinary database and a block-chain is the data structure. A Block-chain collects information together in groups, also known as blocks, which hold sets of information. Each of the Blocks has a particular storage capacity. As soon as a block fills completely, it becomes chained with the previous block, thus leading to the formation of a chain of data. The Blockchain database behaves like an open-source database platform which allows the public privilege to see and track data transactions occurring on the servers in real-time. This deducts a chance of hacking the transactions as the synchronization among different blocks or servers is really very fast. One of the best things about Block-chain is that all the transactions are immutable (i.e. once occurred, not possible to reverse them). This, fortunately, increases the security as all of the occurred proceedings are recorded and can be viewed by anyone.

These were some key concepts of Block-chain. Further, we shall discuss some of its challenges and trials that are essential to keep in mind while taking a look on Cloud and Block-chain Integration.

BLOCKCHAIN TRIALS:

Organizations across the world are rapidly adopting the new technology. At the same time, they had to focus on the ups and downs as well as the challenges that they might have to face while endorsing that new technology. Taking a look at Blockchain, as we discussed previously that it is the latest technology, so apparently, it shall own unique challenges and trials. These trials must be captured at the right time before the complete adoption of Blockchain. Here are some of the vital challenges that one has to tackle while applying Blockchain Technology:

Scalability – One of the biggest challenges of Blockchain Technology is Scalability. As there is a restriction of the block size in Blockchain which only allows 7 transactions per second. This increases the scalability challenge as many of the small transactions may become unsuccessful due to deficiency in the block's actual capacity.

Laws And Rules – Blockchain has brought many changes in society soon after its emergence. It has triggered many legal issues by lagging legal supervision in the early stages of development. Getting proper know-how about the Blockchain characteristics can only strengthen the laws and regulations for the technology. However, many countries across the world have started to implement Blockchain by enhancing their regulatory measures.

Privacy Leakage – In the Blockchain technology, users' transactions are considered safe as they consist of addresses besides real identities. The event of data leakage may lead to the production of multiple addresses. In addition to that, Blockchain also cannot guarantee transactional privacy due to the public visibility of transactions. What becomes a trial is to make the payment anonymous, making it risk-free.

Standardization Issue – Despite the presence of many different networks in Blockchain, there is a lack of a universal standard. This raises many issues such as interoperability, cost increment, ambiguous mechanisms, and protocols. Ultimately, these issues block the way towards the large-scale implementation of Blockchain Technology.

CLOUD COMPUTING HALLMARKS:

Every technology has its hallmarks and features due to which it gains attention. Similarly, Cloud Computing has its own beauty and features. Without wasting the next second, let us discuss some of the salient hallmarks that Cloud Computing Technology possesses.

On-Demand Service – This feature in Cloud Computing refers to the reliability and controllability of Cloud Technology. It enables users to control all the available services of the cloud including network storage. User can get the increment in cloud service as he demands. The best part here is that he doesn't even have to interact with the service provider.

Resource Pooling – Cloud Computing Technology works on a multi-tenant model. This refers to the provision of the storage area of a single cloud to multiple users. What the capability of Cloud Computing to focus here is that the resources, data, or any sort of information of one user becomes tightly abstracted and the other user cannot access or even see that particular data. This extremely increases Cloud's efficiency.

Rapid Elasticity – It is obvious that a user can have a need to multiply the cloud storage space or even adopt some new features as he goes on. Cloud Computing comes up with a solution for this as there is maximum flexibility to gain as many services from the cloud as required.

Measured Services – All the history of advancements and purchases on the cloud that a user performs are scalable and the cloud service provider has the privilege to track the resource usage of any of its users. The charge-per-utilization policy of Cloud Computing is due to the measured services as the user has to pay only for what he utilizes. Hence, it helps organizations to save costs to a greater extent.

Broad Network Access – The best thing about Cloud Computing Technology is none other than the access. A cloud user just needs an internet connection and he can access his privilege mode on the cloud from anywhere regardless of the type of device he uses. This increases the access control for the user that can be really beneficial.

CLOUD COMPUTING CHALLENGES:

While being a very reliable technology, Cloud Computing still encounters a lot of challenges. Let us briefly have a look at them.

Server Down-Time – Cloud Computing aims to provide its services to its clients for 24 hours every day. However, it has been recorded that sometimes, the server of the cloud platform crashes or stops resulting in a Server Down-time issue. This can bring potential loss to the businesses out there who are all dependent on cloud services. The expectation of users to get established standards and optimum services from their cloud providers go in vain.

Restrictions In Services – It has been recorded that most of the cloud service providers do not offer maximum services to their users. They provide limitations in data protection, price structures as well as many regulations and restrictions in data access and storage. The users have to deal with these issues in a very smart way before signing any agreement with the cloud service provider.

Data Management – It is another challenge of Cloud Computing as there is a vast quantity of unstructured and semi-structured data on the cloud. When using virtual machines, the data management is yet too difficult to carry out as VMs can be migrated dynamically. However, there are some techniques and protocols like Auditability and Cryptography, but it is not complete enough to overcome data management challenges.

Data Encryption – The main fault in Cloud Computing Technology is that the data which is stored in the cloud storage is completely decrypted. This could be a security threat for the businesses that have adopted Cloud Technology. The SSL encryption provides such standards mentioned above, which are extremely challenging for the users to handle.

CLOUD AND BLOCKCHAIN INTEGRATION:

Cloud Computing aims to provide a secured paradigm. However, it isn't possible to have a 100% secure environment on the internet. The idea to attain enhanced security in the Cloud Computing Technology

can be achieved through Cloud and Blockchain Integration. This also provides betterment in the Cloud service availability.

Assistance of Blockchain to Cloud Technology:

It's all about the integrity of data while it is on the cloud. Blockchain aids Cloud to have many positive changes which then result in acceptable quality assurance of cloud as user adopts the integrated features. Blockchain's objective is clear for the Cloud Technology, i.e. to assist it in all possible conditions and to make it more enhanced and robust.

- **Data Sharing Capability:**

In an ordinary Cloud Computing framework, it is not possible to communicate internally within the public cloud, plus, there isn't a way to share resources while being on the same cloud. How Blockchain assists the Cloud Technology is the transaction of data among clouds as it considers the sender and receiver as a node, similar to that of Blockchain. This comes up with a very suitable solution for businesses to have data transaction copies

- **Data Encryption:**

It is a well-known fact that the Cloud stores data in a decrypted form. This could increase the risk of hacking or attack on the Cloud Network. When Blockchain shakes hands with Cloud Computing, this issue resolves in an optimal way. The robust cryptographic algorithms in Blockchain generate hash code and hash key for each of the data which has to be transacted. Moreover, each node carries a copy of data generated in each of the transactions. This helps in intensifying data persistence as well as validity.

- **Service Level Consensus:**

There is an effect of injustice in the agreements or consensus of the Cloud Computing regarding consumer and service provider. Now, to overcome this issue, Blockchain has introduced a smart contract system between both candidates. What happens is that all the agreements are shaped up in a form of programmable codes. These codes are run in a particular environment. As these codes self-execute when needed, it becomes easy to verify and predict outcomes, thus, decreasing conflict.

- **Data Management:**

Data needs to be in a structured format to have efficient access. In Cloud Computing, the data stored in clouds may be unstructured, but, when we have Cloud and Blockchain Integration, the assistance of block hash keys help a lot as these keys manage and track data in the network. The distributed ledger technique of Blockchain helps to maintain large-scale data in a smooth manner. The service quality increases due to the smart contracts which ensure the user's anonymity, block validation to make data easily manageable, as well as enhancing data validation on the network.

CONCLUSION:

As we know that Blockchain features decentralization, we have provided a comparative study on Blockchain and cloud services based on different requirements. One of the significant gaps in cloud services is Data Integrity. By this analysis, we could conclude that the data in the cloud would be more secure by adopting the Blockchain platform. This integration can provide us with more storage flexibility, and at the same time, it keeps the validated data. Furthermore, the authorization to the network will be monitored, increasing the network resilience.

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