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BLOCK CHAIN USE IN CLOUD COMPUTING

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Abstract: A recent and well-known financial innovation with the potential to totally change commercial interactions is called blockchain technology. It uses many cryptographic methods and runs on a decentralised network to provide strong and secure transactions. Growing interest is being shown in the integration of blockchain with cloud computing, another significant computing paradigm. The purpose of this study is to evaluate blockchain's uses in cloud computing platforms.

The article starts out by giving a quick review of blockchain and stressing both its benefits and drawbacks. The idea of cloud computing and how it relates to blockchain technology are then further illustrated. Finally, highlighting the areas of blockchain-based cloud computing systems where there is still unresolved research. Future scholars attempting to create original and secure models in this area may find this study useful.

Keywords: Cloud Computing, Blockchain Technology, Security, Cost of compute

1.INTRODUCTION

The general public has been drawn to new improvements in information processing technologies for improved data storage. Cloud computing is now used as a utility model for cloud consumers[1]. Users of the cloud may access, share, or transact with the data depending on their location and time. It indicates inadvertently that after uploading resources to the cloud server, users do not have direct control over such resources. The cloud provider delivers services in accordance with the terms and conditions in an as-is and as-available format.As the "information era" progresses, there has been a tremendous increase in the quantity, speed, and diversity of material available online. Data may come from a variety of sources, including social networks, sensors, mobile devices, and archives. The challenge of "how to efficiently and optimally administer large amounts of data and recognise the new preservation ways of unlocking information" is one that this kind of data explosions raises. The production of millions of transactions made up of private, heterogeneous, and homogeneous data does not jeopardise the level of service provided to customers.

There are still issues with information processing units supporting different financial markets for the creation of next-generation financial technology for the user communication and network security. Blockchain technology has been presented to address financial security. Public ledger networks are what they are known as, and they provide more secured online transactions. Since 2008, the blockchain paradigm has been conceptualised [3]. 'Bitcoin' was the first cryptocurrency to adopt a blockchain-based technique.Through an authentication procedure, the consumer conducts virtual transactions as part of the blockchain transaction process. The most recent transaction detail block is shared by regularly updating this block, which is reflected in the electronic money transaction information.

A. Blockchain and Cloud of Things

Blockchain can establish a decentralised network of nodes that exchange data and processing power in cloud computing. This makes it possible for businesses to do without a centralised, solitary supplier[2]. They may instead rely on a distributed computer network that is run independently of any one corporation. Such a system may provide a number of benefits, including greater security, scalability, and availability. Additionally, it enables the development of novel applications that are now impractical with conventional cloud-based infrastructures. For instance, a distributed file storage system that is safer and more robust than current options may be built using a decentralised network of nodes.

Cloud computing provides the services for the multiple application such as Platform as a service (PaaS), Software as a service (SaaS) and Security as a service (SecaaS) Etc, and Blockchain technology provides combined secure, distributed decentralized mechanism for applications according to application requirements.

The Cloud of Things (CoT) is closely related to the uses of blockchain in cloud computing. The term "Cloud of Things" describes how physical things and gadgets are connected to the internet[5]. Everything from wearable technology and linked autos to business machinery and household appliances are included. Massive amounts of data will need to be kept, processed, and analysed as a result of CoT. This is due to the fact that many sectors of the economy already utilise the Internet of Things (IoT) to gather data from

linked devices for a variety of uses, including asset monitoring and inventory management. By 2030, 29 billion IoT devices are expected to be in use globally, according to Statista.

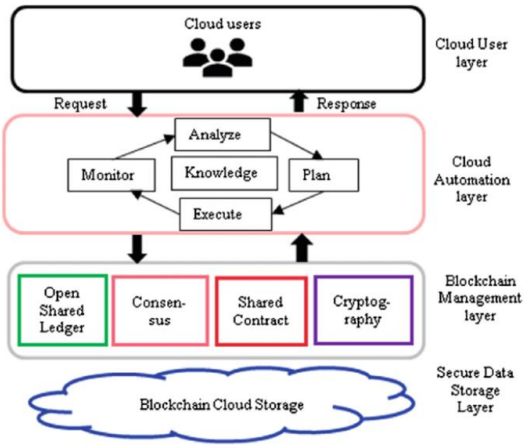

Fig: Block based cloud framework

Blockchain in cloud computing may assist businesses in better managing this data and ensuring its security. For instance, an IoT device's data may be safely and impenetrably stored via a blockchain-based system. Additionally, IoT devices often have a little amount of storage.The ability of the cloud to store large amounts of data further emphasises the significance of CoT.

B Objective and AIM of Research

The goal of the research is to define the function of blockchain technology in the context of cloud computing as well as to pinpoint any possible risks and difficulties associated with its use in this context. Below are the goals that are listed:

In the context of national tourism brand marketing, assess the digital brand marketing methods.

1. To define the blockchain technology's breadth and the applications it has for cloud computing.

2. To determine the blockchain technology's security implications for cloud computing applications.

3. To evaluate the most recent solution in light of security considerations while preserving the privacy, accuracy, and legitimacy of publicly available data.

II BLOCKCHAIN APPLICATIONS IN THE CLOUD

1. Data Security and Privacy: By enhancing the confidentiality (privacy), integrity, and availability of data, blockchain enhances cloud security. AuthPrivacyChain is a privacy-protecting access control architecture based on blockchain [1]. Because every transaction on the blockchain is precisely documented and accessible, even digital assets may be examined at any moment in the future without jeopardising their security. Since the blockchain technology promotes openness, no shady or covert action may occur on the network. Blockchain divides all of its data transactions into smaller parts and distributes them throughout all of the participating computer networks, as opposed to keeping them all on a cloud server.

2.Disaster Recovery and Backup: In order to guarantee the accessibility and security of data and resources in cloud computing, disaster recovery and backup solutions are essential. Blockchain technology may improve the security and resiliency of cloud backup and disaster recovery procedures.

3. Distributed Content Delivery Networks (CDNs): CDNs are essential for effectively and consistently distributing online content to users all around the world. CDNs in the cloud may gain from improved decentralisation, security, and trust by adding blockchain technology. The infrastructure may be decentralised using a blockchain-based CDN by utilising a network of nodes dispersed across several places. Peer-to-peer (P2P) content delivery inside the CDN network may be made possible using blockchain. Algorithms and smart contracts may be used by blockchain-based CDNs to provide effective resource allocation and load balancing.

4. Resource Management and invoicing: Users may have more control over the privacy and consent of their data with blockchain-based resource management and invoicing. Users have the option to immediately withdraw access rights and selectively share resource consumption statistics with service providers. This guarantees adherence to data privacy laws and increases user confidence. Automate cloud billing procedures. These agreements might specify the circumstances under which resources will be used, as well as pricing strategies and payment methods. They may initiate billing and payment procedures automatically by calculating expenses based on resource utilisation.

5. Identity and Access Management: The use of blockchain technology to control user identities, access privileges, and permissions in cloud settings is referred to as IAM (Identity and Access Management) in blockchain in the cloud. It makes advantage of the decentralisation, immutability, and transparency that are built into blockchain to improve the security, privacy, and control over user identities and access to cloud services.

IAM procedures benefit from an added layer of security provided by blockchain's cryptographic technologies.

The fundamentals of Identity and Access Management (IAM) are combined with the decentralised security of blockchain technology in IAM in the cloud.

III BLOCKCHAIN IN CLOUD COMPUTING: BENEFITS

Numerous characteristics of blockchain may improve the efficiency and security of cloud-based systems. The following are a few noteworthy advantages of using blockchain technology in cloud computing:

1. Heightened Security

The fact that blockchain technology is very secure is one of its most important benefits. Instead of being kept in one place, data is now kept in ledgers spread over a network of computers thanks to blockchain technology.

It is practically hard for hackers to get into the system and alter data because of the decentralised architecture. Additionally, before being entered to the ledger, each transaction is validated and confirmed by the network, making it almost difficult to perpetrate fraud.

2. Increased Efficiency

Blockchain technology also has the potential to increase cloud-based systems' productivity. Blockchain may help lessen the need for mediators and middlemen since it is a distributed database.

In turn, this may aid in accelerating transactions and enhancing the overall effectiveness of the system.

3. Increasing Scalability

Additionally, blockchain technology is very scalable. Blockchain can be readily scaled up to accommodate additional users and transactions since it is a distributed database.

For instance, a business may increase the number of computers connected to the network in order to extend its cloud-based system to accommodate additional users.

4. Improvements in Traceability

Blockchain can also aid cloud-based systems with traceability. Each transaction is monitored and recorded in a public ledger using blockchain technology.

Businesses that work with sensitive data, including those in the healthcare and financial industries, must have traceability. Companies may guarantee that the data is safe and secret by keeping track of every transaction.

5. Lower Costs

Blockchain may save administrative expenses by doing away with the need for middlemen. In a similar vein, blockchain-based solutions often have higher levels of automation than conventional systems, which may further save expenses. Blockchain's improved efficiency may also lower energy use and save organisations money.

6. Easier programming paradigms

Existing apps often need to be rewritten for businesses transitioning to the cloud. Businesses may employ more straightforward programming methods that work with the cloud thanks to blockchain, nevertheless. When converting to the cloud, this may save time and money.

7.Enhanced Cooperability

The capacity of various applications and systems to cooperate is referred to as interoperability. By establishing a standardised data format, blockchain can assist interoperability.

IV CONCLUSION AND FUTURE WORK

In conclusion, the use of blockchain technology in cloud computing has the potential to revolutionise how we manage, protect, and store data online. Decentralised and unchangeable blockchain technology has enabled significant breakthroughs in a number of fields, including data integrity, security, decentralised storage, identity management, smart contracts, resource management, and auditing.

Although blockchain technology is still in its infancy, it presents intriguing prospects to improve security, transparency, and efficiency in cloud computing applications. More thorough, scalable, and secure cloud computing systems will be possible with further study and development in these fields.

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