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Survey Paper on Block-Chain in IoT

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Abstract: ***IoT (Internet of Things) is one of the trending technologies nowadays, due to its wide variety of applications but it has many limitations such as data security, centralization, etc. Block-chain can help us to resolve these issues through its decentralized and distributed ledger. There are many ways to integrate block-chain in IoT such as IoT-IoT, IoT- Block-chain, and Hybrid approach but challenges still exist.***
Keywords: Internet of Things (IoT), Cloud Server, sensor, Integration, Physical expansion, Gadgets, Baas, Gateway

I. INTRODUCTION

IoT is an abbreviation for the Internet of Things. It is a system of interdependent gadgets that are linked over the internet for transmitting data. IoT links various devices and things to form a physical network in which monitoring, processing, and interaction operations are automatically controlled and managed without any requirement for humaninteraction. It is employed in a wide range of domains, including intelligent homes, health care, vehicles, and the military. IoT has a wide range of potential applications, and its consequences are already being seen in a number of various fields, including production, logistics, medical treatment, and agribusiness. IoT is set to play a growing role in alteringthe environment and altering how we conduct our lives, perform our jobs, and interact with others as the number of internet- connected devices expands.

IoT devices have been used in organization to detect an assortment of attributes such as climate, humidity, pollution,consumption of energy, and machine efficiency. This data may be examined in real-time to identify emerging trends, patterns, and irregularities that can help stands improve theirefficiency and bottom line.

A. Working of IoT

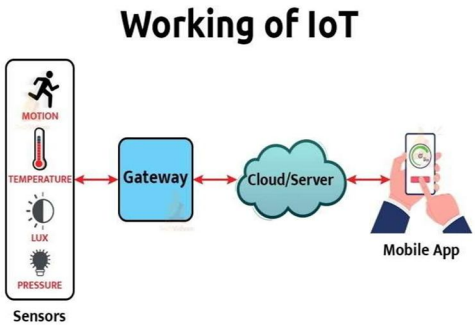


Fig 1.1: Working of IoT

IoT works through linking physical objects (things) over theinternet. Data from a variety of sensors are gathered using these devices and shared with the cloud for analysis and storage. Applications also process the data, generating appropriate data that may be utilized to control the device orexecute automated tasks. The following initiatives are performed to carry out the process:

1) Data is gathered by sensors and gadgets.
2) Data is sent through gateway to a cloud service forprocessing and storage.
3) Data is evaluated and converted into useful information.
4) The data is used to operate the devices or carry outautomatic activities.

B. Block-chain

The Blockchain hypothesis was developed by Distributed Ledger Technology (DLT). This technology is currently being researched to provide Reliable authentication technology throughout a network that may extend the entireglobe with the objective to promote peer-to-peertransactions along with every financial transaction.

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This technique minimizes third-party responsibilities in financial transactions such as banks, representatives, intermediaries, or any authority that may be essential to ensure and maintain the fulfilment or enhancement of transaction data. Then, confirm that each financial transaction is appropriate and maintain it as a new block for an existing transaction. Once a transaction remains preserved within a message, it cannot be altered, modified, or vanished requiring a greater level of security and transparency [1]. Figure 1 demonstrates the fundamental concept of blockchain and IoT interconnection.

II. LITERATURE REVIEW

The distributed ledger of a blockchain is secure, minimizing the need for the parties concerned to trust one another, according to Andres Ricaurte, senior vice president and global head of payments at an IT services company operations. As a consequence, no single entity has control over the enormous quantity of data generated through IoT devices. Because of blockchain data encryption, it is practically impossible for anyone to make changes to existing data records. In addition, storing IoT data on

A. Blockchain in IOT

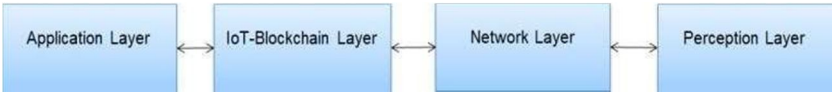


Fig 3.1: IoT-Block-chain architecture

In this scenario, a large amount of data and interactions are transmitted between IoT devices, whereas the blockchain retains just particular kinds of data. This provides numerous advantages, but it can be challenging to obtain low latency and fast functioning for IoT devices in real-time. In addition, this strategy encourages the development of fog computing to account for the restrictions of block- chains and IoT devices. For example, you may use this computing approach for gathering, storing, and examining confidential information using peripheral equipment instead of cloud computing, which will help you save funds on operational expenses.

B. Block-chain as a Service for IoT

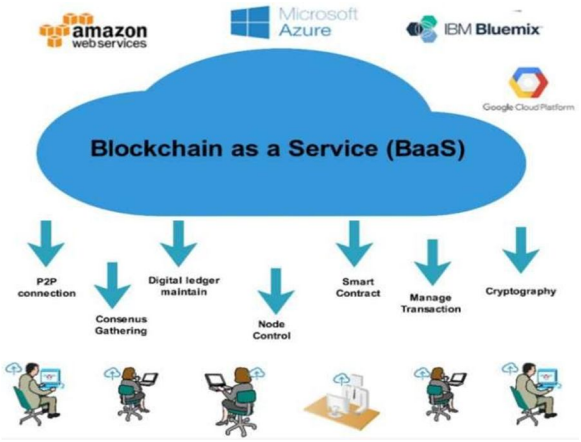


Fig 3.2: Typical architecture of BaaS

BaaS may give multiple benefits for various IoT applications. for example, may be used more readily and cheaply with pre-built cloud platforms than on-premise installation. Also, because BaaS coexists with other cloud services (SaaS, PaaS, IaaS), block-chain will be able to implemented with multiple cloud and IoT applications, increasing the interoperability of block-chain technology with these diverse applications. Usability is also one of the benefits of BaaS . To put it another way, establishing a block-chain utilizing one of the block-chain platforms necessitates a high degree of expertise in cryptography and distributed technology. On the other hand, the service provider may provide BaaS as a full service, allowing the consumer to control and execute block-chain technology does without any additional infrastructure.

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III. THE DIFFICULTIES OF BLOCKCHAININTEGRATION

A. Challenges in Selecting a Consensus Protocol

To pick the best blockchain preference for IoT, keep in mind that many mechanisms cannot be implemented in the current IoT environment because of to high power consumption requirements, adaptability problems, high expenses, and so on.

For example, if you make use of Bitcoin or Ethereum Blockchain, each transaction between the two gadgets will cost around 2 to 20 dollars. Because the Internet of Things performs hundreds or even millions of transactions every single day, an enormous amount of money needs to be handled, which is an important disadvantage. Moreover, block-chains are quite demanding about validation mechanisms, which is not suited for IoT because IoT devices are tiny sensors with limited computational resources and capability.

B. Limited Infrastructural Resources for theInternet of Things

The next issue involves IoT devices that have very low memory and minimal computational capabilities. Because it's necessary to maintain a record and process it, blockchaintechnology requires a lot of memory.

C. Insufficient Data Encryption

Encryption is a critical component of many modern apps, applications, and platforms. Unfortunately, IoT devices cannot connect with systems and people while simultaneously securing data in the same manner that block-chain technology can.

D. Difficulties Regarding Scaling

The issue is that IoT networks keep developing very quickly,which indicates that more devices with sensors, transactions, and data need to be processed. The connectivity of IoT components generally demands a quick transfer of information. All of this challenges flexibility, especially forblockchain with slow processing performance.

E. The Basic Functions of Block-chain

The Block-chain is an electronic framework that applies "Peer to Peer" technology for handling money-related transactions. It provides three main purposes:

1) Enable extremely trustworthy and safe financial transactions between people and organizations all over the world through preventing so-called "double spending."
2) Enable transaction traceability (the capability to monitor anything on the Internet back to its sources), which indicates transactions will be more apparent, transparent, and secured.
3) Protect users against hazardous user attacks or violations using the same system. Furthermore, central authorities have no obligation to participate in financialtransactions or to guarantee lower expenses.
4) The data is used to operate the devices or carry outautomatic activities.

IV. NEED OF BLOCKCHAIN

A. Outdated Firmware

Few providers provide regular updates for their IoT devices, and a few customers are inclined to update the software when an updated version is available. Security holes and weak points in redundant firmware may surface, making gadgets unusable and easily hacked.

B. Unreliable Authentication

Many IoT solutions implement uncomplicated authentication for applications that utilize strong programmed passwords. By choosing an appropriate password, it is simple to breach this form of protection.

C. Unsafe Connection

Many IoT information leaks are a consequence of poor security measures during transmission of informationbetween IoT devices or between IoT devices and the cloud,or when data storage on a device or in the cloud.

D. Physical Expansion

There is a possibility that hackers might alter the configuration of the IoT device, for example when they needto overhear anything, recording video, or establish DDoS attacks.

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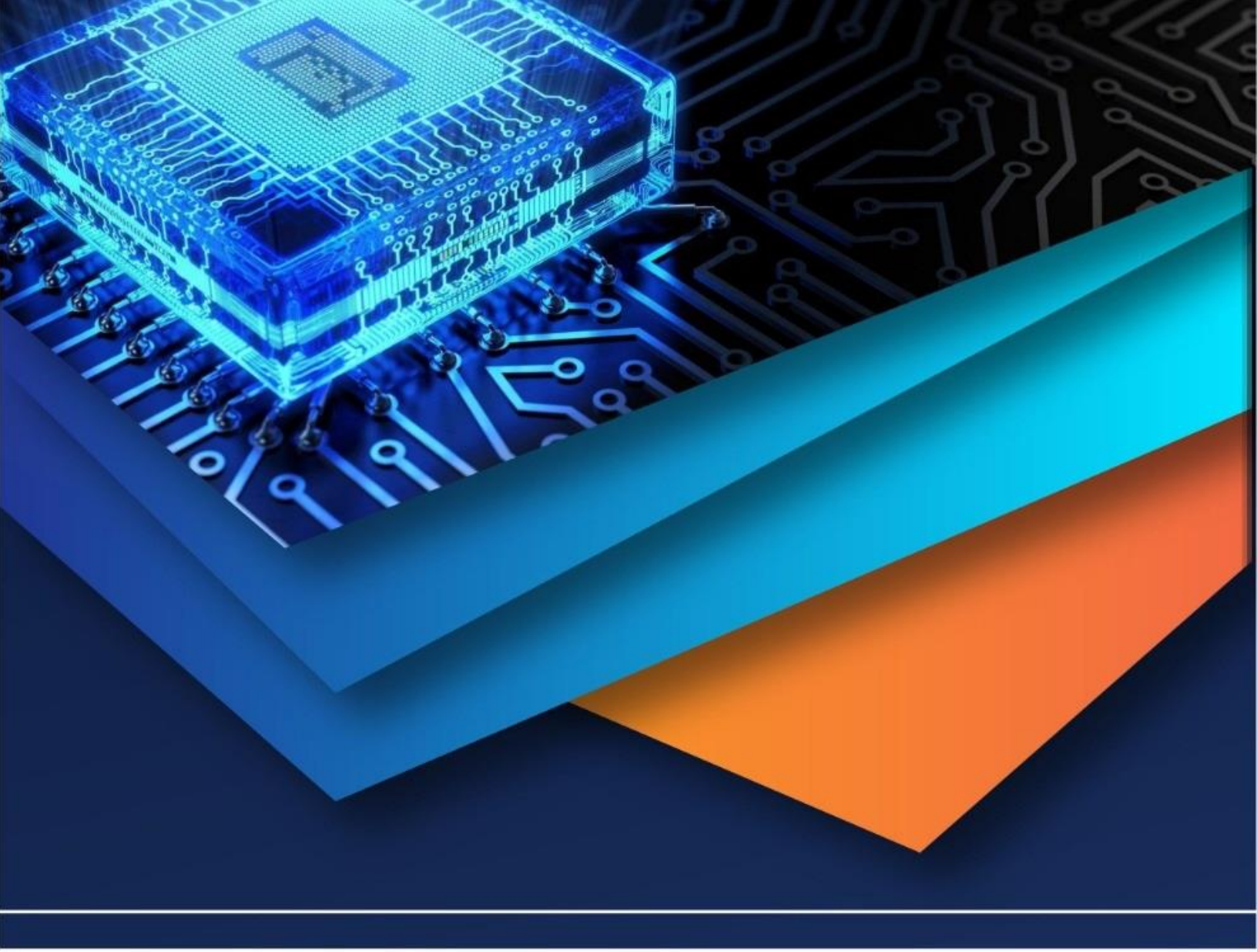
V. CONCLUSION

When Blockchain technology could enhance the security and productivity of IoT networks, and it may also permit decentralization and the capacity to use smart contracts. However, the software's use of this technology introduces a variety of issues, including restricted Internet of Things resources, poor data encryption, scaling problems, and protocols for communication that focus on both IoT devicesand blockchain networks.

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