



## A REVIEW BLOCKCHAIN TECHNOLOGY APPLICATIONS IN VARIOUS FIELDS : DEVELOPMENT, ARCHITECTURE, AND SECURITY.

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### ABSTRACT:

Blockchains have drawn a lot of attention recently because they offer decentralised methods for managing and creating value. To increase the security, scalability, and efficiency of their services, numerous banks, Internet businesses, automakers, and even governments throughout the world have adopted or begun to examine block chain technology. In this article, we examine block chain applications across many industries. These industries include copyright protection, healthcare, insurance, advertising, insurance, energy, and societal applications. For individuals and companies interested in block chains, our work offers a timely summary. We hope that our research will inspire further block chain applications.

**Keywords:**Blockchains,Cryptocurrency,Healthcare,Advertising,Energy

### 1.INTRODUCTION:

Today, Blockchains are a hot topic in news outlets all over the world. They have already been adopted as decentralised methods for fraud-resistant computing without a reliable authority in numerous applications across many different fields. A distributed, append-only log of time-stamped records that is cryptographically shielded from alteration and amendment is known as a Blockchain.Since the Blockchain technology is organised, it is challenging to change the rules or its core functionality without the consent of the users. The term "Blockchain" refers to a system in which more recent obstacles are linked to older ones to form a chain.

### 2. THE THEORY OF BLOCKCHAIN

Blockchain technology combines peer-to-peer networks with a distributed consensus method to overcome the problem of traditional distributed database synchronisation. It does not use a single technique, but rather a combination of cryptography, mathematics, algorithms, and economic models. The following are the top six components of blockchain:

**Decentralized:** Block chain allows for the distributed recording, storing, and updating of data without the need for a single node.

**Anonymity:** Block chain technologies eliminate the requirement for trust between nodes, enabling data transfers to be anonymous and just require a person's blockchain address to be known.

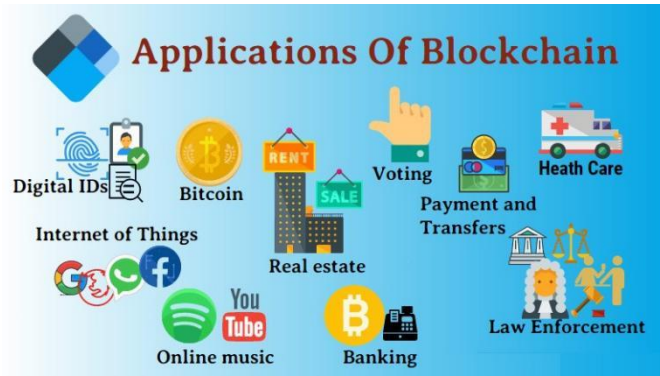
**Autonomy:** The block chain only operates in accordance with the rules set forth by its users. The established regulations are not governed by a central authority.

**Automation:** A self-executing computer programme known as a "smart contract" can automate manual activities that are often governed by legal contracts. A smart contract is a part of a block chain-based system that may automatically enforce rules and procedural processes that have been agreed upon by stakeholders. Smart contracts are fully anonymous once they've been launched, but when their terms are followed, predetermined and agreed-upon activities take place automatically.

**Security:** There are many ways to demonstrate that a block chain is more secure than conventional methods of record-keeping. Before a transaction is entered into the system, it must be approved. This makes it incredibly challenging for hackers to corrupt the transactional data, along with the fact that data is stored over a network of computers rather than on a single server. Blockchain has the potential to change how important data is shared in every industry where the protection of sensitive information is essential – financial services, government, and healthcare — by assisting in the prevention of fraud and illegal conduct.

**Transparency:** Because the block chain system's data record is transparent to every node and is updated in a transparent manner, it can be trusted. All parties can see changes made to public block chains, which promotes transparency, and all transactions are irrevocable.

### 3. BLOCKCHAIN ARCHITECTURE:



There are various block chain architecture types, and each has a unique design and architecture.

#### Public Block chain

Everyone in the organisation can ratify the exchange in a block chain like this and can participate while an agreement is being reached. Through the construction of a square of distributed exchanges, decentralisation is ensured. Before a transaction is sent to the framework, it is connected to the block chain. It may then be confirmed and adjusted with each hub within the organisation. Anyone with a PC and web connection is eligible to be chosen as a hub and receive the complete block chain history. It says that everyone can participate during the period spent reaching agreement as well as check the trade and confirm it. The advantage of a public organisation is the complete openness of the record and client confidentiality.

#### Private Block chain

Node participation in this block chain will be restricted, and there will be stringent authority management over data access. Private block chains have strict administration in place regarding who has access to what data within the network. The verification and validation of transactions cannot be done by any network node. This increases the efficiency of transaction verification and validation. When opposed to public block chains, the advantage of private block chain is that a business may choose which persons have access rights and offer a higher level of privacy. A traditional firm with a governance model that relies on it can benefit from a private block chain. The company can enter the twenty-first century by utilising a privately-run block chain.

#### Consortium Block chain

Combining public and private block chains, consortium block chain might be considered partially decentralised. Although these block chains are accessible to the general public, not all members have access to the whole data set. Blocks are evaluated based on the preset rules and user rights vary. Therefore, consortium block chains are "partially decentralised." Blockchains known as consortiums are those in which a predetermined group of reliable nodes manages the consensus process. Once consensus is reached through the validation of a group of transactions by a certain set of nodes, a block is added to the chain. The ability to view a consortium block chain can be made either public or limited to participants only. Furthermore, consortium Block chains are regarded as partially.



### 4. APPLICATIONS OF BLOCKCHAIN TECHNOLOGY:

#### Internet of Things (IoT)

The majority of communication in an IoT biological system is similar to machine-to-machine (M2M) cooperation. Building trust between participating units is thus the main difficulty that IoT innovation has yet to broadly address. However, by enabling improved capability, security, dependability, and confidentiality, Blockchain might start off as an impetus in such a way. This can be done by introducing block chain technology to the billions of devices connected to IoT eco frameworks and used to enable as well as organise the exchange processing.

#### Finance

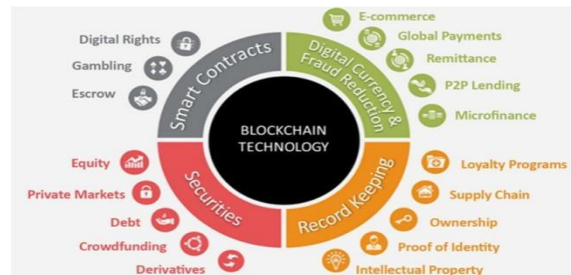
Blockchain has the potential to revolutionise the financial industry. Blockchain technology has several potential applications, including the clearing and settlement of financial assets. Additionally, it demonstrated that there are legitimate corporate uses for block chain, such as the collateralization of financial derivatives, which would lower costs and risks. Business transformation. Along with the advancement of financial and commercial services, block chain will help historic firms successfully complete their enterprise

transformation. Think about a scenario involving postal workers (POs). With the availability of new financial and non-financial services, block chain and crypto currency technology will make it easier for old communication operators (POs), who currently serve as an easy mediator between businesses and customers.

## Healthcare

Health records for specific persons may be encoded and stored on a block chain using a personal key that would only allow access for those individuals. It may be possible to use a comparable technique to confirm that the investigation complied with HIPAA's (secure and confidential) regulations. Surgery receipts might be stored on a block chain and automatically delivered to insurance providers as proof of delivery. The ledger may also be used for human services, such as managing medication supply, monitoring direction uniformity, tracking test findings, and providing medications.

## 5. SECURITY AND PRIVACY OF BLOCKCHAIN:



The following is a list of security notions and guidelines:

### Defense in Penetration

To protect the data, this technique employs a number of corrective procedures. The multiple security layer data protection principle is more effective than a single security layer.

### Minimum Privilege

By limiting data access to the barest minimum, this technique reinforces the high level of security.

### Manage vulnerabilities

With this approach, we scan for vulnerabilities and take steps to identify, authenticate, change, and patch them.

### Manage Risk

Using this technique, we process environmental risks by detecting, evaluating, and controlling them.

## 6. CONCLUSION:

The block chain, also known as distributed ledger technology, is essentially digital data that is handled by a distributed system made up of numerous different computers that work in tandem with a single centralised server. These many computers are referred to as nodes, and they are all connected in an extremely haphazard manner. It is a journal that is incredibly challenging to produce. Due to its peer-to-peer identification and decentralised setup, it is highly regarded and accepted. However, Bitcoin protects a variety of block chain-related research projects. In any event, it's important to remember that Bitcoin and block chain are two entirely different things. In this article, we've explored the concepts behind block chain technology, including fundamental definitions, traits, fundamental ideas, benefits, restrictions, agreement algorithms, along with security issues and future work. We will do a detailed investigation of good accept the long term that takes into account both centralised and decentralised solutions. The block chain is a concept that initially disrupts, similar to any new innovation, but with time it may support the development of a better community that combines both the traditional technique and the revolutionary idea.

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