

BLOCK CHAIN

UNIT-5

TECHNICAL CHALLENGES:

Key challenges for blockchain adoption The following sections consist of a breakdown of some challenges of blockchain adoption.

Key challenges for blockchain adoption



Security issues

Organizations in all industry sectors will face a complicated and potentially contentious array of difficulties, as well as new dependencies, as the blockchain ecosystem matures and additional use-cases arise.

There are numerous problems with blockchain and security issues are among them. So, what are the weaknesses of blockchain in terms of security?

51% attacks

Blockchain technology designs, for example, differ in architecture. Some are more secure than others. Decentralized blockchains are, for example, more susceptible to 51% attacks

than centralized ones. This has caused a few problems for crypto enthusiasts who prefer to keep their assets on decentralized chains.

Delving a bit into the details of how 51% attacks work, they exploit an inherent loophole in decentralized systems that allows users to control a chain by wielding over 51% of the processing power. This usually happens on networks utilizing the proof-of-work (PoW) standard.

Low scalability and interoperability challenges in blockchain technology

Blockchain technology has evolved over the years to become more scalable as use-cases increase. The first blockchain network was developed by Satoshi Nakamoto to underpin the Bitcoin network. The second decentralized network was the Ethereum network founded by Vitalik Buterin.

The Ethereum blockchain was a step ahead of the Bitcoin network because of what experts refer to as programmable money. The network was built to handle a large number of crypto transactions while at the same time supporting decentralized applications.

Energy consumption blockchain challenges

The Bitcoin and Ethereum blockchain systems are among the most popular. They are, however, energy-intensive proof-of-work systems that depend on mining to validate blocks and transactions. The concept is a bit dilapidated, considering the amount of power that they consume.

BTC mining, alone, is estimated to use approximately 100 terawatt-hours of electricity every year. This is more than the amount of energy used in countries such as Finland.

Low workforce availability

The blockchain industry has experienced an explosion of nonfungible tokens and DeFi projects over the past year causing problems in the labor market. According to the latest statistics, demand for blockchain talent has increased by over 300% as both established firms and startups scramble for top-tier talent.

Top blue-chip firms such as Google, Amazon, Goldman Sachs, the Bank of New York Mellon Corporation and DBS Group are already hiring blockchain specialists by the hundreds, and

this is creating a labor shortage. Other blockchain-centric companies such as Coinbase reportedly hire over 500 people per quarter.

BUSINESS MODEL CHALLENGES

The top five blockchain challenges organizations faced, according to the APQC survey, were lack of adoption, skills gaps, trust among users, financial resources and blockchain interoperability.

While newer Gartner research from 2023 indicated that many blockchain challenges have yet to change, it also alluded to two other common themes: the speed at which blockchain products reach the market, and lack of regulatory clarity.

Read on to explore why these blockchain challenges persist, along with ideas on how to address them.

1. Lack of adoption

Blockchains are ecosystems that require broad adoption to work effectively. For example, track-and-trace capabilities in supply chains not only require an organization to adopt a blockchain network but for its suppliers to do so as well. APQC found that only 29% of organizations were piloting blockchain or had fully deployed it.

At the time, there was hope that adoption of blockchain would grow. Organizations were coming together and forming collaborative blockchain working groups to address common pain points and develop solutions that could benefit everyone without revealing proprietary information.

2. Skills gap

Blockchain is still very much an emerging technology, and the skills needed to develop and use it are in short supply. As the figure shows, 49% of respondents to the 2020 survey named the skills gap as a top challenge. The marketplace for blockchain skills is highly competitive and has been for some time. The expense and difficulty of talent acquisition in this area only adds to the concerns that organizations have about adopting blockchain and integrating it with legacy systems.

3. Trust among users

Lack of trust among blockchain users is the third major obstacle to widespread implementation. This challenge cuts in two directions: Organizations might not trust the security of the technology itself, and they might not trust other parties on a blockchain network.

In theory, every transaction in a blockchain is considered to be secure, private and verified. This is true even though there is no central authority present to validate and verify the transactions, as the network is decentralized.

4. Financial resources

The fourth barrier to widespread adoption of blockchain, according to APQC's research, is the lack of financial resources. Implementing blockchain is not free, and for many organizations the pandemic and disruption of 2020 left budgets tight. However, one other lesson learned from the pandemic is that organizations, and IT departments in particular, can change faster than previously thought possible.

A closer examination of this barrier shows that it is connected to an underlying lack of organizational awareness and understanding of blockchain. APQC has found that as awareness of new technologies becomes more widespread, the ability to effectively make a business case for their adoption improves accordingly.

5. Blockchain interoperability

As more organizations begin adopting blockchain, many tend to develop their own systems with varying characteristics -- governance rules, blockchain technology versions, consensus models, etc. These separate blockchains do not work together, and there is no universal standard to enable different networks to communicate with each other.

Blockchain interoperability includes the ability to share, see and access information across different blockchain networks without the need for an intermediary or central authority. The lack of interoperability can make mass adoption an almost impossible task.

6. Slow development pace

Blockchain technology is complicated. New products often require extensive research, development and validation. For this reason, products can be slow to come to market.

Complementary and postproduction vendors, however, do not face these issues as often. Gartner researchers surmised this is because the tools they use are more advanced.

7. Lack of regulation

According to Gartner, some blockchain vendors have indicated issues because of limited regulations during certain parts of the process. Regardless, lack of clarity about the regulatory requirements creates significant risk for blockchain providers and consumers.

SCANDALS AND PUBLIC PERCEPTION

SCANDALS

The Bitfinex Exchange Hack

The Hong Kong based crypto-currency trading platform Bitfinex is said to be the largest Bitcoin exchange platform, with over 10 % of the exchanges. On 2nd August 2016 the company announced that almost 120,000 BTC had been stolen from its platform, the equivalent of \$72 million at the time.

PUBLIC PERCEPTION

The biggest drawback in the way of the success of Blockchain is the perception it holds in the eyes of people. Firstly, people don't see it be a part of mainstream functioning. Secondly, most of the people believe that this technology will not last long. The feature like the lack of governance, easy access to become a member of public Blockchain and lack of regulation further deteriorates the image of Blockchain in the eyes of people. All these factors contribute as challenges for the growth of this Technology.

Privacy Limitations- Pseudonymity is one of the critical features of Blockchain Technology, and when it talks about anonymity, then it means that we know that the transactions or trading is happening from someplace, but there's no real-world identity attached to the same. It raises the concern, what if there is a fraud, and how will we track the person, whom to catch in case of fraud or hacking.

In case of the public Blockchain, the details of smart contracts entered by the users in the Ethereum network become open to the public. Under such circumstances, uploading data

like health records, personal information, medical documents and identity verification, financial reports become vulnerable to hackers attack.

Lack of Regulations And Governance

The critical feature of Blockchain Technology is that it lacks regulation. It allows peer-to-peer transaction which means there is no intermediary. Moreover, there it also requires governance from authorised bodies. You cannot hold anyone responsible for maintaining the network standard thus making the entire system dicey and sceptical.

Cost to set up

The cost to setup-the developers might be preaching a lot about Blockchain Technology, but we cannot ignore the fact that to set up the entire system of Blockchain Technology is expensive especially if you wish to set up the whole operation in-house. Moreover, you may also need to buy specialised hardware for use this software. Apart from the software and hardware cost find a person to work on this system efficiently is yet another area of cost in terms of time. Since the technology is entirely new and there are frequent changes in the same, the organisations need to spend a lot of money in training, setting up the infrastructure and other areas of cost, thus making it a costly affair.

Huge consumption of energy

One of the important areas of concerns while using Blockchain Technology for cryptocurrency exchange is the energy it consumes. Whether it is Bitcoin or Ethereum network, to validate the transactions they follow Proof-Of-Work mechanism which consumes a lot of energy while solving complex mathematical problems. As per the whitepaper published in June 2017, the energy consumers in Bitcoin network can be used by 700 average American houses. With such a large consumption of energy, it becomes mandatory to come up with an alternative consensus mechanism that could consume less power.

GOVERNMENT REGULATIONS

Cryptocurrency regulation

In the current legal landscape, VDAs in India are not expressly regulated nor prohibited. Individuals and entities are allowed to hold, invest in, and transact VDAs, as long as they abide by existing laws.

Who regulates blockchain technology?

The Securities Exchange Board of India ("SEBI") regulates the use of blockchain technology in capital markets, while the Reserve Bank of India ("RBI") regulates cryptocurrency, and the Insurance Regulatory and Development Authority of India regulates insurance-related applications ("IRDAI").

Why there is a need to setup government regulations on blockchain and bitcoin?

One cyber-attack could result in losses for investors who have put their savings in cryptocurrencies. Through regulations, the authorities can implement measures to help cryptocurrency investors protect their assets. Also, investors can address concerns or reclaim their investments in case they lose them.

These events have led to regulators scrutinising the digital asset market and its participants more closely. Although crypto is likely to remain speculative and volatile, proper regulation could help prevent manipulation and fraudulent activity, and offer some level of accountability and investor protection.

What are the laws rules and regulations relating in blockchain in India?

India has not enacted any special legislation for the regulation of virtual currencies ("VCs"). However, it has contemporised various statutes like the Companies Act, 2013, necessitating the reporting of virtual digital assets ("VDAs") in an effort to reflect the emerging dynamics of the financial landscape.

Taxes on Cryptocurrency:

- The Indian government has not yet created ones specific laws governing the taxation of cryptocyrreny. However, cryptocurrencies are generally treated the capital assets and are subject to capital gain taxes.
- This means that any gains from the sale of cryptocurrency must be declared for tax purposes.

- Cryptocurrencies transactions may be subject to other taxes such as income tax and good and services tax (GST)
- The income tax department of India has issued a statement in March 2018 that the income from cryptocurrencies would be treated as capital gains therefore the applicable tax rate would depend on the holding period of the asset. For example if the cryptocurrencies are held for less than 36 months the applicable rate of tax would be 20% while if the holding period is more than 36 months it would be 10%.

Regulations Of Cryptocurrency

Cryptocurrency is not a legal tender in India.

A legal tender is a form of payment recognised by law that must be accepted in the settlement of a debt. Legal tender is usually in the form of a coin or currency that is issued by a government.

Sales Regulation

Cryptocurrencies are currently not regulated in India. The Reserve Bank of India (RBI) has issued warnings to the public regarding potential risks associated with cryptocurrencies, and the government has proposed a draft bill that would ban all cryptocurrencies, except those used in research and development. Additionally, the Supreme Court of India has asked the government to consider regulating cryptocurrencies.

It is important to note that cryptocurrencies are not recognised as legal tender in India and are subject to capital gains tax. This also means that cryptocurrency can be

It is important to note that cryptocurrencies are not recognised as legal tender in India and are subject to capital gains tax. This also means that cryptocurrency can be used for investment and virtual trading but it cannot be used to pay off debts or be used in banks.

Ownership and Mining of Cryptocurrency

The status of cryptocurrency in India is still uncertain. In 2018, the Reserve Bank of India (RBI) issued a circular prohibiting banks from providing services to cryptocurrency exchanges, making it difficult for people to buy, sell, or trade digital currencies. This ban was later overturned by the Supreme Court of India in March 2020. This could

buy, sell, or trade digital currencies. This ban was later overturned by the Supreme Court of India in March 2020. This could potentially lead to the legalisation of cryptocurrency in India in the near future.

Although the ban has been lifted, the legal status of cryptocurrencies in India remains unclear, and it is still not considered legal tender. However, there is no ban on owning cryptocurrency in India, and it is not illegal to buy, sell, or trade digital currencies.

What is Blockchain Technology?

A blockchain is a type of digital ledger technology (DLT) used to protect digital records. It is a series of blocks or data records that record transactions grouped in a chain. Every block contains a single transaction and they are never overwritten or deleted each one builds upon other.

The blockchain is distributed across a peer to peer network with each computer node containing its own copy of the block chain. When someone makes a change to the data with a hash a unique code that tells each block apart. Before that block is added to the chain, it's validated by all nodes in the network following defined algorithms.

USES OF BLOCK CHAIN IN E-GOVERNANCE

A blockchain based digital government can protect data, streamline processes, and reduce fraud, waste, and abuse while simultaneously increasing trust and accountability. On a blockchain based government model, individuals, businesses and governments share resources over a distributed ledger secured using cryptography. This structure eliminates a single point of failure and inherently protects sensitive citizen and government data.

A blockchain-based government has the potential to solve legacy pain points and enable the following advantages:

- Secure storage of government, citizen, and business data.
- Reduction of labor-intensive processes.
- Reduction of excessive costs associated with managing accountability.
- Reduced potential for corruption and abuse.
- Increased trust in government and online civil systems.

The distributed ledger format can be leveraged to support an array of government and public sector applications, including digital currency/payments, land registration, identity management, supply chain traceability, health care, corporate registration, taxation, voting (elections and proxy), and legal entities management.

LAND REGISTRATION

Challenges in the existing land registry process:

The Involvement of middlemen and brokers

Middlemen and brokers are an integral part of every big business as they know more about market offerings. Buyers and Sellers usually prefer to call them to build a full support team. As a result, buyers acquire a deeper understanding of the market and identify lower/higher prices for the transaction. Middlemen gather required information from traders, identify errors, interpret and facilitate the implementation of real estate transactions. Since real estate is big business, it involves a huge number of players, including brokers, lenders, intermediaries and local governments. It leads to additional costs, making the entire ecosystem expensive.

The increasing number of fraud cases

There has been several cases of imposters posing as the seller of a property. If an imposter successfully pretends as a property owner, they may receive the full amount of after completion and escape with the funds. In many of the cases, both sellers and buyers were unaware of the fraud until discovered by the land registry as part of a spot check exercise.

Time Delays

Land Registry takes a considerably long time to complete title registrations. There could be a gap of several months between completion and registration. Many legal problems can also arise during this long gap. For example, what if you have to serve the landlord's notice to break a lease where property has been sold. Such issues can make the entire process delayed and buyers have to wait for a long time.

Human error/intervention

Currently, updates to the land registry records are made manually and the accuracy of those changes depends on a particular individual. It means that the land registry is more vulnerable to human errors. Human intervention can increase the chances of errors in the land registry system.

Why is Blockchain Land Registry Platform a right solution?

Accelerating the Process

Middlemen involved in the land registry process hold information that you cannot access, or you might not have the license required to operate in a property transaction ecosystem. But the blockchain land registry platform can offer you a distributed database where anyone can record and access information without the involvement of any centralized authority. At present, the title to a property/land is just a piece of paper. However, creating a digital title with blockchain land registry platform can improve the process. With the blockchain's potential to prove authenticity, homeowners can transfer the land ownership legitimately to the buyer without needing third-party verification.

Reducing Fraud Cases

In today's digital world, it is now possible for imposters to forge the documents and fake the title ownership with the editing software. Blockchain land registry platform will allow you to upload the title documentation to the blockchain network where signers can sign the document and other users can verify it when needed. By keeping an immutable record of transactions, blockchain can prove that you are the owner of the land title and prevent from forgery of documents. Therefore, it can be said that the blockchain land registry platform could serve as proof of ownership, existence, exchange and transaction.

Bringing Transparency with Smart Contracts

There are only a few people who buy property directly. The process of loan or mortgage is comparatively slower due to administrative issues. But smart contracts can make the process simpler by automating verified transactions. With the blockchain land registry platform, you can create a digital, decentralized ID as a seller and buyer. Doing so would make ownership transfer seamless and quicker than the traditional method. As soon as the registrar confirms the transfer of land title, smart contracts trigger to update ownership for a new buyer and transaction corresponding to it gets stored on the blockchain. In this way, it is always possible to trace back the history of ownership records.

How could Blockchain Land Registry Platform work?

Stakeholders involved in the Blockchain Land Registry Platform:

Buyer: A person who buys the land and uses the platform to search the property, request access and interact with the seller and get the land title ownership.

Seller: A person who sells the land and uses the platform to manage properties and transfer land title to buyers.

Land inspector: A person who uses the platform to manage property requests, view reports, confirm and initiate the transfer.

Step 1: Users register to the platform

Users who either want to sell or buy properties register to the blockchain land registry platform.

They can create the profile on the platform with details like name, government-issued ID proofs and designation. A hash for the identity information submitted by the users gets stored on the blockchain.

Step 2: Sellers upload the property specifications on the platform

Sellers can upload properties' images and documents on the platform and pin the land's location on the map. The transaction corresponding to the seller's action of listing the property details is recorded on the blockchain.

Once the property's details are uploaded to the platform, it is made available to all users who have signed up as a buyer.

Step 3: Buyers request access to the listed property

A buyer interested in any specific property can send a request to access its specification to the seller.

Sellers receive notification for property access requests. They can either deny or accept it by looking at the buyer's profile.

Buyers can view the previous ownership records of the property and send a request to purchase it and initiate the transfer.

Transactions corresponding to the requests made by both sellers and buyers are recorded on the blockchain to ensure authenticity and traceability.

Step 4: Sellers approve the transfer request and land inspector gets the notification

If the seller approves the land ownership transfer request, the land inspector gets the notification to initiate the transfer of property. Smart contracts trigger to provide land documents' access to the land inspector.

After the land inspector verifies the documents, they schedule the meeting for ownership transfer with buyer and seller.

The meeting record is also added to the blockchain to solve property related disputes if occur in the future.

Step 5: Land Inspector verifies the transaction and initiates the transfer

Land inspector verifies the documents submitted by buyers and sellers and adds the authenticated records to the blockchain land registry platform.

Sellers and buyers sign the property ownership transfer document in front of the land inspector on the land registry platform.

The signed document gets saved in the database and transaction corresponding to it is recorded on the blockchain.

The transfer is initiated and smart contracts trigger to send funds to the seller and title's ownership to a new buyer.

Step 6: Land Registry Document Validation and Authenticity

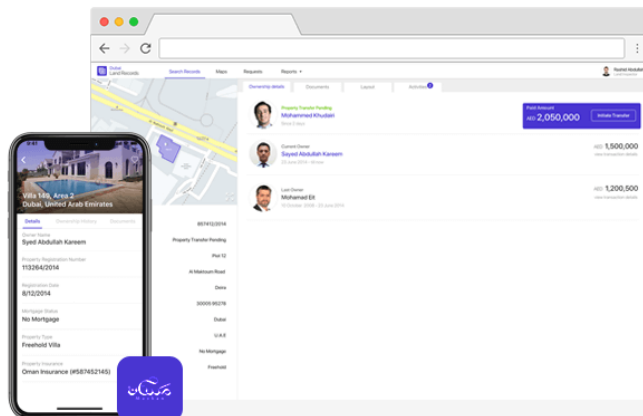
In case of any disputes, any authorized party can upload the signed land registry document on the platform to check its authenticity and validate it.

If hash generated after uploading the document is the same as that of the hash created at the time of signing the document, then the document is authenticated and no modifications have been made to the document.

LeewayHertz's portfolio for Land Registry

LeewayHertz has successfully developed Blockchain Land Registry Platform, an application to buy and sell properties, on the top of Hyperledger Sawtooth.

Blockchain Land Registry Platform



Developed on the Hyperledger Sawtooth, Land Registry is a scalable decentralized application that enables buyers and sellers to deal directly without the involvement of intermediaries.

MEDICAL INFORMATION SYSTEMS

A Blockchain network is used in the healthcare system to preserve and exchange patient data through hospitals, diagnostic laboratories, pharmacy firms, and physicians. Blockchain applications can accurately identify severe mistakes and even dangerous ones in the medical field.

How Can Blockchain Be Used in Healthcare?

Blockchain's distributed ledger technology facilitates the secure transfer of patient medical records, strengthens healthcare data defenses, manages the medicine supply chain and helps healthcare researchers unlock genetic code.

Blockchain and Healthcare Data Security

Keeping medical data safe and secure is the most popular blockchain healthcare application at the moment, which isn't surprising. Security is a major issue in the healthcare industry. There were 692 large healthcare data breaches reported between July 2021 and June 2022. The perpetrators stole credit card and banking information, as well as health and genomic testing records.

Blockchain's ability to keep an incorruptible and decentralized and transparent log of all patient data makes it a technology ideal for security applications. Additionally, while blockchain is transparent, it is also private, ensuring the identity of any individual with complex and secure codes that can protect the sensitivity of medical data. The decentralized nature of the technology allows doctors and healthcare providers to share the same information quickly and safely.

Ways blockchain can secure health data:

- Decentralized data logs that are incorruptible and transparent.
- Complex codes that protect individuals' identities and data.
- Quick transfers that reduce the window in which data is vulnerable.

1. AKIRI

Location: Foster City, California

Akiri operates in a network-as-a-service optimized specifically for a healthcare industry helping protect transportation of patient health data. The Akira system does not store data of any kind. It operates as both a network and a protocol to set policies and configure data layers while verifying the sources and destinations of data in real time.

2. BURSTIQ

Location: Denver, Colorado

BurstIQ's platform healthcare company safely and securely manages massive amounts of patient data. Its blockchain technology enables the safe keeping, sale, sharing or licensing of data while maintaining strict compliance with HIPAA rules.

3. MEDICALCHAIN

Location: London, England

MedicalChain blocks in maintaining the integrity of health records while establishing a single point of truth. Doctors, hospitals and liabilities can all request patient information that has a record of origin and protects the patient's identity from outside sources.

4. GUARDTIME

Location: Lausanne, Switzerland

God time is helping healthcare companies and governments implement blockchain in their cybersecurity methods. The company was vital in helping implement blockchain in Estonia's healthcare systems, And eat signed a deal with a private healthcare provider in the United Arab Emirates to bring blocks on to its data privacy systems.

5. PATIENTORY

Location: Atlanta, Georgia

Patientory's end-to-end encryption ensures that patient data is shared safely and efficiently. The company's platform enables patients, healthcare providers and clinicians to access and store all transfer all important information via blockchain. Patientory helps the healthcare industry move more quickly by housing all patient information under 1 roof.

THE END

THANK YOU

HAPPY LEARNING