

BLOCK-CHAIN TECHNOLOGIES

Unit - 1

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- ⇒ Introduction to Cryptographic concepts required
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Introduction to Blockchain Technology:

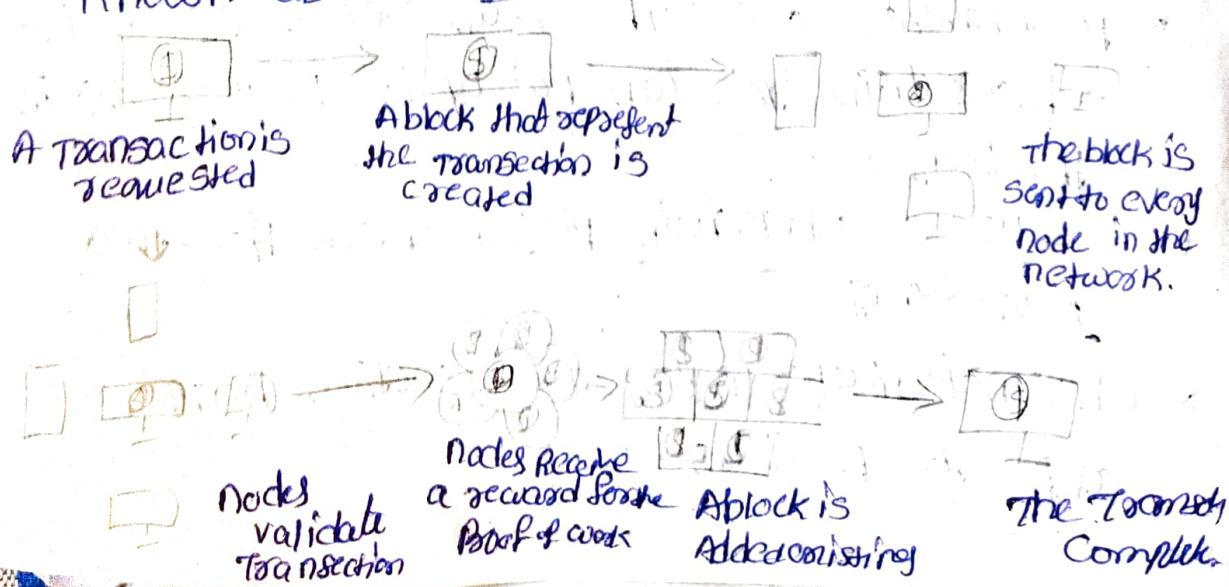
- Blockchain is a list of records called blocks that store data publicly and in chronological order.
- The information is encrypted using cryptography to ensure that the privacy of the user is not compromised and data can not be altered.
- Information on a blockchain network is not controlled by a centralized Authority.
- In a blockchain network involve all the participants has a same copy of Ledger.
- If data is corrupted at one block, the other blocks will be alerted immediately.
- The terms in block chain technology:
 - * **Ledger**: It is a file that is constantly growing.
 - * **Permanent**: Once the transaction goes inside a blockchain, you can put up it permanently in the ledger.
 - * **Secure**: Blockchain placed information in a secured way.
 - * **Chronological**: Every transaction happens after the previous one.

* Immutable: - The ledger can never be changed.

How does Blockchain work:

- ⇒ Blockchain is a combination of three important technologies - cryptographic keys, a peer-to-peer network, and a digital ledger!
- ⇒ The cryptographic keys are two types private key and public key.
- ⇒ Each block has both of these keys and they are used to create a digital signature.
- ⇒ The Digital signature is a secure digital identity reference.
- ⇒ Every transaction is authorized by the digital signature of the owner.

- ⇒ All the Transactions are stored in a structure known as the digital ledger.



Why is Blockchain Popular:-

1. Highly secure :-

- * It uses a digital signature feature to conduct secure transactions.

2. Decentralized system:-

- * In a Block chain technology the data can be stored in a decentralized form. That mean the data have each participant in a Block chain.

3. Automation capability:-

- * It is programmable and can generate systematic actions, events and payments automatically.

Advantages of Blockchain :-

- ⇒ It can provide security.
- ⇒ fast and Accurate Transactions.
- ⇒ there is not any third party involved in Transactions.

Disadvantages of Blockchain :-

- ⇒ Some times may rise problems with private keys.
- ⇒ Each node has a limited transactions possible.
- ⇒ difficult to change data in a block.

how it is changing the landscape of digitalization:

Basic Idea behind the Blockchain:-

1. Cryptocurrency wallet:-

- ⇒ Crypto wallet keep your private keys that give you access to your cryptocurrencies.
- ⇒ Cryptocurrency provide safe and accessible allowing you to send and receive Cryptocurrencies like Bitcoin and Ethereum.
- ⇒ In a Crypto wallet to access money using private keys.
- ⇒ this private keys prove your ownership of your digital money.

2. Blockchain Explorer:

- ⇒ Blockchain Explorer works similarly to a browser.
- ⇒ It makes all blocks, wallets, and transactions.
- ⇒ The Blockchain Explorer uses a hash functions.

3. Smart contract:

- ⇒ smart contract on the Bitcoin make life easier for in commerce and deals.
- ⇒ It is a digital Agreement.

→ It is a software code stored then executed across all nodes in the Bitcoin Blockchain network.

4) Supply chain management:-

→ Block chain can be used to track the quality of products as they move through the supply chain.
→ In a supply chain each block has connected to other block.

→ It supports security and accuracy.

5) Decentralized market place :

which allows buyers and sellers of securities to deal directly with each other instead of meeting in a traditional exchange.

6) Identity management:-

→ Identity management also known as identity and access management.

→ It ensure that authorized people ~~can't~~ have access the technology resources.

how it is changing the landscape of digitalization.

- ⇒ Digitalization is the process of converting information into a digital format.
 - ⇒ Blockchain is the latest technology It is used in many Applications.
 - ⇒ Blockchain is a distributed transaction record between a network of people.
 - ⇒ Data is stored in a secure server located around the world.
 - ⇒ The usage of block chain in digital Advertising is very unique.
- ### major Advertising Areas Influenced by blockchain
1. Data management:-
 - ⇒ Data is precious whether you are an publisher
 - ⇒ Now with the help of blockchain technology advertisers are able to fetch the right key performance.
 - ⇒ Data is distributed and shared across the network.
 - ⇒ It reduces the chances of data alteration.

2. Fraud prevention & Transparency:

- Blockchain brought a very important feature is in advertising industry is Transparency.
- The information flow within network.

3. Removing middlemen - Ad buying and selling:

- Blockchain help establishing that connection by removing the middlemen that could be payment methods.
- Now the process of buying media is quite simple.

4. Audience targeting:

- Blockchain, Advertisers would be able to collect the right ~~as~~ customer information and execute according to their requirement.

5. Ad Frequency optimization:

- Blockchain technology is used tools to control the ad frequency and limit your ad spend.

6. Data safety:-

- Now CCPA is coming to protect user's data.
- Data safety play an important role.

7) Social media ads:-

- Some platforms already implemented a blockchain based solutions like social, synedo, steemit.

Introduction to cryptographic concept required

- ⇒ Cryptography is Technique of securing information and communication by through use of codes.
- ⇒ This codes can be used to Preventing unauthorized access of information.
- ⇒ The cryptography is a combination of two words 'crypto' means 'hidden' and 'graphy' means 'writing'.
- ⇒ In a cryptography is mainly perform two Tasks such as encryption and decryption.
- ⇒ Primarily The Plain Text is converted into a Cipher Text is a encryption format after the cipher text is converted into plain text is a Decrypted format.

Features of Cryptography:

1. Confidentiality: Confidentiality means Data Privacy.
2. Integrity: Information cannot be change in storing or transition between sender and receiver.
3. Non-repudiation: The Sender information cannot deny in later stages.

4. Authentication:

Identities of Senders and Receiver are confirmed.

Types of cryptography:-

1. Symmetric key cryptography:-

- It is an encryption system the Sender and Receiver of message use a single common Key to encrypt and decrypt messages.
- The most popular symmetric key cryptography system are Data Encryption System (DES) and Advanced Encryption System (AES).

2. Asymmetric key cryptography:-

- It is an encryption system the Sender and Receiver of message use a pair of keys for encryption and decryption.
- The most popular asymmetric key cryptography algorithm is RSA Algorithm.

3) Hash Functions:

- There is no usage of any key in this algorithm.
- A hash value with fixed length is calculated as per the plaintext.

Applications of cryptography:

- * computer passwords
- * digital currencies
- * secure web browsing
- * Authentication
- * End-to-End encryption

Advantages:

- 1) Access control
- 2) Secure communication
- 3) Protection against Attacks

Blockchain or distributed Trust:-

⇒ Blockchain model is even more powerful than the community based trust model.

⇒ Blockchain technology based on three pillars:
Two are technological, "asymmetric cryptography" and "distributed systems" and the third is sociological.

⇒ In a Blockchain technology the transactions are takes place without third person involvement.

- The blockchain enables the construction of a vast ledger that is distributed as far.
- The blockchain makes five promises.
 1. Distributed trust.
 2. A system of transactions.
 3. Guaranteed by an extended community.
 4. No trusted third parties.
 5. The capacity to operate complex protocols.

Cryptocurrency :-

- ⇒ Cryptocurrency is a digital payment system that does not rely on banks to verify transactions.
- ⇒ It is a peer-to-peer system that can enable anyone anywhere to send and receive payments.
- ⇒ Cryptocurrency payments exist purely as digital entries to an online database.
- ⇒ The transaction of cryptocurrency are recorded in a public ledger.
- ⇒ Cryptocurrency is stored in digital wallets.
- ⇒ The first cryptocurrency was Bitcoin, which was founded in 2009.

How does Cryptocurrency work:-

- ⇒ Cryptocurrency run on a distributed public ledger called blockchain.
- ⇒ A Record of all Transactions updated and held by currency holders.
- ⇒ units of cryptocurrency are created through a process called mining.
- ⇒ Users can also buy the currencies from brokers, then store them using cryptographic wallets.
- ⇒ To Perform any Transactions from person to person without a Trusted Third Party.

Cryptocurrency Examples:-

- * Bitcoin:-
 - ⇒ Bitcoin founded in 2009.
 - ⇒ Bitcoin was the first cryptocurrency and still the most commonly traded.
- * Ethereum:-
 - ⇒ Ethereum Developed in 2015.
 - ⇒ Ethereum is a blockchain platform with its own cryptocurrency, called Ether or Ethereum.

- * **Litecoin:-**
 - this currency is most similar to bitcoin but has moved more quickly to develop new innovation
- * **Ripple:-**
 - Ripple is a distributed ledger system that was founded in 2012.
 - Ripple can be used to track different kind of transactions

How to buy cryptocurrency:-

- Step-1: Choosing a platform
 - The first step is deciding which platform to use.
 - * **Traditional brokers:** These are online brokers who offer ways to buy and sell cryptocurrency.
 - * **Cryptocurrency exchanges:** There are many cryptocurrency exchanges to choose from each offering different cryptocurrencies, wallet storage.

Step-2: Funding your Account

Once you have chosen your platform the next step is to fund your account so you can begin trading.

Step-3: placing an order:

You can place an order via your broker's or exchange's web or mobile platform.

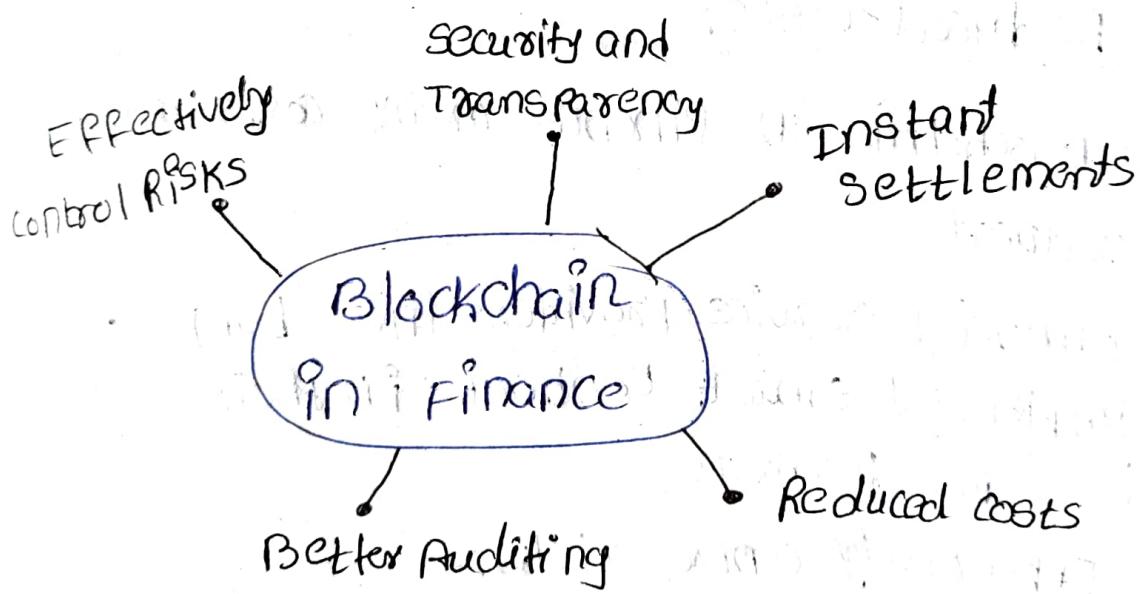
How to store cryptocurrency:-

- ⇒ once you have purchased cryptocurrency, you need to store it safely to protect it from hacks or theft.
 - ⇒ usually, cryptocurrency is stored in crypto wallets, which are physical devices or online software.
 - ⇒ The Data stored in wallets using Private keys.
- * Hot wallet storage:
- "Hot wallets" refer to crypto's storage that uses online software to protect the private keys to your assets.
- * cold wallet storage:
- Cold wallets rely on offline electronic devices to securely store your private keys.

Financial services :-

- The unique feature of blockchain have the potential to benefit the finance industry.

- The financial services industry is estimated to reach US\$ 2.6 trillion by 2022.
- Blockchain technology can be a possible solution to the challenges of the global financial system.



Security and transparency:

- Financial data is mostly stored in centralized databases.
- The centralized data bases high chance of data breaches and servers's Hacking

→ Blockchain in financial service, transparency and security can be ensured simultaneously.

* Immutability:-

Blockchain technology data is immutable.

That means ~~do~~ no data can be altered.

* Privacy :

There are two security keys - a public key and a private key. used for providing data privacy.

2. Reduced costs:-

→ Blockchain in finance many costs can be reduced.

→ Financial service providers like banks can also implement smart contracts in their systems to reduce the costs.

3. Effectively control risks:-

→ Blockchain in financial service every stakeholder is treated as a node.

→ Blockchain in finance makes it easier for financial service providers to handle all risks.

4) Instant Settlements:-

- ⇒ Blockchain in finance peer-to-peer transactions are possible.
- ⇒ As the "layers" of the system will be reduced, instant settlements of payments will be facilitated.

5) Better Auditing:

- ⇒ Blockchain in financial service, the auditing process can be streamlined.
- ⇒ In a Blockchain, the data is immutable.

Bit coin Prediction markets:-

- ⇒ prediction markets are market places where people trade on the outcomes of future events.
- ⇒ most prediction markets are a binary option market
- ⇒ From market the prices are differently shows.
Let ~~for~~ A is US\$ 30 and the price of Token B is US\$ 70. Then the market believes the likelihood of team B winning is approximately 70%.
- ⇒ There are many centralized prediction markets regulated by government organizations.
- ⇒ They predict that Bitcoin will recover to \$ 25,200 in 2024 and then rise to \$ 45,200 in 2025.