Practical : 05

Write a survey report on types of Blockchains and its real time use cases.

Objective:

Understand and explore the working of Blockchain technology and its applications.

Course Outcome:

CO6: Interpret the basic concepts in Blockchain technology and its applications

Overview:

➢ **Blockchain Technology:**

- A blockchain is a decentralized, distributed and public digital ledger that is used to record transactions across many computers so that the record cannot be altered retroactively without the alteration of all subsequent blocks and the consensus of the network.
- Each block contains a hash (a digital fingerprint or unique identifier), timestamped batches of recent valid transactions, and the hash of the previous block. The previous block hash links the blocks together and prevents any block from being altered or a block being inserted between two existing blocks. In theory, the method renders the blockchain tamperproof
- It is a decentralized ledger of all transactions across a peer-to-peer network. Using this technology, participants can confirm transactions without a need for a central clearing authority. Potential applications can include fund transfers, settling trades, voting and many other issues.

➢ **Benefits of Blockchain:**

- Time savings: Blockchain slashes transaction times from days to minutes. Transaction settlement is faster because it doesn't require verification by a central authority.
- Cost savings: Transactions need less oversight. Participants can exchange items of value directly. Blockchain eliminates duplication of effort because participants have access to a shared ledger.

- Tighter security: Blockchain's security features protect against tampering, fraud, and cybercrime.

➢ **Types of Blockchain:**

1. Public Blockchain

These blockchains are completely open to following the idea of decentralization. They don't have any restrictions, anyone having a computer and internet can participate in the network.

- As the name is public this blockchain is open to the public, which means it is not owned by anyone.
- Anyone having internet and a computer with good hardware can participate in this public blockchain.
- All the computer in the network hold the copy of other nodes or block present in the network
- In this public blockchain, we can also perform verification of transactions or records

Blockchain is an emerging technology being applied for creating innovative solutions in various sectors, including healthcare.

2. Private Blockchain

These blockchains are not as decentralized as the public blockchain only selected nodes can participate in the process, making it more secure than the others.

- These are not as open as a public blockchain.
- They are open to some authorized users only.
- These blockchains are operated in a closed network.
- In this few people are allowed to participate in a network within a company/organization.

2. Hybrid Blockchain

It is the mixed content of the private and public blockchain, where some part is controlled by some organization and other makes are made visible as a public blockchain.

- It is a combination of both public and private blockchain.
- Permission-based and permissionless systems are used.
- User access information via smart contracts
- Even a primary entity owns a hybrid blockchain it cannot alter the transaction. **4.**

Consortium Blockchain

It is a creative approach that solves the needs of the organization. This blockchain validates the transaction and also initiates or receives transactions.

- Also known as Federated Blockchain.
- This is an innovative method to solve the organization's needs.
- Some part is public and some part is private.
- In this type, more than one organization manages the blockchain.

➢ APPLICATION OF BLOCKCHAIN IN HEALTHCARE:

Blockchain is critical to healthcare for a number of reasons.

- Firstly, it allows private information to be securely shared without the need to copy it, which can help reduce mistakes in healthcare records. The data is also time-stamped, which gives it greater security.
- Secondly, blockchain allows research data to be shared between scientists and healthcare researchers around the world, giving them the ability to collaborate on solving complex medical problems and diseases.
- Thirdly, blockchain gives scientists and healthcare organizations the ability to crowdfund for research with cryptocurrency. Regulations will be necessary to ensure fairness of financial exchanges throughout the world, but this can help develop access to healthcare for all.
- Lastly, blockchain will give individual healthcare agencies the means to collaborate; thereby giving them a greater ability to reduce worldwide health care disparities while combating diseases.

Hence, it can improve the performance, security, and transparency of sharing medical data in the health care system. It can help avoid the fear of data manipulation in healthcare and supports a unique data storage pattern at the highest level of security. For different purposes, health records must be kept safe and confidential. Blockchain helps for the decentralized protection of data in healthcare and avoids specific threats.

➢ <u>TIMELINE:</u>

In 2017 – Chronicled and the LinkLab announces the MediLedger project, a blockchain backed system to safeguard the pharmaceutical industry

➢ <u>WORKFLOW OF BLOCKCHAIN-BASED HEALTHCARE APPLICATIONS:</u>

Fig. Integrated work-flow process of blockchain technology for healthcare culture.

workflow of blockchain-based healthcare applications. The workflow is composed of four main layers including healthcare raw data, blockchain technology, healthcare application, and stakeholders. The blockchain as a decentralized technology enables multiple stakeholders to benefit from healthcare applications.

➢ **HEALTHCARE BLOCKCHAIN BUSINESS IDEAS WITH TRANSFORMATIVE POTENTIAL:**

1) Use blockchain in "Remote Patient Monitoring" (RMP)
2) Transformation of "Electronic Medical Record" (EMR) systems using blockchain
3) Improving health insurance records and reporting with blockchain
4) Improving drug traceability and safety with blockchain.
5) Managing clinical trials:

➢ **PROS**

1. Blockchain is a major change from traditional approaches to data management. 2. Blockchain adapts to situations where the transparency and immutability of data is needed

➢ **CONS:**

1. Blockchain development cost
2. Blockchain can't go backwards: data is immutable
3. Expert knowledge

➢ **QUESTIONS:**

1) Which countries use bloackchain in healthcare?
Answer: Estonia is one of the most digitally progressive countries in the world. Estonia's medical services information is 99% digitized. It is the first country which uses the blockchain in healthcare.

2) How does blockchain help healthcare?
Answer: Blockchain can increase data security, lower operating costs, provide borderless access.

3) Which Cryptocurrency is related to healthcare?
Answer: Medicalchain (MTN-USD): Medicalchain is one of the leading projects seeking to help users protect their data. The goal of the project is to aggregate a user's health data into a single secure location.

4) What are benefits of using blockchain in healthcare?
Answer: Following are some of the benefits of using blockchain:

• Blockchain is a major change from traditional approaches to data management. • Blockchain adapts to situations where the transparency and immutability of data is needed
• Management of patient consent and data access permissions.

5) What are the drawbacks of using blockchain in healthcare?

Answer: Following are some of the drabacks of using blockchain:

• Blockchain is a major change from traditional approaches to data management. • Blockchain adapts to situations where the transparency and immutability of data is needed • Management of patient consent and data access permissions.