Practical No 5

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

Course Outcome:

CO6: Interpret the basic concepts in Blockchain Technology and its Application.

Theory:

- ## Introduction:

Blockchain concept was introduced with the Bitcoin whitepaper to solve the double-spending problem, when executing a transaction over a communication medium without relying on a trusted third party like a financial institution or a bank [1]. First public blockchain behind Bitcoin was developed with a specific set of functionality in mind, namely decentralized currency and peer-to-peer electronic cash applications. Therefore, Bitcoin blockchain was practically difcult to customize and had very low programmable support using a scripting system called Script for other purposes. Vitalik Buterin noticed this difficulty and introduced Ethereum blockchain platform with a built-in turing complete programming language, allowing anyone to write programs called smart contracts and run decentralized applications.

Blockchain can be defined as an immutable distributed digital ledger, which is secured using advanced cryptography, replicated among the peer nodes in the peer-to-peer network, and uses consensus mechanism to agree upon the transaction log, whereas control is decentralized.

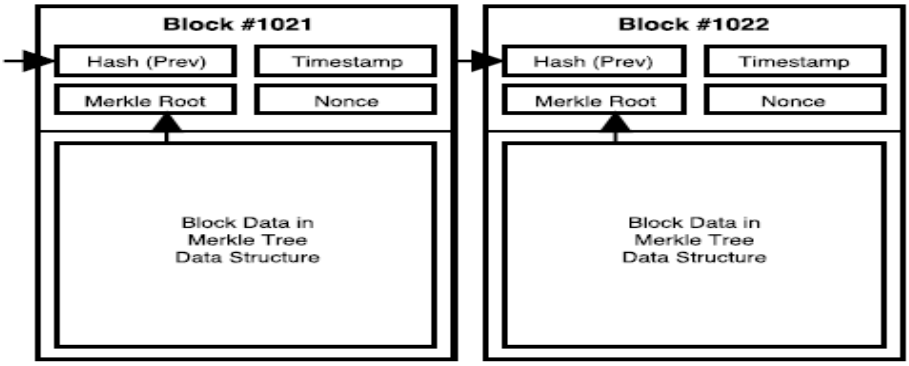

Fig. 1 General block structure in blockchain

- ## Blockchain Types

According to our survey findings, blockchains can be categorized into two main types namely permissionless blockchains and permissioned blockchains.

Permissionless Blockchains

Permissionless blockchains do not enforce any restrictions on its nodes; anyone can openly read data, inspect data, and participate in validation and writing of the data in accordance with the consensus protocol of the particular blockchain. Bitcoin, Ethereum and many other cryptocurrencies run on permissionless blockchains.

Permissioned Blockchains

Permissioned blockchains restrict the writing access for a limited set of participants, and a consensus mechanism is used to validate the writing of data among its privileged participants. Read access could either be open to anyone or closed to the public based on the requirement of the permissioned blockchain.

Basic 4 types of Blockchain Technology

There are different types of blockchain technology for a variety of purposes. You can choose which type you want to use based on what you need it for. There are 4 types of blockchain technologies so far. They are private blockchain, public blockchain, permissioned blockchain, and consortium blockchain.

1. Private Blockchain

Businesses and organizations use private blockchain networks because they tend to work on closed networks. Private networks give companies the ability to customize the accessibility of their blockchain network as it suits their organization. In addition, they can set the parameters for their network and manage the security as per their needs.

Privacy becomes extremely important for organizations if they don't want their competitors to get access to any of their data. A competitor organization can disclose private information about an organization to the media, ruining the business's plans for itself.

Pros:

- Quicker than other blockchain networks
- Tighter in security
- Minimum change of hacking
- One company is entirely in charge of the network

Cons:

- Risky for smaller organizations
- Less number of participants can collapse the entire network

Examples:

- Multichain
- Corda

2. Public Blockchain

A public blockchain has no restrictions on who can participate in the network. Anyone who wants to join the network can sign onto a blockchain platform with their device and internet connection. There is no need for anyone's permission to distribute the ledger system.

Public blockchains are common for mining. They are also common for exchanging cryptocurrencies. Once a person is part of the network, they are authorized to access records and transactions from a block.Public blockchain networks do not lose their security if all users follow the rules and do not jeopardize the network's security. After all, you must realize that it is tough for someone to modify once-validated data on a public blockchain network. So while it might look riskier than a private network, the data is still unchangeable.

Pros:

- Multiple nodes are linked together, adding an extra layer of security
- Every transaction comes with transparency

Cons:

- The more nodes, the more time it takes to verify transactions
- There is a risk of hackers
- Public blockchains like bitcoin are safe, but a less decentralized network would be risky.

Examples:

- Bitcoin
- Ethereum
- Litecoin

3. Permissioned Blockchain

A permissioned blockchain is also known as a hybrid blockchain because it combines private and public blockchain networks. In a permissioned blockchain network, users can control who can get access to what information. Not all the data that goes on the blockchain is made public. Whoever manages the data can make it public or keep it private and only accessible to certain people.

A permissioned blockchain also allows users to join a private network while being part of a few public networks; when a user tries to join a private network, they usually have to be verified and permitted into the network by someone inside the network.

Pros:

- They are resistant to 51% of hacker attacks
- This is a high-performing network. They are scalable and cost-effective

Cons:

- It does not provide incentives for network participation
- There are issues with transparency

Examples: Dragonchain

4. Consortium Blockchain

As a semi-decentralized network, more than one organization manages the blockchain network. So it's unlike a private blockchain network with only one authority. Here in the consortium blockchain network, the authority is shared among organizations.

So organizations that are part of a consortium blockchain network can carry out transactions, exchange information, and even do crypto mining. You will find a lot of government organizations or banks using a consortium blockchain network.

Pros:

- They are faster than public blockchain
- And offer control to more authorities than a private blockchain

Cons:

- There is a lack of transparency
- Nodes can get compromised and risk the collapse of the entire network
- It does not provide incentives for network participation

Examples:

- Energy Web Foundation
- R3

***Take printout of 4 above pages then create softcopy as per below**

***Maximum 2-3 Pages not more**

****Next add one case study from below topics:****

1. **Retail,**
2. **Banking and Financial Services**
3. **Government Sector**
4. **Healthcare**
5. **IOT**
6. **Energy and Utilities,**
7. **Supply Chain Management**
8. **Property Title Registries**
9. **Digital Voting**

Choose any one topic from and elaborate topic using below points as per below

ABSTRACT

Structured summary Background; objectives; case selection criteria; methodological approach; data sources; participants; major findings; limitations; conclusions and implications.

INTRODUCTION

Research and Application , Goals
Description of goals being addressed and their relevance for academia and/or the industry.
Case rationale Rationale for the case study in light of previous research / studies.

METHODOLOGY

Methods Justification and explanation of the methods being applied.
Information sources Description of information sources (e.g., company resources, databases, interviews). Limitations Study limitations in light of the original research goals.

Conclusions and implications

General interpretation of the results in the context of other evidence and implications for future research.

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