Group C: Assignment No 5

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

Objectives: Student will be able to learn

1. Concept of types of Blockchains

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

Theory:

Blockchain & Types

Blockchain technology is being used to carry and transfer the transactions or exchange of information through a secure network. Blockchain technology and distributed ledger technology is used parallel to the digital cryptocurrency to the people. Blockchain is being used for the purpose of private networking and uses too where only the restricted network users can get the authorization and access. Here network administrators are authorized to administrate the activities and any new nodes or users who wish to get permission, need to contact with the system or network administrators. Primarily there are two types of Blockchain technology viz. private Blockchain and public Blockchain. Though based on some other criteria and analysis Blockchain technology can also be noted and called as consortium blockchain technology, and hybrid blockchain technology. It is important to note that every kind of Blockchain basically consists of a cluster of nodes, and this is working on the peer-to-peer (P2P) network system.

Every node in the network has a copy of the shared ledger and further that is timely updated and also being verified the transactions, initiate and receive transactions. Keeping in mind the broad nature, experts classified Blockchain Technology into following three

Public Blockchain,

Private Blockchain, and

Hybrid Blockchain.

1. **Public Blockchain** is a major type of Blockchain, and that is not only open but also decentralized in nature. And in this type of Blockchain technology computer networks are basically accessible to anyone interested in transactions. Here based on validation the validated person basically receives the transaction rewards and furthermore, two kinds of Proof-of-work and Proof-of-stake models are being used. The Public Blockchain is furthermore a non-restrictive and distributed ledger system which is doesn't seek any kind of permission, and anyone having access can be authorized one to get the data or part pf the Blockchain. This kind of Blockchain also gives authorization regarding the current and past records verification. Additionally, this is being used for mining and exchanging cryptocurrencies

In this segment most common is Bitcoin and Litecoin blockchains. It is mostly secure upon following strict security rules as well as methods. However, upon non-following the security protocols it may be risky. Some of the examples of this type of Blockchain are - Bitcoin, Ethereum, and Litecoin.

Here given figure depicted some of the features and advantages regarding Public Blockchain Systems and Technology.

PUBLIC

Anyone can participate

Requires a crypto currecy

High decentralization

Low throughput

High energy consumtion

Fig. Salient features and functions of the public blockchains

There are two common examples of public blockchains and these are Bitcoin and Ethereum as per the experts This type of Blockchain is concerned with the following type of features viz.
High Security and Privacy,
☐ Open and Flexible Environment,

☐ Anonymous Nature,

☐ No regulations and strict Policies,

☐ Full Transparency and Systems.

☐ Distributed, etc.

However, according to the experts, the following are being considered as important advantages and benefits of the Public Blockchain.
Trustable and Faith
Public Blockchainis trusted and here unlike private blockchains, the participants are don't need to think of authenticity. In this type of Public Blockchain, they no need of knowing other nodes, and therefore there is no fraud in the transactions. In this category nodes can contact blindly without feeling the needing to trust individual nodes

Secure and Safe
In the Public Blockchain,there are opportunities in connecting with the other participants and nodes in the same public network, and this results in secure, largest, and greater communication and participation. Owing to this feature, it is difficult for the attackers to enter the systems and here every node will do the mverifications and transactions as per norms. Here thoughtful cryptogenic encrypting methods are being used and therefore it is much safer than the private blockchain according to some experts.

Open and Transparent

Public Blockchain is also having the features of openness and here data is basically transparent to all the nodes and in this mechanism, one blockchain record is normally available to all the authorized nodes.Therefore, here all the nodes become open and transparent and there is an absence of fake transactions or hiding any information. Though there are plenty of advantages and benefits but it is also having a different kind of disadvantages and weaknesses, and some of them are as under.

Lower Transaction per Second

In Public Blockchain System the rate of transaction per second is also very low, and this is due to having a large number of nodes and huge network. Here each node has to verify the transaction and also do

proof-of-work is time consuming. Here in public systems seven (07) transactions happen per second and additionally, here Ethereum network has about a 15 TPS rate.

Scalability Matters

Similar to the previously mentioned issue on a lower transaction per second in public blockchain another issue is scalability according to the experts. The huge size basically creates the scalability in this regard and here bitcoins lightning networks are considered as important to overcome the problem according to the experts.

High Energy Consumption

The public blockchain also suffers from higher energy consumption due to the proof-of-work energy consumption. As it needs special algorithms therefore high energy consumption is considered as important in energy, environment, and financial context.

2. Private blockchains

Private Block Chain are restricted and not open, such kind of blockchain also has features of access. This blockchain allows permission for the transaction from the support of the system administrator

Private blockchain solutions develop these platforms having the features of the following—

ˆˆ Full of privacy,

ˆˆ High efficiency,

ˆˆ Faster transaction,

ˆˆ Better scalability,

ˆˆ Faster and speediness.

This type of blockchain is works on closed systems and networks only and these are usually useful in the organizations, enterprises from which only selected members can be joined. This type of blockchain contains proper security, authorizations, permissions as well as accessibility. According to the experts, private blockchains are deployed forvoting, regarding supply chain management, for finding and managing digital identity, regarding asset ownership,and so on. There are certain popular private blockchains like Multichain, Hyperledger projects, Corda, etc. Participants are

PRIVATE

○
△✓   Participants are
      pre-selected

($)   No crypto currency
      is required

⦵   Low decentralization

(⌒)   High throughput

🔋   Low energy
      consumption

Fig.: Salient features and functions of the private blockchains

Private blockchains as running with the authorized nodes; therefore no one from the outside of the private network is able in accessing information and transaction related data exchanged between two nodes.

3. **Hybrid Blockchains** is a merger of public blockchain as well as private blockchain and it is required in better control for achieving higher goals. Hybrid Blockchain deals with centralized and decentralized systems and it is not open; however, it has the features of integrity, transparency, as well as security. It has several advantages over traditional blockchains as depicted in Fig. 5. In Hybrid Blockchains maximum customization is being considered as main benefits with private permission-based system as well as a public permission-less system. In this type of blockchain systems users are able in getting access and selected sections and rest can be recorded or keeps safe due to the benefits of the records from the ledger. Hybrid Blockchains is flexible enough so that users can join easily as private blockchain. This type of blockchain is able in enhancing the security and transparency of the blockchain network.

4. **Consortium Blockchain** is another type of semi-decentralized type of blockchain, and this type of blockchain is able in the organization of managing the blockchain network. This type of blockchain is able in doing activities even from a single organization. Here blockchain is able in exchange information or do the mining and are being used in the areas such as banks, government organizations, etc. Some of the examples of this type of consortium are Energy Web Foundation, R3, etc.
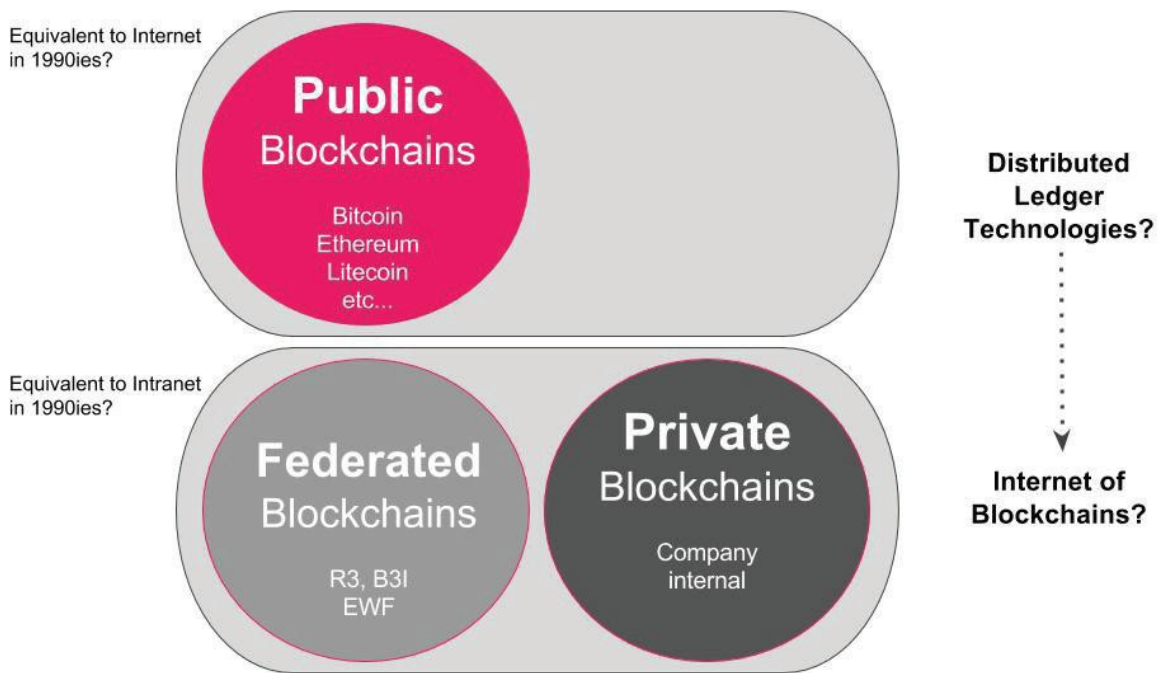
Fig. Types of Blockchains and roadmaps

Therefore, in a nutshell, all the Blockchains are having their own benefits and advantages and as a whole public and private is considered as major or worthy in terms of operations (as depicted in Fig. According to the expert's security, scalability, and transparency are considered as worthy and main points in the Blockchains of public and private types. It is important to note that private blockchains are not trustworthy; while the public network is important in proof-of-work based.
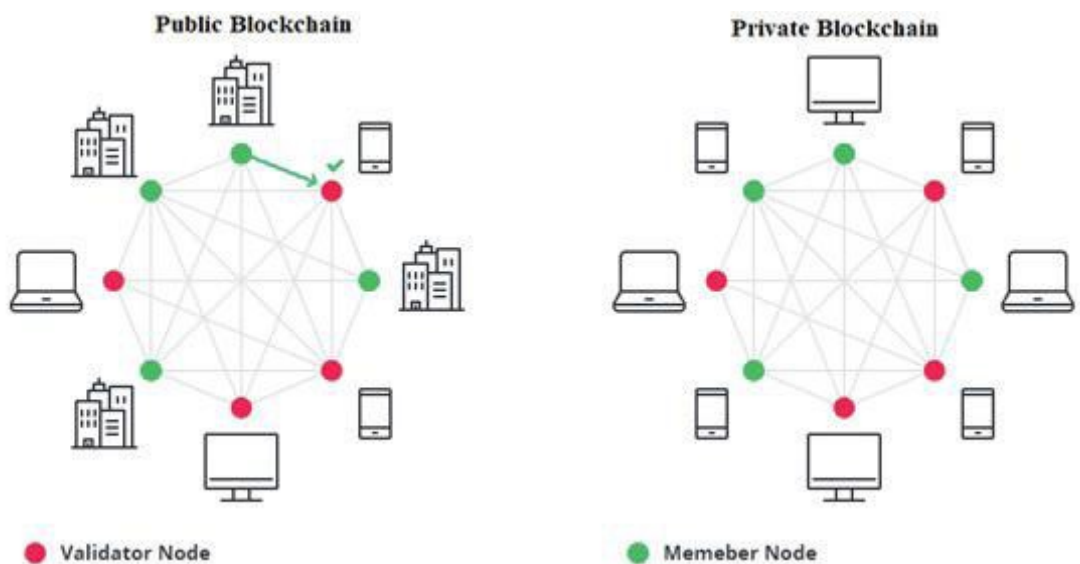

Fig. Architecture wise differences in public and private blockchains

Top blockchain use cases

Blockchain is "a general-purpose technology, which means it is applicable across sectors," said Christos Makridis, a research professor at Arizona State University, senior adviser at Gallup, digital fellow at Stanford University's Digital Economy Lab and CTO at arts and education technology start-up Living Opera. "For example, financial services can use it to write smart contracts between consumers and their banking institution. Similarly, healthcare can use it to write smart contracts between insurers and hospitals, as well as between patients and hospitals. The possibilities are endless." Blockchain use cases continue to expand. Here are some common commercial applications:

1. **Smart contracts.** The primary function of computer programs called "smart contracts" is to automate the execution of contract terms when conditions warrant them. The computer code follows a relatively simple command of "when/if _then___" to ensure that all parties receive the benefits or penalties as the contract stipulates and actions require. Smart contracts are useful to, and used by, most industries today for a variety of uses traditionally governed by paper contracts. The blockchain also makes a permanent record of every action and reaction in the transaction.

2. **Cybersecurity.** Blockchains are highly secure because of their permanency, transparency and distributed nature. With blockchain storage, there's no central entity to attack and no centralized database to breach. Because blockchains are decentralized, including those privately owned, and the data stored in each block is unchangeable, criminals can't access the information. "Essentially, the intruder needs keys to many different locations versus just one," Makridis noted. "The computing requirements for the intruder grow exponentially."

3. **IoT.** Two primary IoT uses of blockchains are in the supply chain sector and for asset tracking and inventory management. A third use is in recording measurements made by machines whether those sensors are in the Artic, the Amazon jungle, a manufacturing plant or on a NASA drone surveying Mars. "Whether it be reports of chemical data regarding oil grades or tracking shipments of electronics across the world through various ports of entry, the blockchain can be utilized anywhere there is data interacting with the real world," explained Aaron Rafferty, CEO of cryptocurrency investment firm R.F. Capital.

4. **Cryptocurrencies.** The blockchain concept was originally developed to manage digital currencies such as bitcoin. While the two technologies still compete against each other in alternative transactions, they've also been separated so blockchains could serve other purposes. Given the anonymity of crypto coins, blockchain is the only way to document transactions with accuracy and privacy for the parties involved.

5. **NFTs.** Nonfungible tokens are units of data certified to be unique and not interchangeable. In short, they are digital assets. According to Rafferty, NFTs are revolutionizing the digital art and collectibles world. "We are using decentralization and the ethereum blockchain to create a music live stream network where artists and streamers can connect with fans directly, sell their NFTs, receive contributions from fans and trade in their rewards and contributions for crypto tokens," said Shantal Anderson, founder and CEO of music and pop culture streaming network Reel Mood.

Conclusion: We have studied the survey report on types of Blockchains and its real time use cases.