BLOCKCHAIN

The basic application of the blockchain is to perform transactions in a secure network. That's why people use block chain and ledger technology in different scenarios. One can set up multi chain to prevent unauthorized access to sensitive data. It is not available to the public, and can only be available to authorized entities in the organization. It depends on the organization which type it requires to choose for their work.

By using blockchain we can track orders and payments from end to end.

Advantage using blockchain :

1. It provides greater trust among users.
2. It provides greater security among data.
3. Reduce the cost of production.
4. Improve Speed.
5. Invocation and tokenization.
6. It provides immutable records.
7. Smart contracts

Disadvantages using blockchain :

1. Data modification is not possible.
2. It requires large storage for a large database.
3. The owner cannot access the private key again if they forget or lose it.

Real life application of blockchain :

Here is a list of real world problem where we can use blockchain :

1. In a secure and full-proof voting management system.
2. To supply chain management.
3. In healthcare management.
4. Real estate project.
5. NFT marketplace.
6. Avoid copyright and original content creation.
7. In the personal identity system
8. To make an immutable data backup.
9. Internet of Things

Permissionless Blockchain

It is also known as trustless or public blockchains, are available to everyone to participate in the blockchains process that use to validate transactions and data. These are used in the network where high transparency is required.

Characteristics:

- Permissionless blockchain has no central authority.
- The platform is completely open-source.
- Full transparency of the transaction.
- Heavy use of tokens.
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Advantages:

- Everyone can participate only requirement is good hardware and internet.
- Bring trust among users or entities.
- It has a high level of transparency as it’s a larger network.
- Broader decentralization of access to more participants.

Disadvantages:

- Poor energy efficiency due to large network.
- Lower performance scalability.
- Less privacy as many of the things is visible.

Permissioned Blockchain

These are the closed network only a set of groups are allowed to validate transactions or data in a given blockchain network. These are used in the network where high privacy and security are required.

Characteristics:

- A major feature is a transparency based on the objective of the organization.
- Another feature is the lack of anatomy as only a limited number of users are allowed.
- It does not have a central authority.
- Developed by private authority.

Advantages:

- This blockchain tends to be faster as it has some nodes for validations.
- They can offer customizability.
- Strong Privacy as permission is needed for accessing transaction information.
- As few nodes are involved performance and scalability are increased.

Disadvantages:

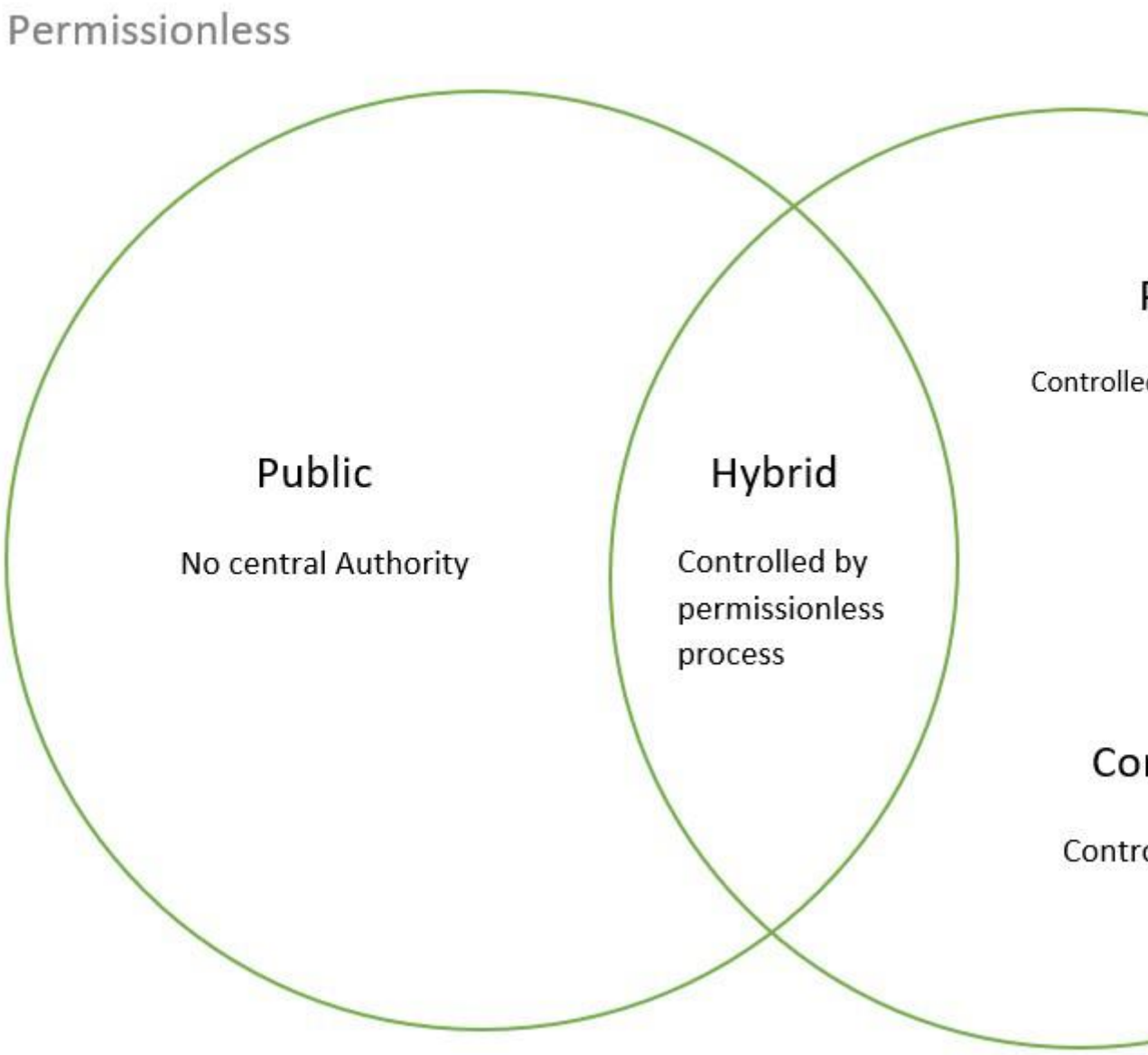
- Not truly decentralized as it requires permission

- Risk of corruption as only a few participants are involved.
- Anytime owner and operator can change the rules as per their need.

Types of Blockchain

There are 4 types of blockchain:

- **Public Blockchain.**
- **Private Blockchain.**
- **Hybrid Blockchain.**
- **Consortium Blockchain.**



Let’s discuss each of these topics in detail.

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

Advantages:

- **Trustable:** There are algorithms to detect no fraud. Participants need not worry about the other nodes in the network
- **Secure:** This blockchain is large in size as it is open to the public. In a large size, there is greater distribution of records
- **Anonymous Nature:** It is a secure platform to make your transaction properly at the same time, you are not required to reveal your name and identity in order to participate.
- **Decentralized:** There is no single platform that maintains the network, instead every user has a copy of the ledger.

Disadvantages:

- **Processing:** The rate of the transaction process is very slow, due to its large size. Verification of each node is a very time-consuming process.
- **Energy Consumption:** Proof of work is high energy-consuming. It requires good computer hardware to participate in the network
- **Acceptance:** No central authority is there so governments are facing the issue to implement the technology faster.

Use Cases: Public Blockchain is secured with proof of work or proof of stake they can be used to displace traditional financial systems. The

more advanced side of this blockchain is the smart contract that enabled this blockchain to support decentralization. Examples of public blockchain are Bitcoin, Ethereum.

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.

Advantages:

- **Speed:** The rate of the transaction is high, due to its small size. Verification of each node is less time-consuming.
- **Scalability:** We can modify the scalability. The size of the network can be decided manually.
- **Privacy:** It has increased the level of privacy for confidentiality reasons as the businesses required.
- **Balanced:** It is more balanced as only some user has the access to the transaction which improves the performance of the network.

Disadvantages:

- Security- The number of nodes in this type is limited so chances of manipulation are there. These blockchains are more vulnerable.
- Centralized- Trust building is one of the main disadvantages due to its central nature. Organizations can use this for malpractices.

- Count- Since there are few nodes if nodes go offline the entire system of blockchain can be endangered.

Use Cases: With proper security and maintenance, this blockchain is a great asset to secure information without exposing it to the public eye. Therefore companies use them for internal auditing, voting, and asset management. An example of private blockchains is Hyperledger, Corda.

3. 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

Advantages:

- **Ecosystem:** Most advantageous thing about this blockchain is its hybrid nature. It cannot be hacked as 51% of users don't have access to the network
- **Cost:** Transactions are cheap as only a few nodes verify the transaction. All the nodes don't carry the verification hence less computational cost.
- **Architecture:** It is highly customizable and still maintains integrity, security, and transparency.
- **Operations:** It can choose the participants in the blockchain and decide which transaction can be made public.

Disadvantages:

- **Efficiency:** Not everyone is in the position to implement a hybrid Blockchain. The organization also faces some difficulty in terms of efficiency in maintenance.
- **Transparency:** There is a possibility that someone can hide information from the user. If someone wants to get access through a hybrid blockchain it depends on the organization whether they will give or not.
- **Ecosystem:** Due to its closed ecosystem this blockchain lacks the incentives for network participation.

Use Case: It provides a greater solution to the health care industry, government, real estate, and financial companies. It provides a remedy where data is to be accessed publicly but needs to be shielded privately. Examples of Hybrid Blockchain are Ripple network and XRP token.

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.

Advantages:

- **Speed:** A limited number of users make verification fast. The high speed makes this more usable for organizations.
- **Authority:** Multiple organizations can take part and make it decentralized at every level. Decentralized authority, makes it more secure.

- **Privacy:** The information of the checked blocks is unknown to the public view. but any member belonging to the blockchain can access it.
- **Flexible:** There is much divergence in the flexibility of the blockchain. Since it is not a very large decision can be taken faster.

Disadvantages:

- **Approval:** All the members approve the protocol making it less flexible. Since one or more organizations are involved there can be differences in the vision of interest.
- **Transparency:** It can be hacked if the organization becomes corrupt. Organizations may hide information from the users.
- **Vulnerability:** If few nodes are getting compromised there is a greater chance of vulnerability in this blockchain

Use Cases: It has high potential in businesses, banks, and other payment processors. Food tracking of the organizations frequently collaborates with their sectors making it a federated solu