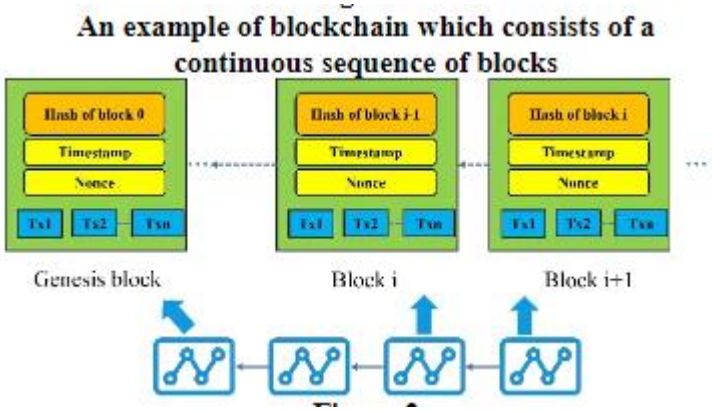
# Define Problem / Problem Understanding

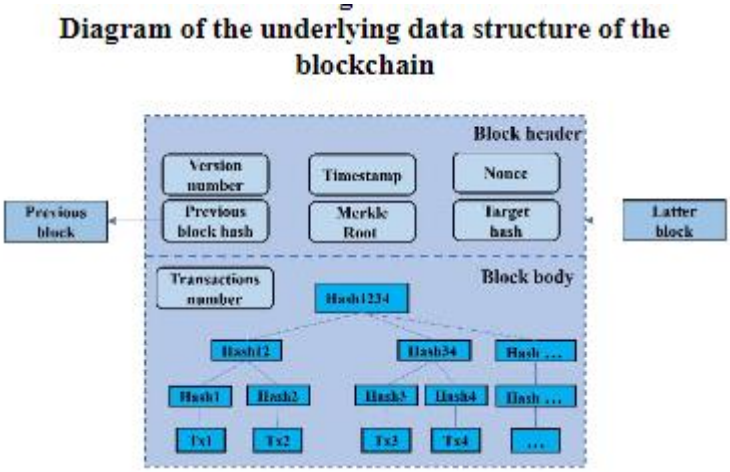
## Literature Survey

| Team ID | NM2023TMID04427 |
|---|---|
| Project Name | Project - Tracking Public Infrastructure And Toll Payments Using Blockchain |

**Blockchain structure :**




Blockchain is a sequence of blocks, which holds a complete list of transaction records like conventional public ledger. Figure1 shows the basic structure of the blockchain, where TX represents a specific transaction on the blockchain.



A block on the blockchain is composed of two parts: a block and a block. The block contains data records generated within a certain period of time that cannot be tampered with. Specifically, the block contains information such as the block version, Merkle tree root hash, time stamp, parent block hash, and nonce.

**Table 1**
**Comparisons among public blockchain, consortium blockchain and private blockchain**

| Property | Public blockchain | Consortium blockchain | Private blockchain |
|---|---|---|---|
| Consensus determination | All miners | Selected set of nodes | One organization |
| Read permission | Public | Public or restricted | Public or restricted |
| Immutability | Nearly impossible to tamper | Could be tampered | Could be tampered |
| Efficiency | Low | High | High |
| Centralized | No | Partial | Yes |
| Consensus process | Permissionless | Permissioned | Permissioned |

**Table 2**
**Comparison of Smart Contract Platforms**

| Platform& Comparison item | Bitcoin | Ethereum | Fabric | Corda | EOS | Stellar |
|---|---|---|---|---|---|---|
| Language | C++ | Solidity, Serpent | Java, Golang | Java, Kotlin | C++ | Python, JavaScript |
| Execution Environment | Docker | EVM | Docker | JVM | WebAssembly | Docker |
| Consensus Protocols | PoW | PoW | PBFT | Raft | BFT-DPOS | SCP |
| Data Model | Transaction-based | Account-based | Key-value pair | Transaction-based | Account-based | Account-based |
| Permission | Public | Public | Private | Private | Public | Consortium |
| Turing Completeness | Turing incomplete | Turing complete | Turing complete | Turing incomplete | Turing complete | Turing complete |
| Application | Digital currency | General | General | Digital currency | General | Digital currency |

**Table 3**
**Comparison of major consensus mechanisms**

| | PoW | PoS | DPoS | Raft | PBFT |
|---|---|---|---|---|---|
| Application Scenarios | Public blockchain | Public blockchain & Permissioned blockchain | Public blockchain & Permissioned blockchain | Consortium blockchain | Permissioned blockchain |
| Degree of decentralization | Fully decentralized | Fully decentralized | Fully decentralized | Semi-decentralized | Semi-decentralized |
| Accounting node | Full network | Full network | Selected nodes | Leader-based | Semi-dynamic |