

## Hyperledger

Hyperledger is a blockchain project that has a ledger, uses smart contracts as Ethereum and is a system in which participants manage their transactions. In contrast with other platforms, Hyperledger is private and permissioned, which members enrolls through a Membership Service Provider (MSP). This enrollment is made through a type of account called chaincode, which is the same as Ethereum contract, where a chaincode can only have access to its private storage and they are isolated from each other. This platform also offers different options like the ledger can be stored in multiple formats, consensus mechanisms can be switched and different MSPs are supported. Hyperledger implements the called Bucket-Merkle tree which uses a hash function to group state into a list of buckets from which a Merkle tree is built. An important Hyperledger feature is that offers the possibility to create channels so a group of participants can create a separate ledger of transactions. The Hyperledger ledger subsystem is formed by two components, the world state and the transaction log, where each participant has a copy of the ledger to every network they belong to. Here, the world state describes the state of the ledger at a given point in time, i.e., the database of the ledger, and the transaction log records the before and after values of the ledger database being used by the blockchain network. When a transaction is submitted, Hyperledger returns a transaction id which can be used for checking the transaction status at a later time, and confirms a block as soon as it appears on the blockchain. Another key feature of the Hyperledger model is what is called assets. Assets enable the exchange of elements with monetary value over the network. Assets are represented as a collection of key-value pairs, with state changes recorded as transaction on a channel ledger, where is one ledger per channel. Smart contracts in Hyperledger are invoked by an application that is external to the blockchain when the application needs to interact with the ledger. An important feature of Hyperledger is related with privacy, where Hyperledger privacy is implemented using channels. In Hyperledger, the consensus mechanism (currently include SOLO, kafka, and will be extended with SBTf) can be chosen as the one that represents better the relationship that exist between the different participants.