Hyperledger Fabric

Tim Sigl

Hyperledger Fabric is a permissioned blockchain network. Only members of a Hyperledger Fabric network enrolled through a trusted Membership Service Provider (MSP) can take part in the network. Hyperledger Fabric provides a modular and extendable architecture where for example the consensus mechanism can easily be swapped. Ethereum on the other hand is not modular and independent of any industry use-case. The needed PoW in Ethereum has a negative effect on the tps and data in transaction is available to all members of the whole network. The access control in Hyperledger Fabric is more fine-grained due to its permissioned nature and consensus has only to be reached between participating parties so no PoW is needed. In Hyperledger Fabric channels can be used to partition the message flow, so transactions are only visible to the clients connected to a particular channel. Furthermore Hyperledger Fabric has no built-in currency because no currency is needed to incentivize nodes to validate transactions. Ethereum's high transparency comes at the cost of scalability and privacy. Due to its permissioned access policy Hyperledger Fabric solves scalability and privacy issues.
Hyperledger Fabric consists of the following modular building blocks: a ordering service to broadcast state updates and to reach consensus, a membership service provide to associate peers with identities, an optional peer-to-peer gossip service to send block outputs to all peers, a smart contracts building block and finally the ledger which is a append only blockchain. The main Hyperledger Fabric architecture consists of two parts: A smart contract called chaincode which implements the application logic and runs during the execution phase and an endorsement policy which is evaluated in the validation phase and specifies for example the number of endorsers. Here is diagram showing the execution phases of the network:

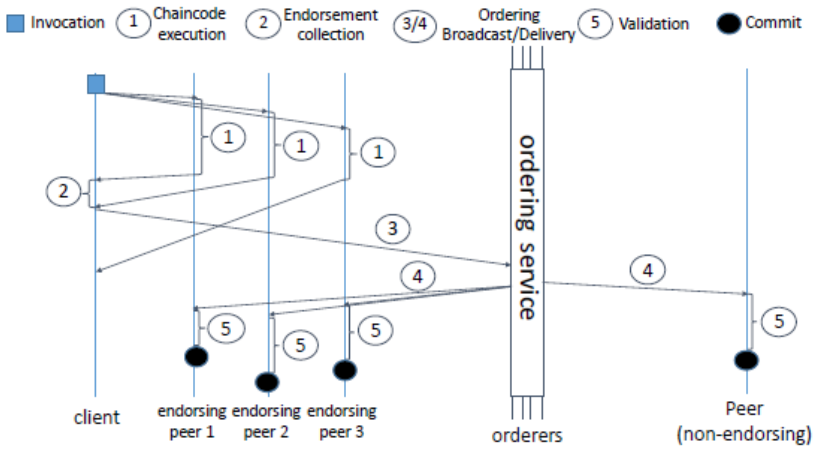


Figure 4: Fabric high level transaction flow.

In the first phase clients send transaction proposals to the endorsers. The endorsers execute the transactions. In the second phase The client collects the endorsement of the endorsers untill the number of endorsements specified in the endorsement policy is reached. In the

third phase the transaction is assembled by the client and sent to the ordering service which establishes a total order on all submitted transactions i.e. reaches consensus. The last phase is the validation phase where blocks are delivered to peers either directly by the ordering service or through gossip. Peers validate the endorsement policy and check for read-write conflicts. After all checks are fulfilled the local ledger state is updated.