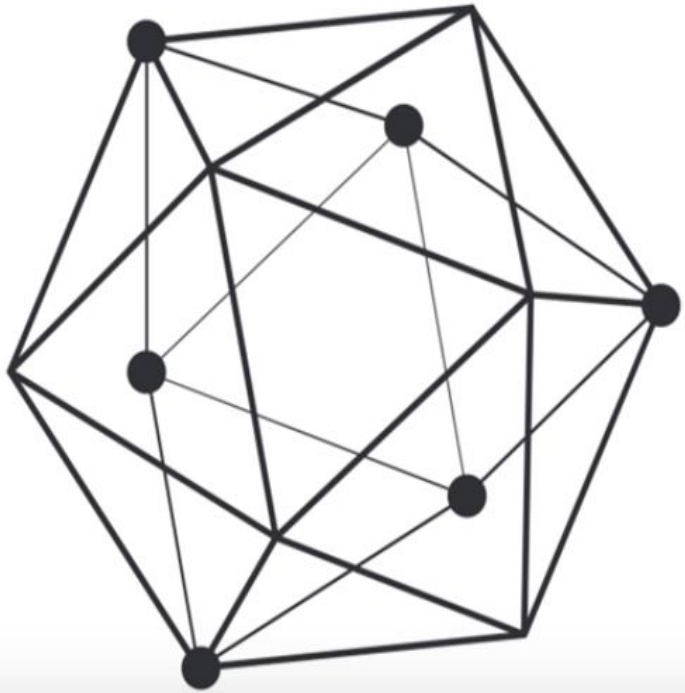
# HyperLedger Fabric

# Hyperledger

"Hyperledger is an open sourced community of communities to benefit an ecosystem of Hyperledger based solution providers and users focused on blockchain related use cases that will work across a variety of industrial sectors." –

Brian Behlendorf

(Executive Director, Hyperledger)



# Hyper… What?

In simpler terms, Hyperledger can be thought of as a software which everyone can use to create one's own personalised blockchain service.

# Restrictions

"Public blockchains requires each peer to execute each and every transaction and run 'consensus' at the same time" are….

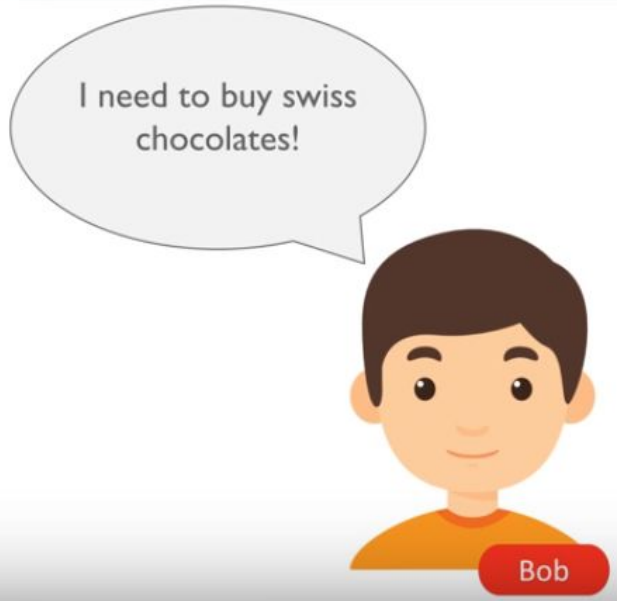
Not Scalable

Do not support Private and Confidential transactions

# Friend in Need

Suppose Bob, had a friend in Switzerland,

and they had a special deal as they were old friends!

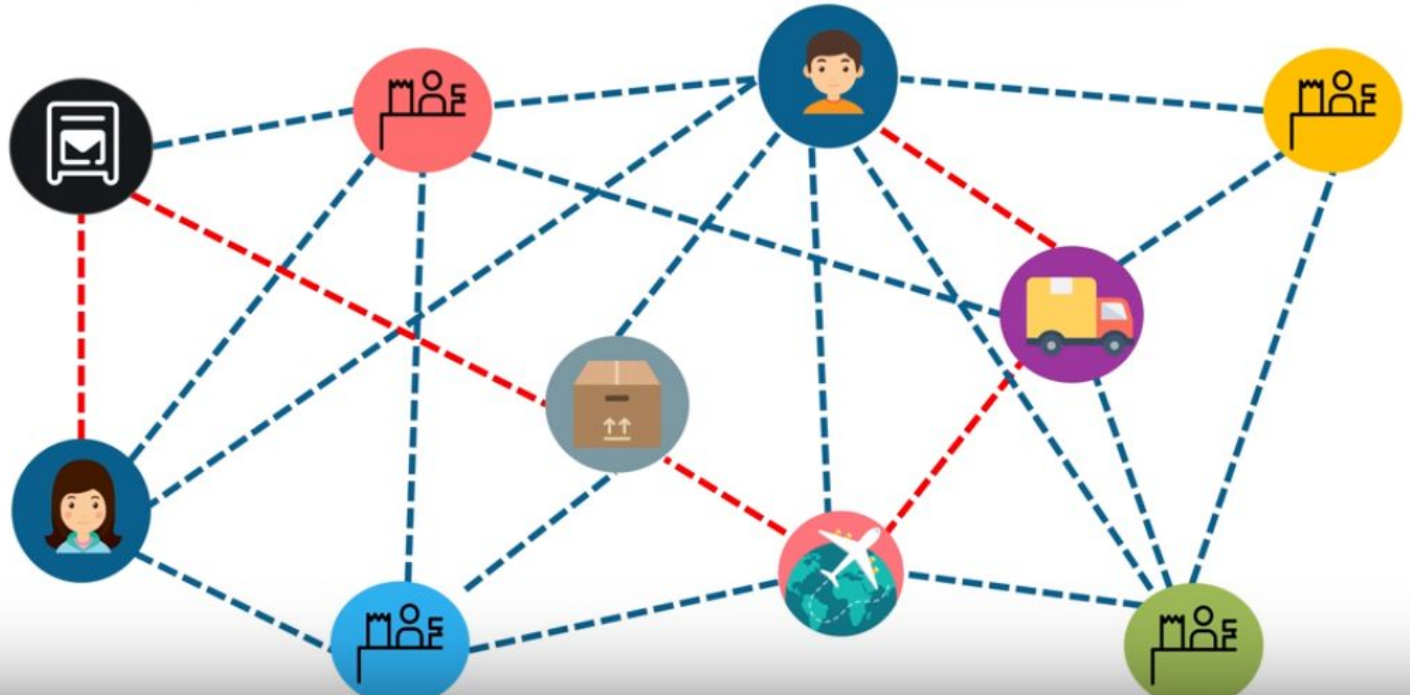


# But Alice has a Big Market

# Private and Confidential

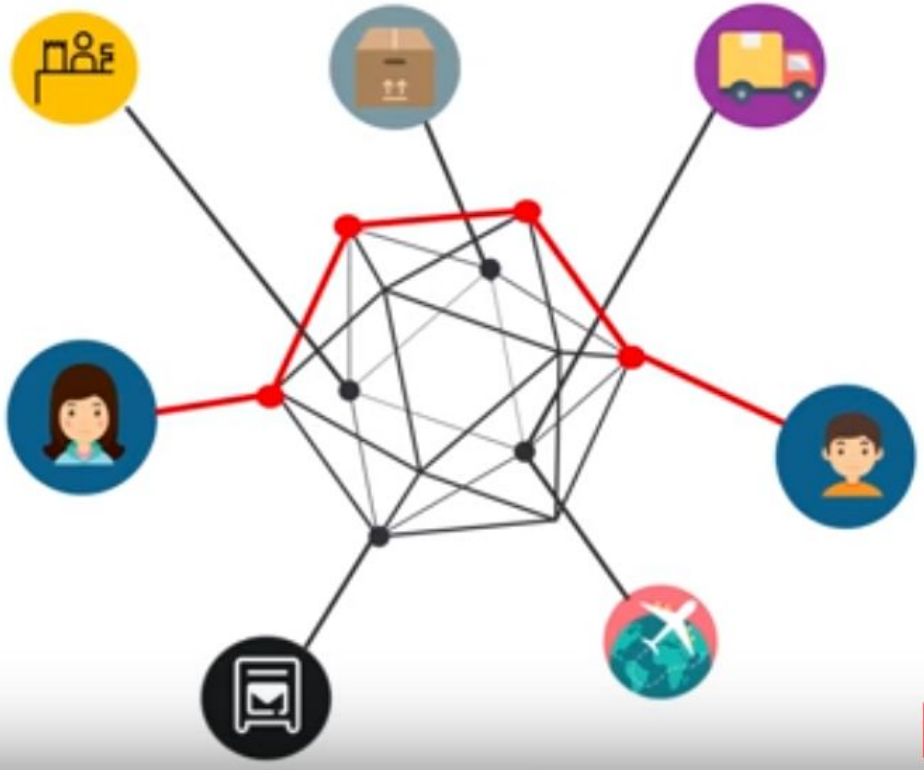
# On a Public Blockchain

Every ledger will be updated about Alice and Bob's special deal



# The Hyperledger Way

On the Hyperledger network, only parties directly affiliated with the deal are updated on the ledger and notified. Thus maintaining privacy and confidentiality



# How it works?

### App Query

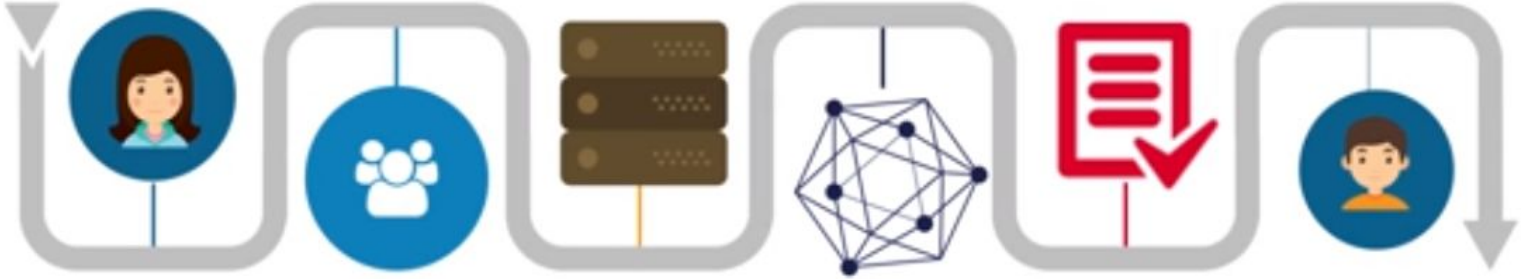
She looks up her app for Bob's address on the network

### Hyperledger

The Hyperledger network then connects both parties directly affiliated with the deal

### Bob Receives

Once the consensus cloud validates the transaction, Bob receives his product and the transactions are committed to the ledger



### Alice Sends

Alice decides to send Bob her product

### Membership Service

The app looks up a membership service validates Bob's membership

### Verification

Both parties generate a result which are then sent to the consensus cloud to be ordered and verified

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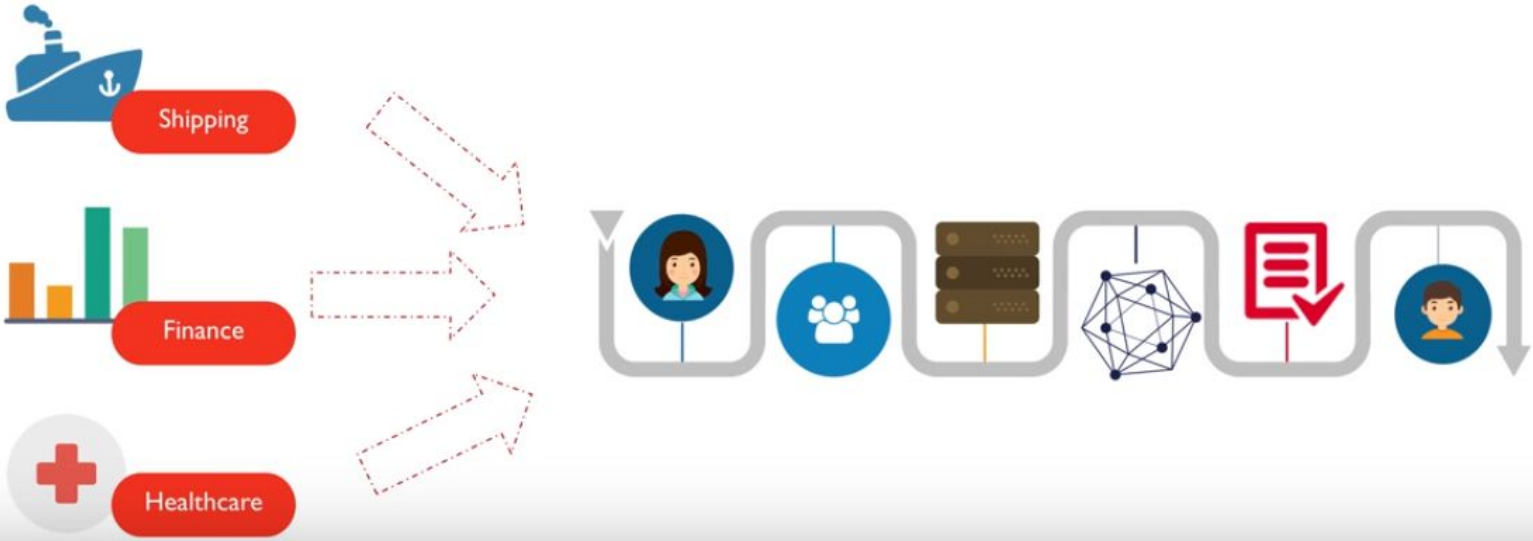
# Pattern Matching

This same pattern is needed by a lot of industries where
confidential obligations are need to be met without passing everything through a central authority.

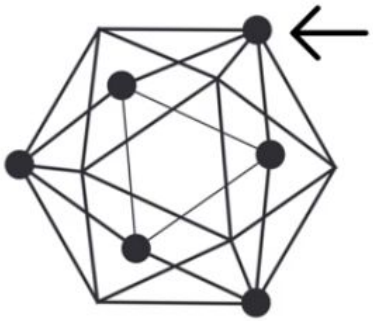


So how is Hyperledger different from existing blockchain platforms?

It is a private and permissioned Blockchain system which means Unlike, in Permissionless(or public network) systems that allow unknown identities to participate in the network, the members enroll through **Membership Service Provider (MSP)**.

It also offers the ability to create channels, allowing a group of participants to create a separate ledger of transactions.

# Notable Changes



Peers

Two Separate Runtime

Three Distinct Roles

Endorser

Committer

Consenter

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# Peer Roles: Committer

Committer

Responsible for

1. Append validated transactions to their specific ledger

# Peer Roles: Endorser

Endorser

Responsible for

1. Simulating Transactions
2. Preventing unstable and Non deterministic transactions

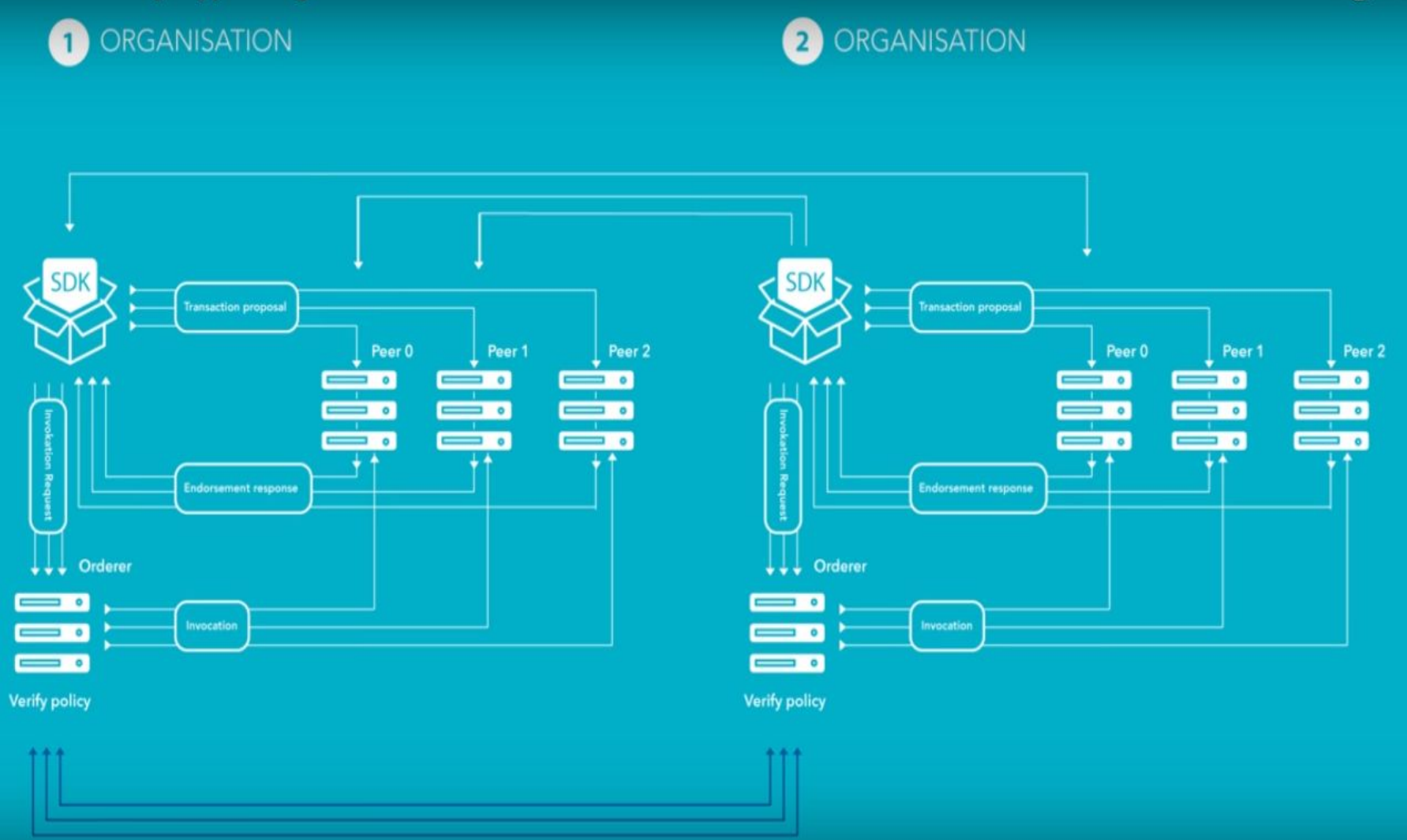
# Peer Roles: Consenter

Consenter

Responsible for

1. Network's Consensus service
2. A collection of consensus service nodes (CSNs) will order transactions into blocks according to the network's chosen ordering implementation

# Working of HyperLedger


1 ORGANISATION
2 ORGANISATION
SDK
Transaction proposal
Peer 0
Peer 1
Peer 2
Invokation Request
Endorsement response
Orderer
Invocation
Verify policy
SDK
Transaction proposal
Peer 0
Peer 1
Peer 2
Invokation Request
Endorsement response
Orderer
Invocation
Verify policy

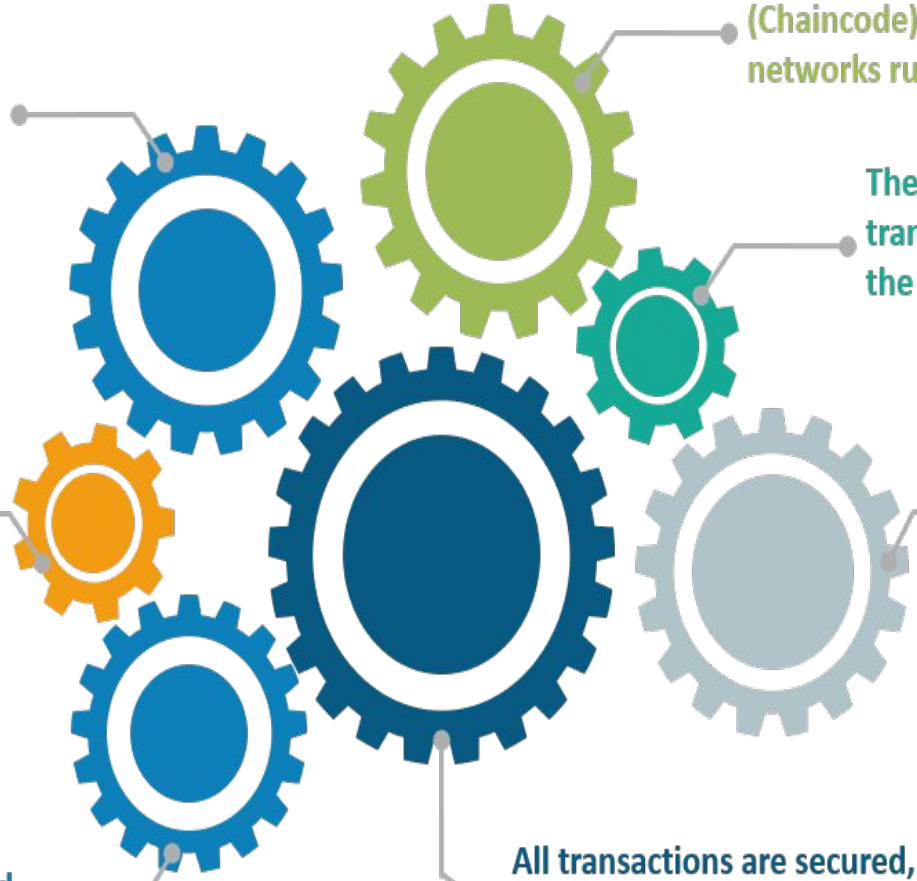
Relies on a smart contract system (Chaincode), which every peer of the networks runs in Docker containers

Fabric issues transactions with derived certificates that are unlinkable to the owning participant

The events are structured as transactions and shared among the different participants

All participants must register proof of identity to membership services in order to gain access to the system

The transactions are executed without a cryptocurrency



The content of each transaction is encrypted to ensure only the intended participants can see the content

All transactions are secured, private, and confidential. Fabric can only be updated by consensus of the peers

# Benefits

**Data Protection & Consistency**

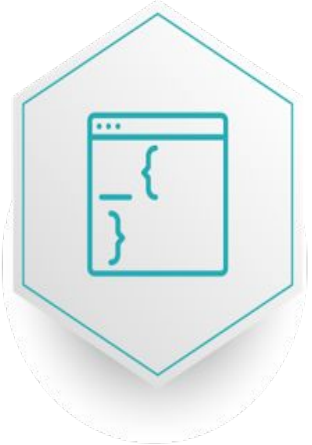
Use permissions to ensure accountability of membership & access rights

**Confidential transactions**

Use Give businesses the flexibility & security to make transactions visible to select parties with the correct encryption keys

**No cryptocurrency**

Does not require mining & expensive computations to assure transactions



**Programmable**

Leverage the embedded logic in smart contracts to automate business process across your network

# How Hyperledger Differs

| Parameters | Bitcoin | Ethereum | Hyperledger |
|---|---|---|---|
| Cryptocurrency | Bitcoin | Ether | None, but can be implemented when required |
| Network | Public | Public | Permissioned |
| Consensus | Proof of Work (SHA256) | Proof of Work (Ethash) | PBFT (practical byzantine fault tolerance) |
| Smart Contract | None | Yes (Solidity) | Yes (chaincode) |
| Language | C++ | Golang, Python | Golang, Java |

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# References


1) https://www.youtube.com/watch?v=Y177TCUc4g0
2) https://www.hyperledger.org/
3) https://www.ibm.com/blockchain/hyperledger.html