BCDV 1025
Enterprise Blockchain

2023 February

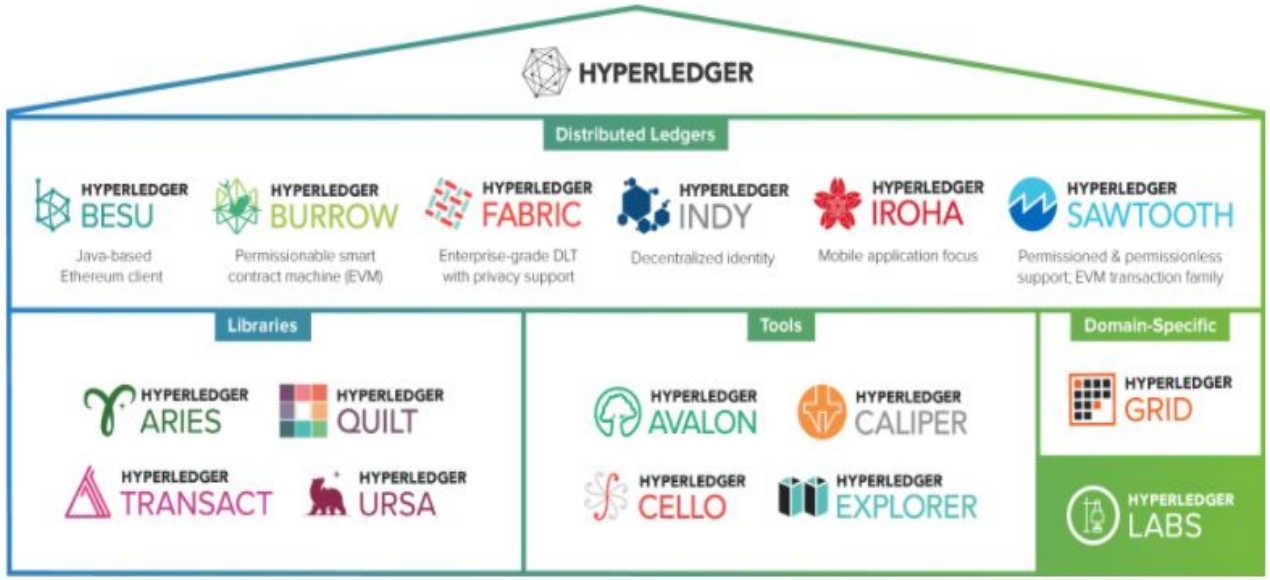
week 01 - class 01

What is HyperIdger Fabric?

Hyperledger Fabric is an open-source enterprise-grade permissioned distributed ledger technology (DLT) platform, designed for use in enterprise contexts

Bit history about the Project.

Hyperledger was established under the Linux Foundation. It is governed by a diverse technical steering committee, and the Hyperledger Fabric project by a diverse set of maintainers from multiple organizations. It has a development community that has grown to over 35 organizations and nearly 200 developers since its earliest commits.



Where is it used?

The fabric has a broad range of industry use cases including banking, finance, insurance, healthcare, human resources, supply chain and even digital music delivery.

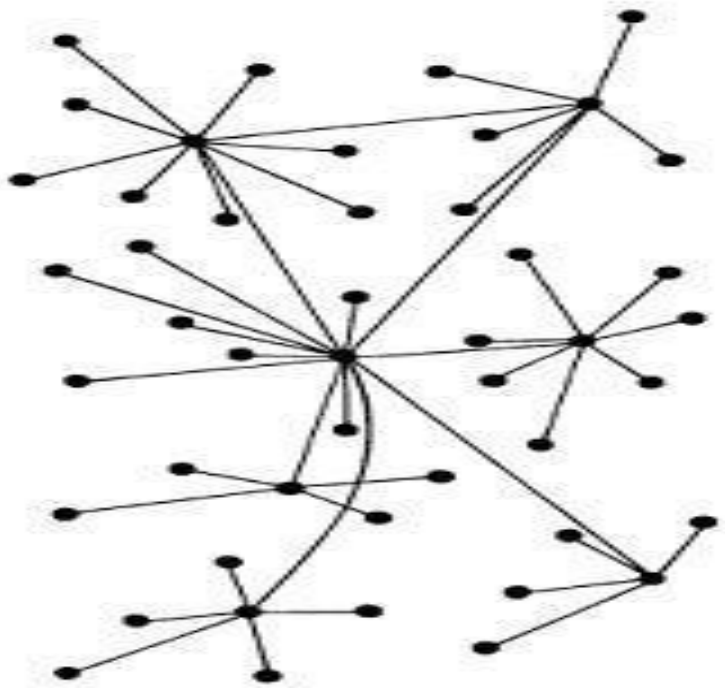
What makes it attractive?

The fabric has a highly **modular** and **configurable** architecture, enabling innovation, versatility and optimization.
Its support for **pluggable consensus protocols** enables the platform to be more effectively customized to fit particular use cases and trust models. For instance, when deployed within a single enterprise, or operated by a trusted authority, fully byzantine fault-tolerant consensus might be considered unnecessary and an excessive drag on performance and throughput.

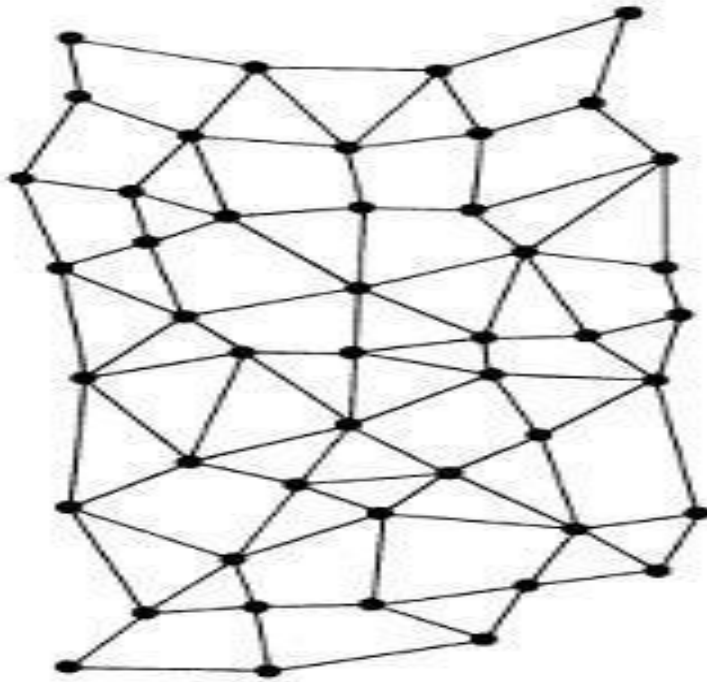
Fabric can leverage consensus protocols that **do not require a native cryptocurrency** to incent costly mining or to fuel smart contract execution. Avoidance of a cryptocurrency reduces some significant risk/attack vectors, and the absence of cryptographic mining operations means that the platform can be deployed with roughly the same operational cost as any other distributed system.

Decentralized Ledger – Only Authorized peers have the copy of ledger.

Distributed Ledger – Each peer have the copy of ledger.



DECENTRALIZED
(B)



DISTRIBUTED
(C)

Permissioned Vs Permissionless Blockchain

Requires permissions to join and interact with the network	Anyone can join the network
Ledger transparency is limited to the participants	Ledger is transparent globally
Ledger is distributed	Ledger is Decentralized
Data is partially immutable	Data is truly immutable
Custom governance and access policies are implemented	Offers open governance and anonymity
Mining is not necessary	Mining is involved

Use Case:

Supply chain Industry:

Lets take an example of a truck carrying an Ice-cream. Now as we know Ice-cream is a very temperature sensitive thing to transport. Even a slightest temperature difference can ruin the entire inventory.

Now lets assume we have Company A (Manufacturer), Company B (Transporter) and Company C (Retailer).

Now, Company B was transporting it by truck and due some issues in between their cooling system failed. Now, when the Company C when they received this inventory it was in the damaged condition.

Now when the retailer complained the Company B refused to take the liability just as Company A.

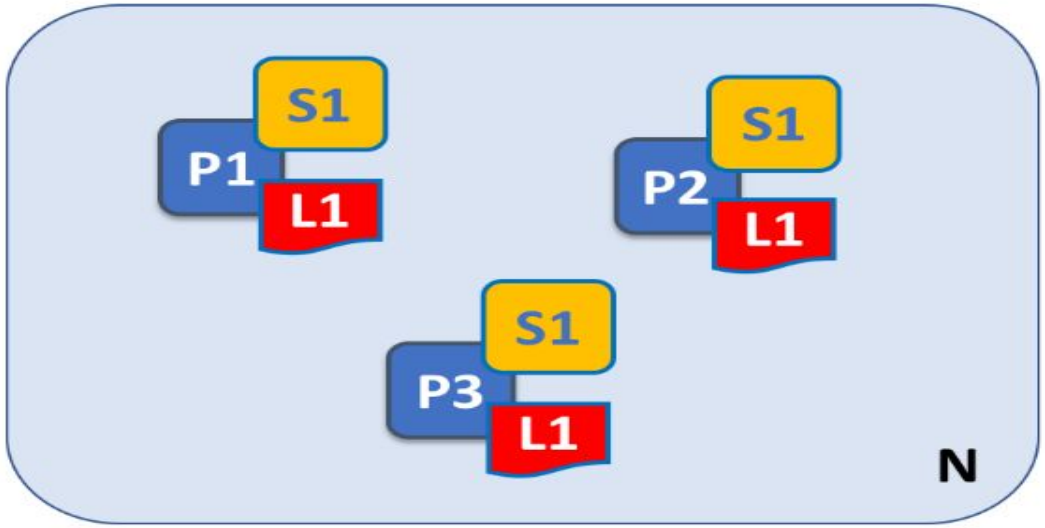
Now, this problem can be solved using blockchain.

How, Each company can maintain a same a ledger where a real time data from the temperature sensors can be imputed from the time of manufacturing to the retailer receiving the delivery. This will bring the transparency in the whole supply chain of the product and liabilities.

Main Components of the Network:

Peers

Fundamental element of a Hyperledger Fabric blockchain network is the set of *peer nodes* (or, simply, ***peers***). **Peers** are fundamental because they manage ledgers and smart contracts.



N	Blockchain network
P	Peer node
S	Smart contract (aka chaincode)
L	Ledger

Orderers

The mechanism by which applications and peers interact with each other to keep the ledger current and consistent across a channel is mediated by special nodes called ***orderers***. It's to these orderer nodes that we now turn our attention.

Certificate Authority

Hyperledger Fabric CA is the default **Certificate Authority** component, which issues PKI-based certificates to network member organizations and their users. The CA issues one root certificate (rootCert) to each member and one enrollment certificate (ECert) to each authorized user.