



NPTEL ONLINE CERTIFICATION COURSES

Blockchain and its applications Prof. Sandip Chakraborty

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Lecture 33: Enterprise Blockchains

CONCEPTS COVERED

- Enterprise blockchains



KEYWORDS

- Enterprise blockchain applications
- The Hyperledger greenhouse
- Hyperledger Fabric



Blockchain – The Application Space

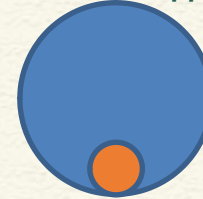


Blockchain is a design pattern made famous by its use in **Bitcoin**. But its uses *go far beyond*.



Blockchain can **reimagine** the world's most fundamental business interactions and open the door to invent new styles of digital interactions.

Total Blockchain Opportunity

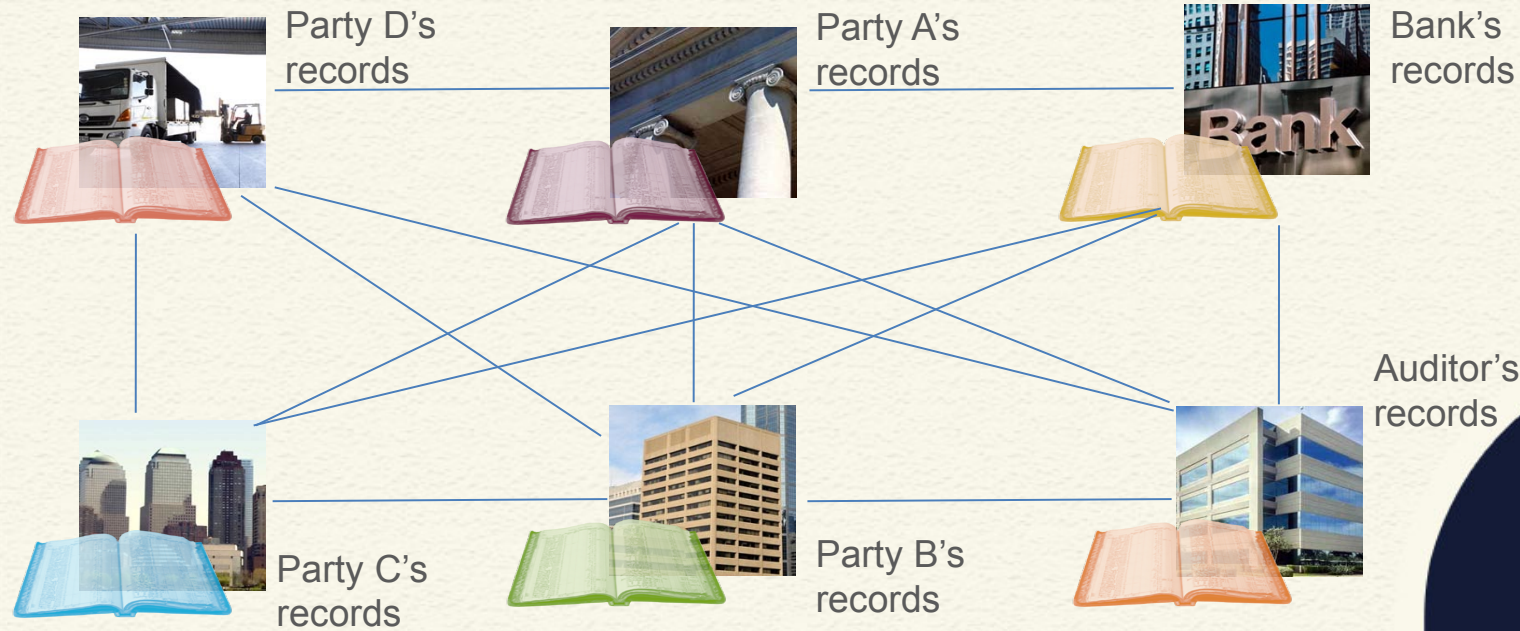


Total Bitcoin Opportunity

Enterprises are adopting Blockchain to a very **broad range** of business applications

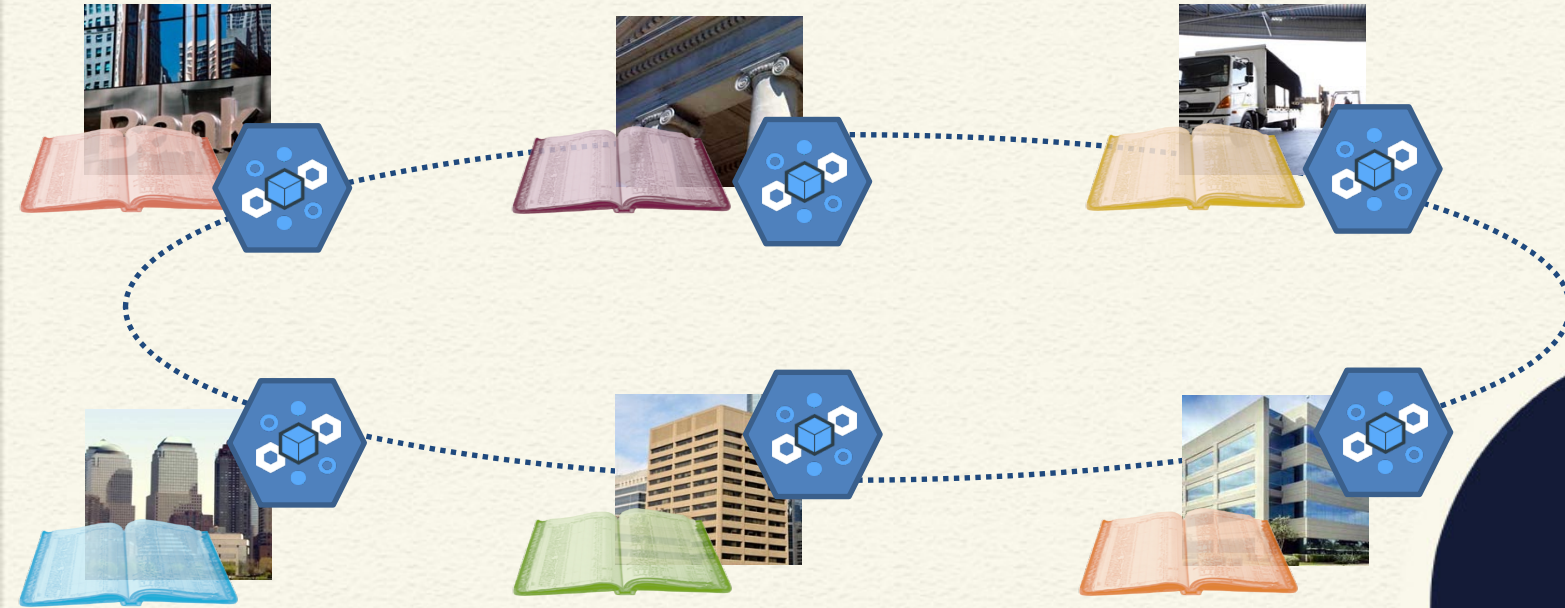


Asset Transfer in a Business Network



... Inefficient, expensive, vulnerable

Asset Transfer in a Business Network



... Consensus, provenance, immutability, finality

Benefits of Blockchain for Business

Append-only distributed
system of record shared
across business network

**Shared
Ledger**

Security

Ensuring appropriate
visibility; transactions are
secure, authenticated &
verifiable

Business terms embedded
in transaction database &
executed with transactions

**Smart
Contracts**

Consensus

All parties agree to network
verified transaction

ReducesTime



Transaction time
from days to near
instantaneous

Removes Cost



Overheads and
cost of
intermediaries

ReducesRisk



Tampering, fraud
& cyber crime

**Enables
NewBusiness
Models**



IoT Integration
into supply
chain



Degree of Centralization



Figure source: "Distributed Ledger Technology: Beyond Blockchain", A report by UK Govt Chief Scientific Adviser



Permissionless vs Permissioned Blockchains

	Permissionless	Permissioned
Access	Open read/write access to database	Permissioned read/write access to database
Scale	Scale to a large number of nodes, but not in transaction throughput	Scale in terms of transaction throughput, but not to a large number of nodes
Consensus	Proof of work/ proof of stake	Closed membership consensus algorithms
Identity	Anonymous/pseudonymous	Identities of nodes are known, but transaction identities can be private/anonymous/pseudonymous
Asset	Native assets	Any asset/data/state



The Linux Foundation Hyperledger Project

A collaborative effort created to advance blockchain technology by identifying and addressing important features for a cross-industry open standard for distributed ledgers that can transform the way business transactions are conducted globally.



HYPERLEDGER
FABRIC



HYPERLEDGER
GRID



HYPERLEDGER
INDY



HYPERLEDGER
IROHA



HYPERLEDGER
QUILT



HYPERLEDGER
SAWTOOTH



HYPERLEDGER
TRANSACTION



HYPERLEDGER
URSA



HYPERLEDGER
ARIES



HYPERLEDGER
AVALON



HYPERLEDGER
BESU



HYPERLEDGER
BURROW



HYPERLEDGER
CACTUS



HYPERLEDGER
CALIPER



HYPERLEDGER
CELLO



HYPERLEDGER
EXPLORER

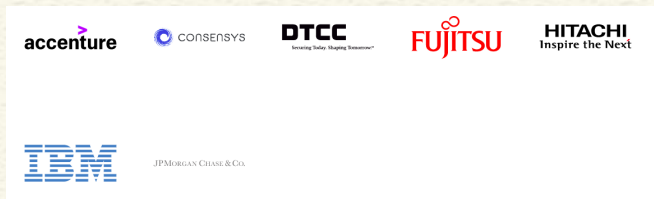
<https://www.hyperledger.org/>



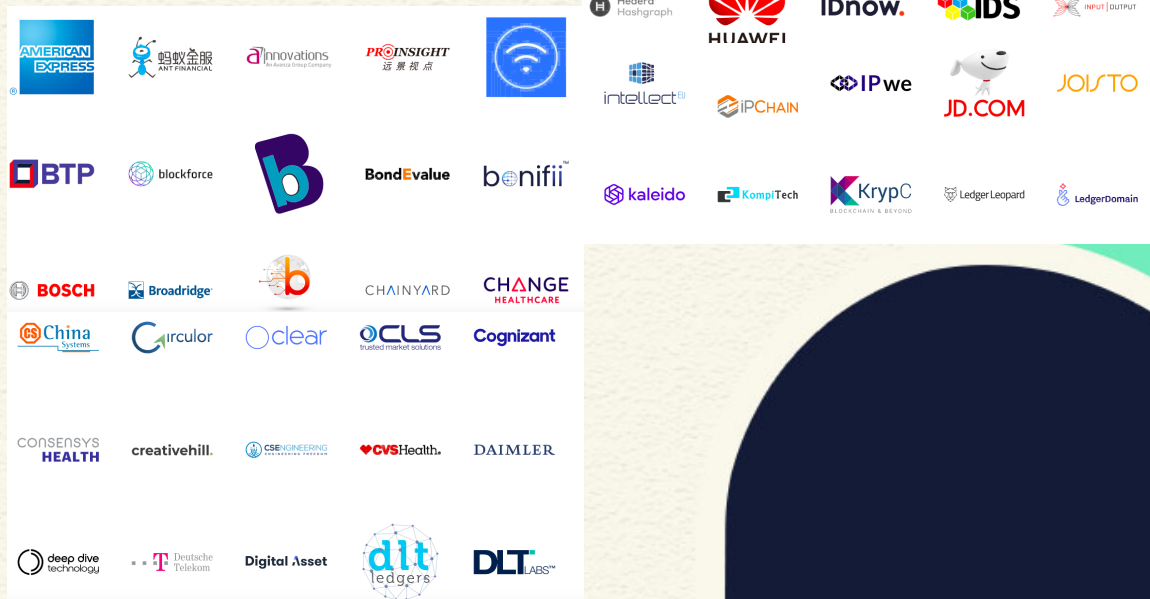
Hyperledger Members

<https://www.hyperledger.org/about/members>

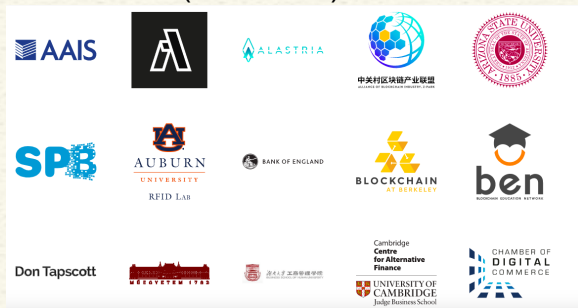
Premier



General (Partial list)

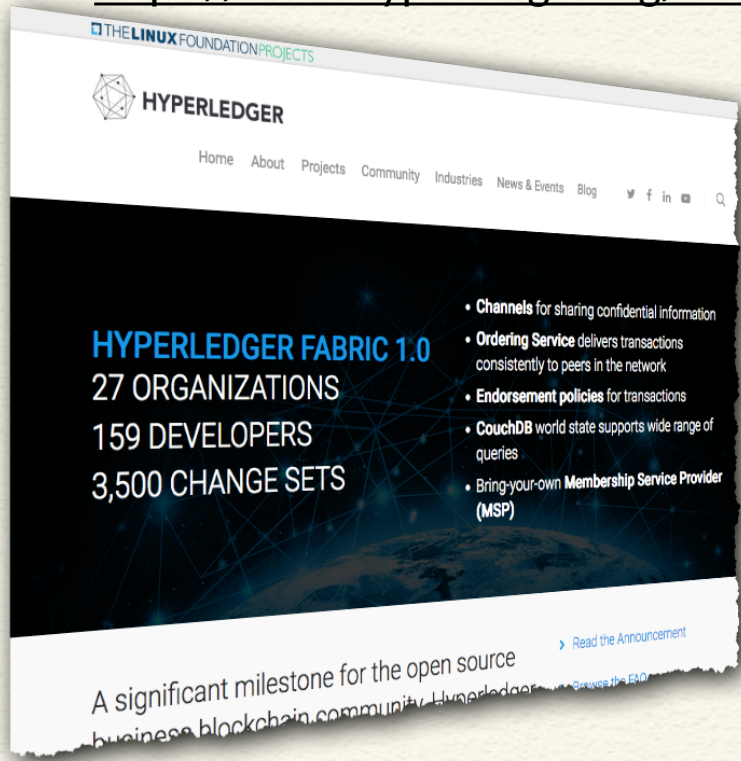


Associates (Partial list)



Hyperledger Fabric – Distributed Ledger Platform

<https://www.hyperledger.org/use/fabric>



- An implementation of blockchain technology that is a foundation for developing blockchain applications

- Emphasis on ledger, smart contracts, consensus, confidentiality, resiliency and scalability.

- V1.0 released July 2017

- 159 developers from 27 organizations



Conclusion

- Enterprise blockchains have a wide spectrum of applications and use cases that can be developed over permissioned models
- We'll next explore Hyperledger Fabric to develop our first DLT application



*Thank
you*

