

LDT S7: Blockchain & Business Strategy

DTSL

Neena Pandey, IIMV



Session Objective

- What is Blockchain?
- Terminologies Used & Prominent Examples
- Blockchain Demo
- Types & Benefits
- Business Use Cases
- Do you really need a blockchain?

What is a blockchain?

- The God Protocol - Nick Szabo, 1997
 - With limitations - Speed, Privacy, Fault tolerance
- A blockchain is a **distributed, or decentralized** ledger
 - A digital system for recording among multiple partners in a verifiable, tamperproof way
 - Pros - distributed power - hence devoid of bias (trustless), low error possibility; real-time data reconciliation; resilience
 - Cons - higher cost of maintenance, hence lower performance; lower privacy
- Basically, an encrypted linked list
- Can be programmed to trigger transactions automatically - e.g., Smart contracts

Blockchain – Use Cases

- Blockchain – The Trust Protocol – mass collaboration, cryptography, and clever code
- Primary use cases:
 - Smart contracts
 - Decentralized Finance (DeFi)
 - Crypto assets
 - Self-sovereign identity (Digital identity)
 - Distributed Autonomous Organizations (DAOs)

Conventional Databases vs. Blockchain

- Which is better? Centralized databases or Blockchains
- Better than them in all situations?
- Benefits of centralized databases
 - Efficient and fast storage and retrieval
 - Complete control even if distributed

Terminologies Used

- Hash
- Protocols
- Token
- Consensus mechanism: Proof of work (value) /round-robin/ proof of elapsed time/proof of stake

Blockchain Demonstration

- <https://andersbrownworth.com/blockchain/>

Prominent Examples

- Bitcoin - <https://bitcoin.org/bitcoin.pdf> - Satoshi Nakamoto
- Ethereum - primarily enables smart contracts
- Hyperledger - for development of cross-industry blockchain applications/use cases - personalized blockchain (permissioned) services;

Types: Permissioned vs. Permissionless

- Permissionless - e.g., Bitcoin
 - Secure; Irrevocable record of financial transactions
 - Proof of work; Provides proof of ownership of a digital coin
 - No centralized authority; Anonymous participants
- Permissioned - e.g., Hyperledger (supply chain, smart contracts)
 - Known participants (permissioned)
 - Selective access - Why? - competitive intelligence, trade stocks, predict market movements
 - Governance mechanisms
 - From proof of work to another consensus protocol

Permissioned vs. Permissionless

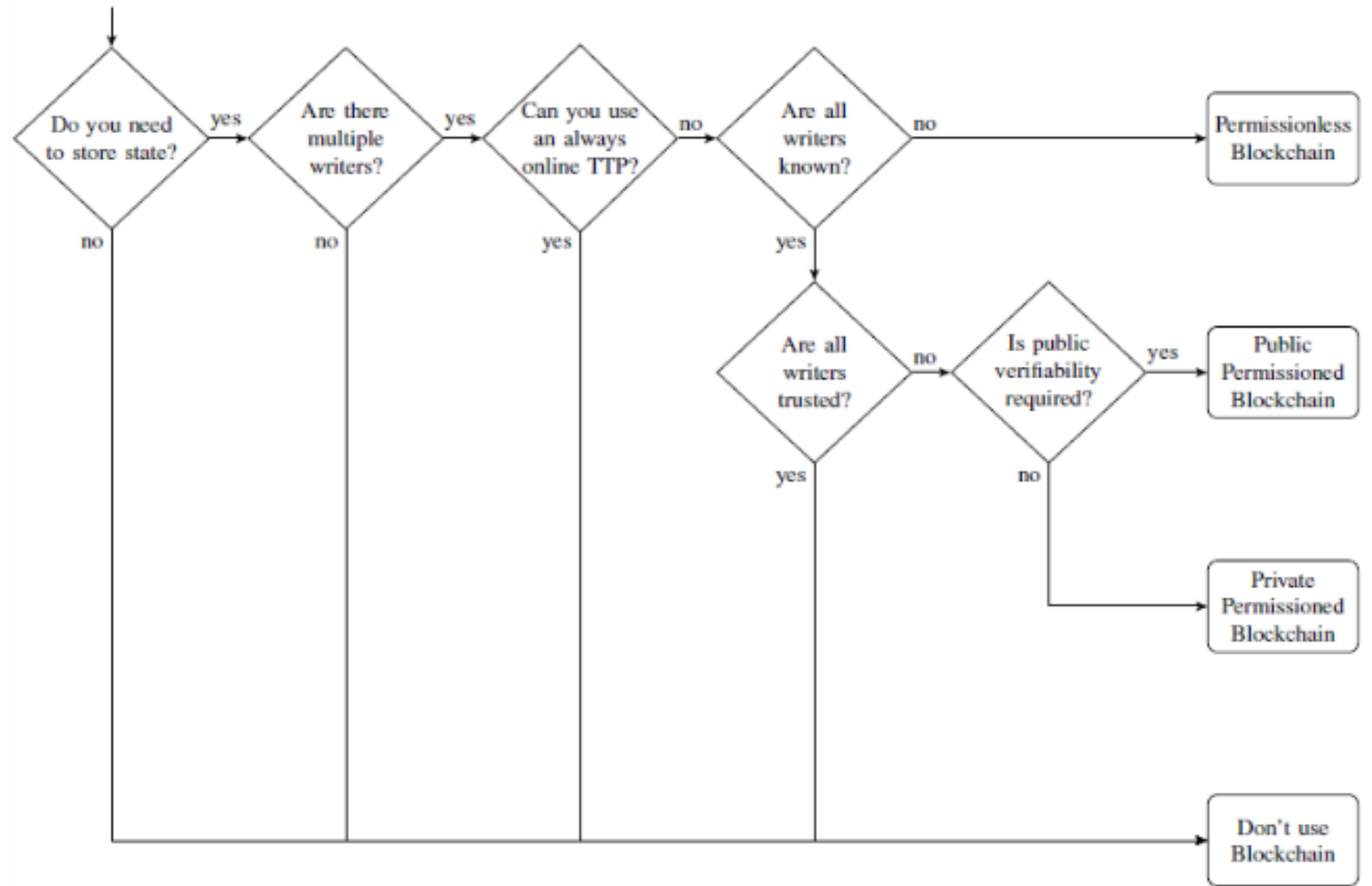
Permissionless vs. permissioned blockchain

	Permissionless	Permissioned
OVERVIEW	Open network available for anyone to interact and participate in consensus validation. Fully decentralized across unknown parties.	Closed network. Designated parties interact and participate in consensus validation. Partially decentralized (i.e., distributed across known parties).
ALSO KNOWN AS	Public, trustless.	Private, permissioned sandbox.
KEY ATTRIBUTES	<ul style="list-style-type: none"> ■ Full transparency of transactions, based on open source protocols ■ Development via open source ■ Mostly anonymous, with some exceptions ■ Privacy depends on technological limitations or innovations ■ No central authority ■ Often involves digital asset or token for incentives 	<ul style="list-style-type: none"> ■ Controlled transparency, based on organizations' goals ■ Development via private entities ■ Not anonymous ■ Privacy depends on governance decisions ■ No single authority, but a private group authorizes decisions ■ May or may not involve digital assets or tokens
BENEFITS	<ul style="list-style-type: none"> ■ Broader decentralization, extending access across more network participants ■ Highly transparent, which is beneficial for speed and reconciliation across unknown parties ■ Censorship resistant, due to accessibility and participation across locations and nationalities ■ Security resilience, since attackers cannot target a single repository, and it is costly and difficult to corrupt 51% of the network 	<ul style="list-style-type: none"> ■ Incremental decentralization, but participation from multiple businesses helps mitigate risks of highly centralized models ■ Stronger information privacy because transaction information is only available based on permissions ■ Highly customizable to specific use cases through diverse configurations, modular components and hybrid integrations ■ Faster and more scalable, since fewer nodes manage transaction verification and consensus
PITFALLS	<ul style="list-style-type: none"> ■ Less energy efficient because network-wide transaction verification is resource-intensive ■ Slower and difficult to scale, as high volume can strain network-wide transaction verifications ■ Less user privacy and information control 	<ul style="list-style-type: none"> ■ Limited decentralization because a network with fewer participants increases risk of corruption or collusion ■ Risk of override, since owners and operators can control or change the rules of consensus, immutability, or mining ■ Less transparent to outside oversight, since participants are limited and operators determine privacy requirements
MARKET TRACTION	<ul style="list-style-type: none"> ■ Peer-to-peer ■ Business-to-consumer ■ Government-to-citizens 	<ul style="list-style-type: none"> ■ Business-to-business ■ Business-to-consumer ■ Governments-to-organizations

Benefits: Blockchain based Supply chain

- Enhanced Traceability
 - Counterfeit, stolen or harmful products - Pharma, Food (agriculture)
 - Same/different blockchains for different tokens
 - No need of sharing competitive data - hence higher adoption
- Increasing efficiency and speed and reducing disruptions
 - Complex supply chains; same components being used by two firms with no transparency
 - Blockchain with logistics company
 - Integration of all data from all organizations?
 - Blockchain wouldn't require significant changes to firm's internal systems

Do you even need a blockchain?



Applications of Blockchain

- Decentralized Finance (DeFi)
- Non-Fungible Tokens (NFTs)
- Central Bank Digital Currencies (CBDCs)
- Reputation Markets
- Distributed Autonomous Organizations (DAOs)

References

- <https://www.hivenet.com/post/decentralized-or-distributed-whats-the-big-difference>
- The God Protocol - <https://nakamotoinstitute.org/the-god-protocols/>
- Smart Contracts: <https://www.youtube.com/watch?v=ZE2HxTmxfrI>
- Use Blockchains Technology to Manage Supply Chains: How Smart Contracts Can Transform Supply Chains : <https://www.youtube.com/watch?v=C8ow4b5YCQU>
- Blockchain for agricultural Supply chain: <https://www.youtube.com/watch?v=6ImFBrRuGG0>
- <https://www.forbes.com/sites/amazonwebservices/2019/12/10/improving-international-trade-with-blockchain/>
- <https://consensys.io/blockchain-use-cases>