Blockchain 101-A high level overview for the uninitiated

(NOT a technical overview)

Contents

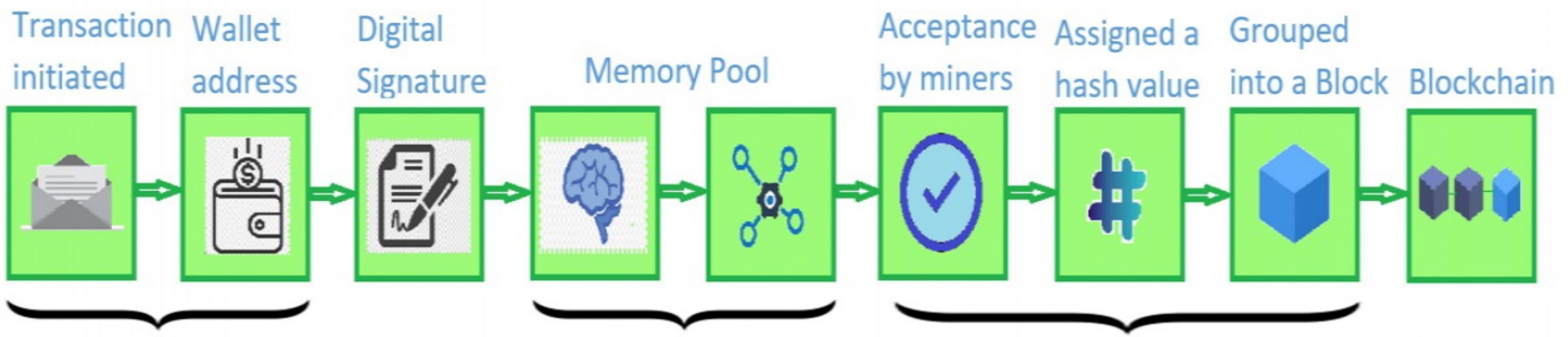
What is Blockchain

- Based on whitepaper by Satoshi Nakamoto in 2008, which outlined a “new protocol for a peer-to-peer electronic cash system using a cryptocurrency called Bitcoin.”
- This protocol established a series of rules in the form of distributed computations to ensure the integrity of data and create trust without the need for a trusted intermediary.
- All transactions are verified and stored in a block. Each block is linked to the previous block thereby creating a chain. Hence the term “Blockchain”.
- Also called “internet of value or of money”

Difference between Blockchain and DLT

- All Blockchains are Distributed Ledger Technologies (DLTs), but all DLTs are not Blockchains
- Some unique characteristics of Blockchain (not in other DLTs):
  - Data stored in blocks
  - Linked by a chain
  - Smart Contracts
  - Tokens

A transaction lifecycle in Blockchain



1. A transaction is created by the sender using the wallet address of the receiver
2. Sign a transaction
3. Transaction is sent to the memory pool
4. Transaction is accepted by the miners, grouped into a block and assign a hash value to the block
5. The block now becomes a part of blockchain

How Blockchain works

3 layers- application, decentralised ledger, peer to peer network

- Application: Top layer, application software, user interface. E.g. Bitcoin wallet- where public and private keys are maintained
- Decentralised ledger: middle layer. Consistent and tamper proof global ledger. Database exists on several computers and every copy is identical. Mining – process of grouping transactions into a block. Blocks are cryptographically linked through hashes. Consensus mechanisms like POW, POS etc.
- Peer to peer network: bottom layer. Node types play different roles and messages are exchanged.

Characteristics of Blockchain

- Distributed database
- peer to peer (P2P) transmission
- transparency with pseudo anonymity
- irreversibility of records
- computational logic (pow, pos)
- trust

Types of Blockchain

- Public or permissionless e.g. Bitcoin, Ethereum
- Private or permissioned e.g. Hyperledger fabric, most Corporate Blockchains
- Hybrid : combination of the above eg XinFin

Advantages of Blockchain

- Informational- data quality and integrity, reduce human error, info access, privacy, reliability, data sharing, anonymity
- Technological- flexibility, smart contract, security, resiliency, simplicity, speed, authenticity, proof of identity, digitalisation
- Economic- implementation and running cost
- Organisational- trust, transparency, auditability, predictability, control, ownership, accuracy, security, business model, decentralisation
- Strategic- several areas- identity, trust, avoid fraud, reduce corruption

Problems with the current state of Blockchain

- Immaturity
- Electricity
- Scalability
- Security
- Storage space
- Last mile-GIGO
- Integration
- Business model
- Decentralisation
- Lack of large scale implementations
- Hype- technology chasing a solution

Blockchain technology spectrum

Four types (as per Kandaswamy & Furlonger)

- Blockchain Disruptor (achieve decentralisation of business/technology)
- Digital Asset Market (new markets to create new digital assets)
- Efficiency Play(in existing business process at a company or industry level, with neither decentralisation nor new markets),
- Record Play (records are immutable and can be audited on demand).

When is Blockchain appropriate

- Lots of hype and “Blockchain White-washing”
- Lacity says 5 questions need to be asked before adopting Blockchain:
  - Right solution
  - Adequate standards
  - Adequate regulation
  - Governance
  - Ecosystem

Areas of Blockchain application (some examples)

- Finance
- Banking
- Health care
- Marketing
- Media
- Legal
- Logistics
- Supply chain including supply chain financing (SCF)
- Accounting & audit
- Personal identity security
- Land records
- Government
- Cryptocurrency, CBDC, NFT, Web 3.0,Metaverse (more later in this presentation)

Blockchain in banking and finance (an example)

- Current financial system very inefficient- antiquated, centralised, exclusionary
- Blockchain will accelerate digitalisation with AI, RPA, IOT. It will do to finance what internet did to media
- Expected to make banking and finance faster, more secure, transparent, cost effective. Bring in unbanked, facilitate micro payments
- Some early areas of pilots: Trade finance, cross border payments, KYC.
- The ultimate objective is to largely do away with intermediaries like banks (cryptocurrencies, ICOs)- though this is a very long way off and may never happen at scale.

Blockchain in supply chain (an example)

- Supply chain involves flow of cash, materials, information
- Current issues with supply chain : no quick interface, costs high, systems slow, cyber security issues
- Blockchain to accelerate digital supply chain integration, of both processes and information
- Areas include provenance, cross border transactions, SCF
- Maximise impact with IOT/sensors, AI, digital tokens, smart contracts,

Blockchain in marketing (an example)

- Marketers currently pay intermediaries like Facebook for customer data
- Blockchain can end Facebook-Google duopoly- can compensate customers directly for page view (overcome ad-block)
- Can help with micropayments to motivate customers to directly share personal information
- Can verify ad delivery and consumer engagement
- Can stop spam and bots
- Smart contracts for subscription to newsletters or reward programs
- Individuals can control their own online profiles and social graphs

Blockchain in accounting and audit (an example)

- Precision of records, compliance, confidentiality, integrity important.
- Currently manual or multiple systems so need reconciliations, elaborate checks and balances. Cost, time delays, redundancy, possibility of fraud and regulatory costs are issues
- Blockchain- distributed yet concurrent databases, simultaneously used by numerous participants, highly controlled data integrity within the blockchain, security.
- Features of consensus, provenance, finality and immutability could reduce challenges of accounting and auditing function
- However auditors still need to evaluate both technology and data controls and estimates provided by management.

Some related buzzwords

- Cryptocurrencies- digital currency, decentralised, encryption algo. Over 20,000. 4 types-utility, payment, security, stable coins. Bitcoin, Ethereum, Tether are 3 biggest. Now around $1 trillion.
- CBDC- Central Bank Digital Currency- Over 100 governments looking to issue. Number of Caribbean countries live; China, India, France pilots.
- NFTs-unique digital identifier, digital or physical asset e.g. art
- Web 3.0- coined by Ethereum cofounder Wood in 2014. Decentralised ecosystem based on Blockchain. Web 1-R, Web 2-R&W, Web 3-R, W, O.
- Metaverse- network of 3D virtual worlds focused on social connection. Virtual reality headset. Avatars.

In summary

- Why Blockchain is so important:
  - Truly decentralised, no intermediaries
  - Ownership of own data
  - Financial inclusion
  - Underpins cryptocurrency, Web 3.0, Metaverse etc
- Current status:
  - Lots of hype and pilots, few large scale implementations other than cryptocurrencies
  - Expected to scale in the next 5 to 10 years post fixing some of the current issues of Blockchain and setting standards and regulations

Some good places to start to learn about Blockchain

- Books/ Articles written by Don & Alex Tapscott who founded the Blockchain Research Institute (BRI) in Canada, starting with their book " The Blockchain Revolution" (2016)
- Follow Antony Day on LinkedIn and listen to his podcast " Blockchain won't save the world" and "RightClickSaveTheWorld" (on spotify, YouTube etc).
- Gartner
- Follow Paul Brody, E&Y's head of Blockchain. Listen to their Blockchain Summits on YouTube.
- For people with deep interest and deeper pockets do the online blockchain courses from MIT and/or Oxford

Thank You

Questions?