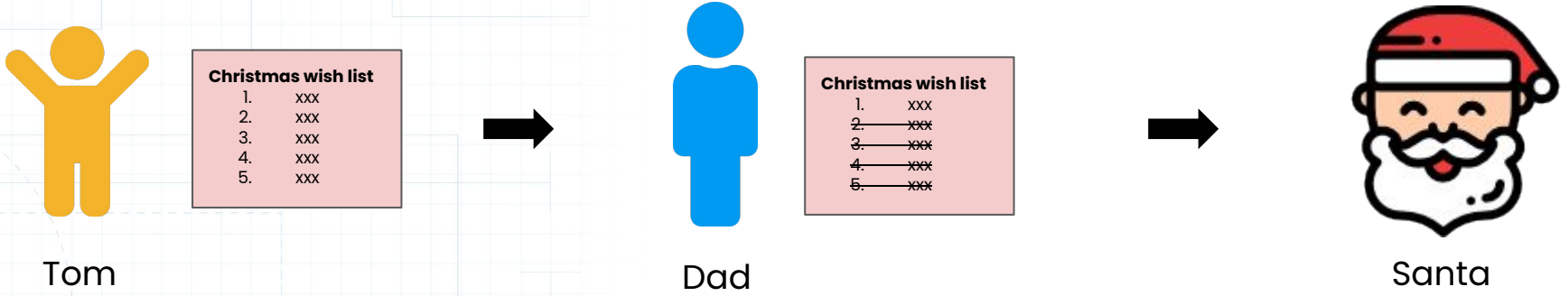
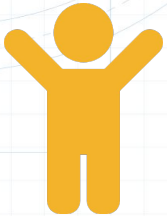
Algorand Blockchain

What is Blockchain?



What is a Blockchain?



Tom

Christmas wish list
1. xxx
2. xxx
3. xxx
4. xxx
5. xxx

Christmas wish list
1. xxx
2. xxx
3. xxx
4. xxx
5. xxx

Christmas wish list
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Christmas wish list
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Christmas wish list
1. xxx
2. xxx
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4. xxx
5. xxx

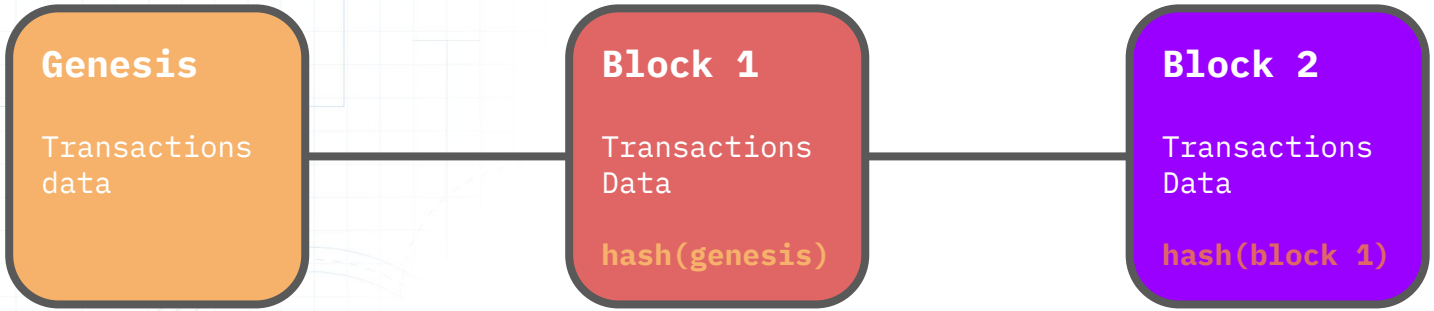
Elves

Dad

Santa

What is a Blockchain?

- A public ledger of transactional data, distributed across a system of multiple nodes in a network.
- Nodes work together using the consensus protocol to add transactions to the ledger.
- The ledger is publicly verifiable, permissionless, and tamper-proof.



Real World Usage

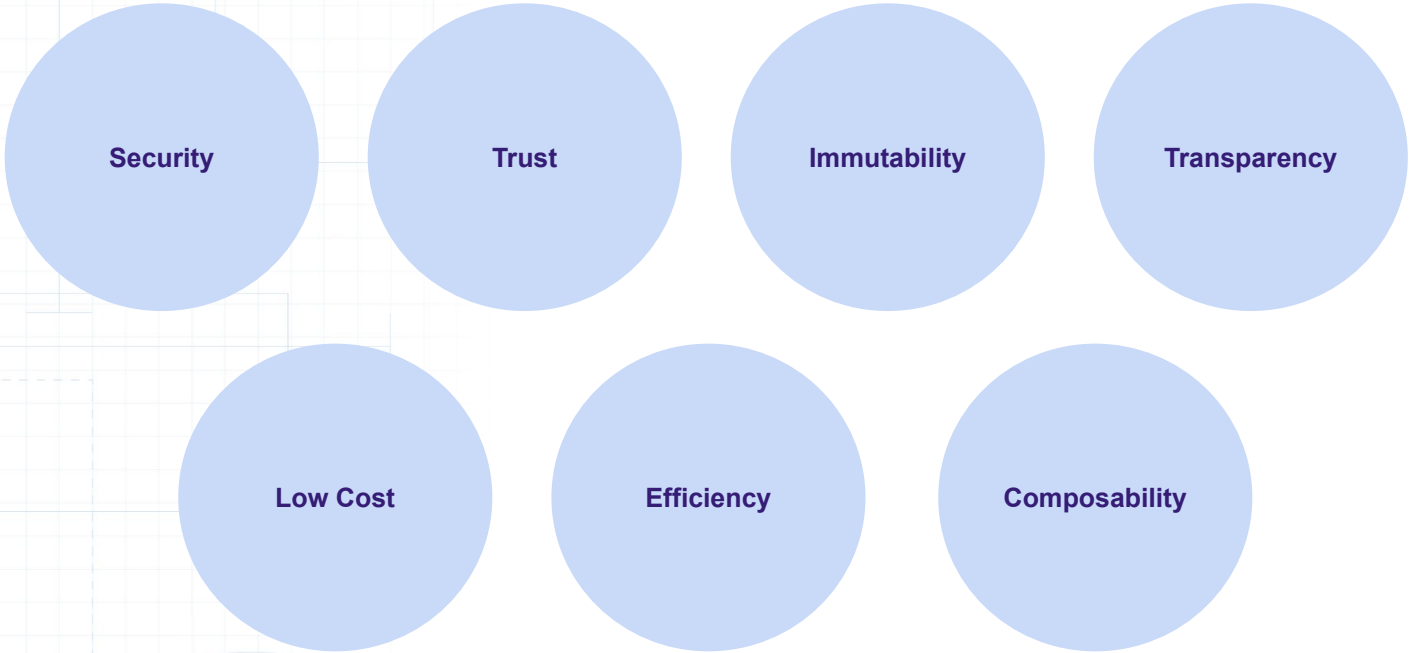
DE BEERS GROUP

- Tracks each step of the diamond's journey - from mining, processing, retailer, and end user.

SINGAPORE AIRLINES

- Manage its loyalty point system - KrisFlyer miles on their digital wallet.

Benefits of Blockchain



Blockchain Projects

- Ethereum
- Terra (LUNA)
- BSC (BNB)
- Avalanche (AVAX)
- Solana (SOL)
- Fantom (FTM)
- Polygon (MATIC)
- Tron (TRON)
- Cronos (CRO)
- Waves (WAVES)

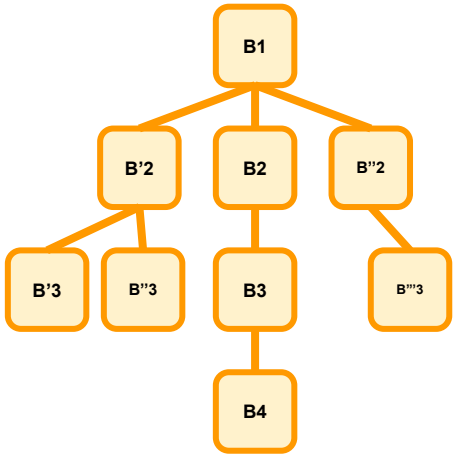
Source: Defi Llama

Consensus Protocols

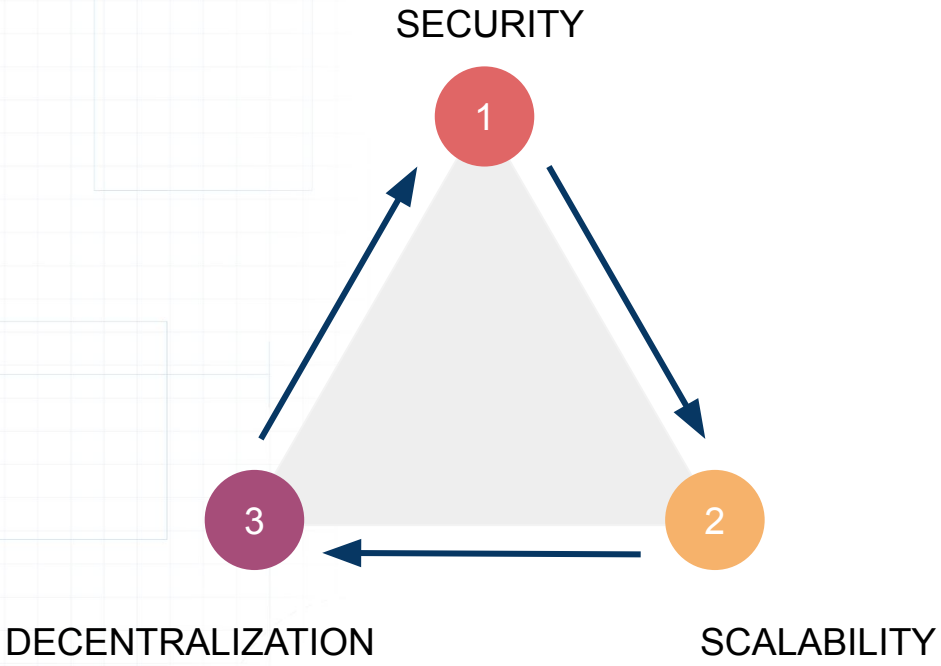
Name	Mechanics	Critical Issues
Proof of Work (PoW) E.g. Bitcoin, Ethereum	• Miners (nodes) **compete with each other** to append the next block. • Rewards are given for the node that manages to **produce the cryptographic hash**.	• Huge electrical consumption • Takes a long time to produce a block
Proof of Stake (PoS) E.g. Cardano, Avalanche, Solana	• Accounts will **stake their coins** to verify transactions and produce blocks. • Validator nodes are chosen to review blocks. • Voting power is **proportional** to their staked coins.	• Benefits wealthy participants • Minimum staking period • Known validator nodes are prone to DDoS attacks.

Forking and Finality

- Fork happens when two or more miners find a block at nearly the same time.
- The fork is resolved when network accepts the longest chain.
- Finality is the guarantee that cryptocurrency transactions cannot be altered once it is completed.
- Measures the amount of time one has to wait for a reasonable guarantee that crypto transactions are completed.



Blockchain Trilemma



Blockchain Trilemma

Name	Issues to solve	Is affected by
Security	• Prevent adversaries from validating fraudulent transactions. • Tackle 51% attacks - *gain control of hashing power to invalidate transactions*.	• Requires additional nodes to reduce coordinated attacks.
Scalability	• Support high transactional throughput	• Centralized servers are more powerful
Decentralization	• No one entity can control or censor the data that is being transacted.	• Transaction speeds drop (PoW)

Ethereum Blockchain Project

- Current uses Proof of Work consensus. They are upgrading it to use Proof of Stake soon.
- Scalability Issue - high gas fees, network congestion, power consumption

Quiz #1

Which option is not a feature of a blockchain?

1. Blocks in a blockchain contain a list of transactions.
2. A block contains a cryptographic hash of the previous block.
3. **An administrator can reverse a transaction on the blockchain.**
4. Blocks are added to the blockchain via consensus protocol.

Quiz #2

Which of these statements is false about the benefits of blockchain?

1. Transactions in a block cannot be tampered with.
2. Decentralized applications can leverage on each other on the blockchain.
3. Transactions on the blockchain can be publicly viewed.
4. **Submitting a transaction to a blockchain is free.**