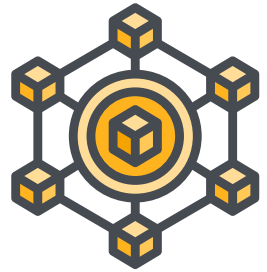
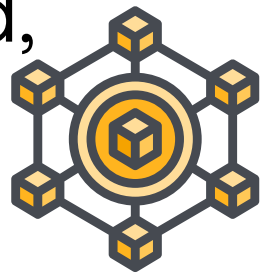
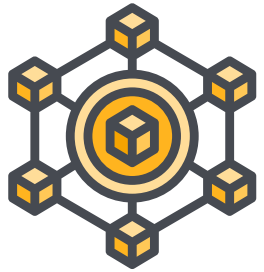
⚙️ What is a Consensus Mechanism?



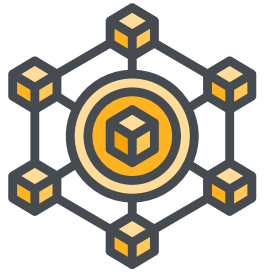
- A consensus mechanism is the process used by blockchain networks to agree on the validity of transactions.
- It ensures that all nodes (computers) in a decentralized network have the same version of the ledger.
- Prevents issues like double spending, fraud, or manipulation.
- Consensus = “Agreement” between distributed participants without needing a central authority.
- It’s what keeps the blockchain secure, decentralized, and trustworthy.



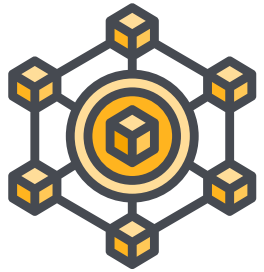
🔨 Proof of Work (PoW)



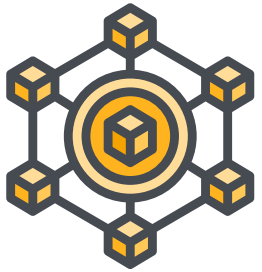
- Oldest and most traditional consensus mechanism, used by Bitcoin and Litecoin.
- Miners compete to solve complex mathematical puzzles using computational power.
- The first miner to solve it adds the new block to the chain and earns a crypto reward.
- Ensures high security but consumes a lot of electricity and resources.
- Slower transaction speed compared to newer mechanisms.



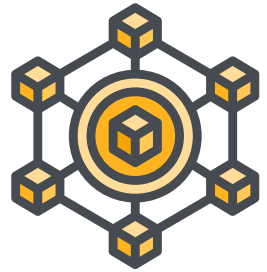
💎 Proof of Stake (PoS)



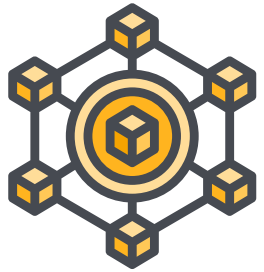
- Used by modern blockchains like Ethereum (after The Merge), Cardano, and Polkadot.
- Instead of solving puzzles, validators are chosen based on the amount of cryptocurrency they “stake” (lock up).
- The more coins you stake, the higher your chance to validate transactions.
- It is energy-efficient and faster than PoW.
- Validators earn transaction fees and small rewards for honest behavior.



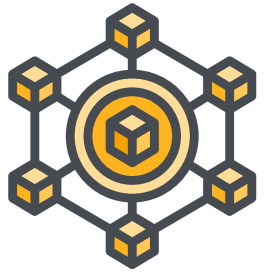
🏛️ Proof of Authority (PoA)



- Used in private or permissioned blockchains.
- Only trusted and verified authorities (pre-approved validators) can create new blocks.
- Very fast and efficient, but less decentralized.
- Often used by enterprises or consortiums where participants are known and verified.



⚡ Other Popular Consensus Mechanisms



- **DPoS (Delegated Proof of Stake):** Users vote for "delegates" who validate transactions on their behalf (e.g., EOS, TRON).
- **PBFT (Practical Byzantine Fault Tolerance):** 'Used in Hyperledger' great for enterprise blockchains.
- **PoH (Proof of History):** 'Used by Solana' timestamps transactions to achieve ultra-fast processing.