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HOW BLOCKCHAIN WORKS STEP BY STEP

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Introduction to Blockchain

- Definition: Blockchain is a decentralized, distributed ledger technology that records transactions across multiple computers.

- Key Features:
  - Immutable: Once recorded, data cannot be altered.
  - Transparent: Transactions are visible to all participants.
  - Secure: Uses cryptographic techniques to protect data.

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Step 1: Initiating a Transaction

- What Happens:
  - A transaction is initiated by a user (e.g., sending cryptocurrency, recording a contract).
  - The transaction includes details like sender, recipient, and the amount or data.
- Example: Alice sends 1 Bitcoin to Bob.

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Step 2: Broadcasting to the Network

- What Happens:
  - The initiated transaction is broadcast to a network of nodes (computers) in the blockchain network.
  - Each node receives and validates the transaction based on predefined rules.
- Purpose: Ensures the transaction's legitimacy and prevents fraud.

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Step 3: Validation by Nodes

- What Happens:
  - Nodes validate the transaction through a consensus mechanism:
    - Proof of Work (PoW): Solving complex mathematical puzzles.
    - Proof of Stake (PoS): Validators are chosen based on stake ownership.
  - Once validated, the transaction is added to a pending list.
- Key Component: Miners or validators play a critical role in this step.

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Step 4: Adding to a Block

- What Happens:
- Validated transactions are grouped into a block.

- The block includes:
  - A timestamp.
  - The list of validated transactions.
  - A reference to the previous block (hash).
- Miners compete to add the block to the blockchain.

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Step 5: Block Confirmation and Addition

- What Happens:
  - The first miner/validator to solve the puzzle or validate (depending on the mechanism) adds the block to the blockchain.
  - Other nodes verify and agree that the block is valid.

- Key Outcome: The block is added to the chain, and the blockchain is updated across all nodes.

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Step 6: Completion of Transaction

- What Happens:
  - The transaction is now part of the blockchain and is immutable.
  - Both the sender and recipient can verify the transaction's success.

- Final Result: The ledger is updated, ensuring transparency and security for all participants.

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