



# LESSON INTRO 1 - Blockchain Introduction

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# What is Blockchain?

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**Blockchain** is a technology that serves as a *distributed ledger*, enabling secure and transparent recording of data across a *decentralized network*. Unlike traditional databases, where information is stored in a central server, blockchain operates on a *peer-to-peer network*, ensuring that no single entity has control over the entire system.

At its core, a blockchain is a *chain of blocks*, where each block contains:

- **Data:** Information about transactions or other records.
- **Hash:** A unique identifier for the block, acting like a fingerprint.
- **Previous Hash:** Linking the block to its predecessor, creating a chain.

# Key Characteristics of Blockchain

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- **Decentralization:** Data is distributed across a network of nodes, reducing the risks of centralized control or failure.
- **Immutability:** Once data is recorded on the blockchain, it cannot be altered or deleted, ensuring integrity.
- **Transparency:** Transactions are visible to all participants in the network, promoting trust.
- **Security:** Cryptographic algorithms secure the data, making it resistant to hacking.
- **Native Currency:** Many blockchains have a native cryptocurrency used to incentivize participants and facilitate transactions.
- **Transactions:** Blockchain enables peer-to-peer transactions without intermediaries, ensuring faster and cost-effective operations.
- **Nodes:** Devices or entities that participate in the blockchain network by maintaining and validating the distributed ledger. They can take on different roles depending on the blockchain's design.

# What is Ethereum?

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**Ethereum** is a decentralized, open-source blockchain platform designed to enable developers to build and deploy smart contracts and decentralized applications (DApps).

Key characteristics of Ethereum:

- **Smart Contracts (SCs)**: self-executing contracts with the terms of the agreements directly written into code. SCs execute automatically when predefined conditions are met, removing the need for intermediaries.
- **Ether (ETH)**: The native cryptocurrency of the Ethereum network. It is used to pay for transaction fees and computational services on the network, often referred to as "gas (next slide)".
- **Ethereum Virtual Machine (EVM)**: The runtime environment for smart contracts on Ethereum. It ensures that the code executes in a consistent and secure manner across all nodes in the network.
- **Decentralized Applications (DApps)**: Applications that operate using decentralized technologies. On Ethereum, DApps leverage smart contracts (SCs) to function.
- **Validators**: Nodes selected to propose and validate new blocks.

# What is Gas?

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In Ethereum, **gas** is a unit of measurement that represents the computational effort required to execute operations or transactions on the network. Every action (transaction) performed on the Ethereum blockchain (for example transferring ETH) requires computational resources. Gas is the mechanism used to allocate and limit these resources.

- **Gas Fees:** Incentivize validators to process and validate transactions. They are paid in ETH.
- **Gas Units:** Each operation on Ethereum has a specific gas cost, measured in gas units. For example, transferring ETH costs 21,000 gas units.
- **Gas Price:** The amount of ETH a user is willing to pay per gas unit, typically measured in gwei (1 gwei =  $10^{-9}$  ETH).
- **Total Gas Fee Calculation:** The total fee a user pays for a transaction is calculated as: Gas Units \* Gas Price

# Outro

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This was a lot of information.

Next, we will set up our wallet and make our first transaction.