



Lecture 03 — Cryptocurrency: A closer look at Ethereum

Transcript

Ethereum is a decentralized blockchain that is a peer-to-peer network designed to securely execute and verify application code. Proposed by blockchain researcher and programmer, Vitalik Buterin, Ethereum was ideated in late 2013 and launched in 2015. Ethereum is built on a different blockchain architecture than bitcoin. Its native transactional token is called Ether, or ETH. Like Bitcoin, Ethereum is decentralized, transparent, and secured through a consensus mechanism.

One of the main features of Ethereum is its smart contract functionality. Smart contracts are applications that live on the blockchain and can be accessed and used by anyone without a central authority.

Smart contracts are self-executing contracts with the terms of the agreement between the user and the contract being enforced through the blockchain. They are used to execute agreements between parties, ensuring that these agreements are transparent, secure, and tamper-proof—without the need for an intermediary.

You can think of Bitcoin more as a payment network and a store of value, aka digital gold, while Ethereum is more like an infrastructure technology, which acts as a marketplace for financial services, games, and whatever other decentralized applications people decide to build.

One of the most prominent use cases for Ethereum is decentralized finance applications, which offer access to various financial services, such as borrowing and lending, trading, asset issuance, and insurance, all without the need to rely on centralized institutions. Today, Ethereum supports a flourishing Decentralized Finance ecosystem.

Over time, Ethereum users have established standards for creating fungible tokens on the blockchain. The Ethereum Request for Comment 20, or ERC-20, is a standard that guides the creation of new fungible tokens on Ethereum so that they are interoperable with other smart contract tokens. Fungible tokens are mutually interchangeable, whereas non-fungible tokens are not. Non-fungible tokens are unique, one of one. The ERC-20 standard is utilized by most tokenization projects, including most stablecoins. The most common non-fungible token standard is ERC-721, which is widely used for creating NFTs, that is digital collectibles.

Learn more about NFTs in our Tokenized Assets lecture.

We believe Ethereum will become highly relevant in the future of finance. The benefits of Ethereum for financial applications include ability to support permissionless innovation, cost reduction by removing centralized intermediaries, enablement of frictionless transactions and near-instant settlement, decentralization and credible neutrality, and mass customization via smart contracts.

Proof of Stake vs Proof of Work

In the previous lesson, we talked about Proof of Work, and how this is used by the Bitcoin blockchain network as the consensus mechanism to verify blocks and transactions. Unlike Bitcoin, since the so-called “merge” in September 2022, Ethereum relies on Proof of Stake, PoS, rather than Proof of Work, PoW.

POS is a consensus algorithm used in blockchain networks to determine which participant gets to validate the next block. While Proof of Work miners perform computational work and compete to determine who adds the next block and secure the network, Proof of Stake validators deposit collateral, or stake, to become eligible to produce the next block. There are many ways to design a Proof of Stake system, but often the size of the user’s stake determines the likelihood of being selected to add the next block and receive the associated block rewards. To become a validator, an ETH holder must “stake” a specific amount of ETH or, in other words, lock up a portion of collateral. Blocks are validated by multiple validators, and when a certain threshold of the number of total active validators verify that the block is accurate, the voting period is finalized and then closed.

Proof of Stake is less energy-intensive than Proof of Work since it doesn’t require competition based on computational power, but rather random selection based on a pool of eligible validators. It is estimated that Ethereum’s switch from PoW to PoS has reduced the network’s energy consumption by more than 99%.

This table provides a general comparison overview of Proof of Stake and Proof of Work.

Ultimately, there are benefits and drawbacks to both types of block production methods, but both can be designed well to achieve the outcome of decentralized block production.

Why Ethereum Now?

Ethereum is constantly evolving and has a vibrant community of developers and entrepreneurs working on a wide range of projects.

Some of Ethereum’s latest upgrades have improved network scalability, security, energy efficiency, and cost.

Ethereum is the second-largest cryptocurrency in terms of market capitalization. At the time of this recording, Ethereum has a market capitalization of over \$225 Billion dollars with a diverse range of use cases beyond simple peer-to-peer transactions.

Similarly to Bitcoin, ETH has been one of the best-performing assets when compared to a range of securities, such as equities, fixed income, indices, and commodities, over the past years. It is still a very young asset class and past performance is no guarantee for future results, however, we believe it has great growth potential ahead, considering its range of diverse applications and use cases.

Ethereum's smart contract technology enables developers to build decentralized applications , also sometimes called DApps, which are in high demand due to their ability to automate complex processes both securely and efficiently.

We acknowledge that there are some concerns around Ethereum including smart contract code security, high fees, and slow transaction finalization times, especially during periods of high network congestion. These concerns have increased demand for alternative layer-1 blockchains and layer-2 networks that settle on Ethereum, both of which can offer faster and cheaper transactions. That being said, Ethereum continues to be the world's most decentralized and popularly used blockchain platform for deploying decentralized applications and smart contract code.

In Summary:

Ethereum is a blockchain-based technology enabling decentralized applications and smart contracts. It differs from Bitcoin, which is a blockchain-based technology primarily enabling payments.

Ethereum uses a Proof-of-Stake consensus mechanism whereas Bitcoin uses Proof-of-Work.

Ethereum is the second-largest cryptocurrency by market capitalization.

Ethereum is a general-purpose blockchain that can support a vibrant and diverse marketplace of financial services, games, and other types of decentralized applications.

Ethereum is constantly evolving and has a vibrant community of developers and entrepreneurs.