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Understanding the value of the Ethereum network

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Key takeaways

- 1. Ethereum expanded upon Bitcoin's design to create a versatile platform for decentralized applications, enabling a comprehensive decentralized economy.
- The introduction of the Ethereum Virtual Machine and smart contracts has revolutionized app development, making Ethereum the foundation for a diverse array of decentralized applications across various sectors.
- Ethereum's extensive developer community and its leading role in sectors like decentralized finance (DeFi), non-fungible tokens (NFTs), and gaming, highlight its significant impact on the decentralized digital economy and its position at the forefront of Web3 innovation.

Improving on the Bitcoin model

Though people may be most familiar with bitcoin—the original cryptocurrency introduced in 2009 that popularized blockchain technology—the crypto ecosystem has advanced far beyond that initial offering. Bitcoin is a peer-to-peer payment network powered by its own currency—bitcoin (BTC). Unfortunately, having a payment network without businesses widely able to accept and transact in that currency has proven limiting and has led many to claim that there is minimal value being created in the crypto ecosystem.

Enter Canadian teenager Vitalik Buterin, who sought to improve on the Bitcoin network design and offer a more expansive view of what a decentralized economy might offer. He launched the Ethereum network in 2015 with the goal of providing "a platform for decentralized applications—an android of the cryptocurrency world, where all efforts can share a common set of application programming interfaces (APIs), trustless interactions and no compromises."¹ Put more simply, Ethereum set out to build a new open-source development platform on top of a blockchain payment network where programmers could develop a whole array of applications to operate in a decentralized manner. His model for this vision was the Android platform that was launched in 2007 by the Open Handset Alliance, a group of prominent companies that includes Google, HTC, Motorola, Texas Instruments and others. Yet, unlike apps created by Android developers that relied on third-party platforms such as Google to host their offerings and fiat currency banking and payment rails to process their transactions, Ethereum would allow apps to be launched directly by developers on the decentralized Ethereum network and transactions to be facilitated by an embedded peer to-peer cash payment network akin to Bitcoin.

The Ethereum platform introduced its own programming language and developed a toolkit for programmers which included templates to create their own programmable tokens and to design their own "if-then" functionality via smart contracts. The platform launched the "Ethereum Virtual Machine" or EVM—a cloud-based processing computer that was designed to monitor the state of transactions by continually assessing "if-then" clauses laid out in the smart contract code and initiating actions when the correct triggers were identified. Finally, Ethereum replicated the peer-to-peer cash payment network first introduced by Bitcoin and introduced its own native cryptocurrency—ether (ETH). Entrepreneurs build apps on the platform, consumers utilize those apps, thus generating transactions, and to record those transactions, they pay with the platform's cryptocurrency. Because of these characteristics, Ethereum is often referred to as the "internet of value" or "programmable money."

Over time, this collection of capabilities—1) an embedded native peer-to-peer cash payment network, 2) a common developer coding language and toolkit, and 3) a virtual computer able to host decentralized apps and facilitate the automated execution of smart contract clauses—became the blueprint for a self-contained crypto transactional ecosystem. These platforms have subsequently come to be known as a Layer 1 or L1



Source: Franklin Templeton Industry Advisory Services. For illustrative purposes only.

blockchain. Several L1 blockchains have since emerged, each supporting their own economic ecosystem. Examples include Solana (SOL), Cardano (ADA), and Avalanche (AVAX). In a sense, these L1 blockchains can be thought of as digital nation-states with their own currencies, economies, and payment systems.

Collectively, these L1 blockchains have set a new standard for how app development can occur. Each L1 blockchain offers developers a set of composable open-source building blocks. Commonly used processes such as "make a market between these two assets" or "loan this asset to a specific borrower" become building blocks where the entire set of code can be lifted from the platform's code library and plugged into a new app's code base, accelerating the developer's ability to design and launch a new offering. This "Lego-like" ability is possible because all apps on the same platform use the same programming language and the smart contract templates offered on the platform are interoperable. Thus, new apps can adapt common building blocks, interact with existing apps, and enable new functionality more rapidly.

Building on top of Ethereum

Ethereum's model, while effective, has demonstrated some shortcomings in terms of its through-put of transactions. The time it takes to verify enough transactions to fill up a block and go through the consensus protocol to affirm that block and add it to the chain is slow, relative to the number of trades that can be processed in the centralized economy. Transactions often get backed up, and processing costs get pushed up through competition to move to the front of the queue. Indeed, Vitalik Buterin calls this the "scalability trilemma."³ Simply put, this refers to the difficulty in achieving decentralization, scalability and security in a node-based verification system.

To address this challenge, new layer 2 (L2) solutions were developed for Ethereum. These L2 protocols are built and operate independently but rely on the Ethereum blockchain often referred to as the mainnet—for security and recording transactions. Ethereum is able to capture some of the value of commercial activities occurring on L2s via gas (transaction) fees. L2 solutions utilize the same coding language, templates and primitives as the L1 blockchain they are built on top of, but process transactions differently, typically through a process to "roll up" a whole set of transactions into a single packet that is then transmitted to the mainnet. The goal is to allow for more rapid verification of trades and lower processing costs.

Collectively, L1 blockchains (Ethereum and others) and L2 blockchains provide the foundations for "Web3," the new iteration of the World Wide Web (WWW) that enables users' WWW ownership. The Web3 business models that have emerged are paving the way for a new type of network economy and approach to commercial transactions, creating a protocol-based economy that encourages democratized ownership and rewards participation. This compares to today's Web2 platform-based economy where companies, not participants, own and control both the networks and the data they generate, centrally retaining the benefits being generated by those individuals and enterprises that drive the platform's network effects. The only way for investors to participate in the growth of this ecosystem is through the tokens and coins created within these protocol-based economies.

Ethereum's explosive growth

The functionality, flexibility, and incentive structure of Ethereum has drawn significant developer talent to the network. Developer activity is considered a leading indicator of a blockchain's overall health and value creation. The total number of developers on Ethereum has more than doubled over the past five years (from approximately 3,000 at year end 2019 to nearly 8,000 at year end 2023). And while monthly active developers on Ethereum fell by 25% in 2023, 55% of the developers that left were newcomers (with less than 1 year in crypto), while the number of established developers (2+ years in crypto) grew by 37%.⁴ Overall, Ethereum has by far the largest and most active developer base, regardless of which developer metric. Polygon, an L2 sidechain on Ethereum, and Polka Dot are a distant second and third in the total number of developers as of December 31, 2023.⁵

Another important metric for blockchains is total value locked (TVL), which is the aggregate value of digital assets that are locked or staked in decentralized apps (dApps) on a particular blockchain. TVL is akin to the value of deposits held by an institution. Once again, Ethereum has seen prolific growth with TVL going from essentially zero to a peak of over US\$100 billion by the end of the 2021.⁶ While Ethereum's TVL dropped off sharply from that peak in 2022 and was relatively steady throughout 2023, it has climbed in 2024 and stood at over US\$65 billion as of early June.⁷ Importantly, Ethereum has long been and continues to be the leader amongst all blockchains for TVL.



Lastly, Ethereum's growth in developers and TVL have directly translated into financial growth. Ethereum's business model is to generate fee revenue by renting secure blockchain space to users seeking to interact with dApps and L2s. This model proved so successful that Ethereum surpassed US\$10 billion in revenues in just seven years–a milestone that only Alphabet and Meta have reached more quickly.⁸

As alluded to earlier, the most direct way to invest in the Ethereum network's growth is by holding its native token, ether (ETH). ETH is the second-largest cryptocurrency after bitcoin and has a market cap of over US\$460 billion as of June 5, 2024.⁹ Since Ethereum transitioned to a proof-of-stake consensus mechanism in 2022, ETH holders have the option to stake (lock up) their tokens to earn more ETH as a reward for contributing to the security of the network.

The merge: moving from proof-of-work to proof-of-stake

Ethereum originally operated as a Proof-of-Work (PoW) consensus mechanism to verify transactions in the same way as Bitcoin does today. PoW is when the network of computers (miners) compete to solve a cryptographic computation to verify a transaction and add it to the blockchain in exchange for a reward denominated in the blockchain's native cryptocurrency. The vast computer power required makes PoW very energy intensive.

Proof-of-Stake (PoS) was created as an alternative to PoW and requires validators to hold and stake tokens, thereby earning

fees for the transactions they verify. Validators are chosen based on the number of staked coins they have, with larger stake positions having higher odds.

In September 2022, the original Ethereum mainnet transitioned to PoS by merging with a separate PoS blockchain called the Beacon Chain (hence, "the merge"). The Merge reduced Ethereum's energy consumption by approximately 99.95%² and has resulted in nearly all of Ethereum's transaction fee revenue flowing through to the benefit of ETH holders.

A vibrant, diversified protocol economy

In a very short amount of time, Ethereum has succeeded in its mission to become a platform for dApps. There are currently over 3,000 dApps running on Ethereum¹⁰ across several different categories. Some of the most popular include:

- Decentralized finance (DeFi)—Ethereum is the leading platform for DeFi, which refers to financial systems built on blockchain technology, enabling peer-to-peer transactions without intermediaries. DeFi represents an entire digital alternative to Wall Street where users can earn interest, borrow, trade assets and derivatives, and more, and offers benefits such as increased accessibility, reduced costs, and enhanced security. Some of the largest DeFi dApps on Ethereum include Uniswap and Curve (decentralized exchanges) and Aave and Compound (for lending and borrowing).
- Non-fungible tokens (NFTs)—Ethereum has historically been the preeminent platform for NFTs, which have revolutionized digital ownership, enabling creators to tokenize and sell unique digital assets, such as art, collectibles, and virtual real estate, on the blockchain. Utilizing Ethereum's smart contract capabilities, NFTs provide irrefutable proof of ownership and authenticity, empowering artists and content creators with new avenues for monetization and direct interaction with their audience. The prominence of various NFT blockchains has changed meaningfully since the introduction of Bitcoin Ordinals in early 2023, however Ethereum has averaged 45.9% market share of transaction volume over the past 12 months.¹¹

 Gaming—Decentralized gaming in the Ethereum ecosystem (particularly on L2s) has seen significant growth, leveraging blockchain technology to create transparent, secure and player-owned gaming experiences. The Ethereum blockchain's robust infrastructure supports these games by enabling secure asset ownership and facilitating decentralized finance (DeFi) integrations, allowing players to trade, sell, and earn from their in-game assets seamlessly.

Many social, metaverse and technology applications are also built on the Ethereum network.

Conclusion

Ethereum has profoundly reshaped the decentralized economy by expanding on the Bitcoin model and offering a versatile platform for decentralized applications. Its unique combination of a native peer-to-peer payment network, a common developer toolkit, and a virtual machine for executing smart contracts has set a new standard for blockchain technology. Ethereum's ability to attract a robust developer community and support a diverse array of dApps across sectors like DeFi, NFTs, and gaming underscores its role as the leading blockchain network. Despite challenges such as scalability, Ethereum's innovative solutions and continued evolution position it at the forefront of Web3, driving significant economic activity and technological advancement in the decentralized digital landscape.

Endnotes

- 1. Source: Cuofano, Gennaro. "Ethereum: The History of Ethereum." FourWeekMBA. March 7, 2022.
- 2. Source: Ethereum.org. As of April 24, 2024.
- 3. Source: "A beginner's guide on blockchain layer-2 scaling solutions." Cointelegraph.
- 4. Source: Electric Capital Developer Report 2023.
- 5. Ibid.
- 6. Source: DeFiLlama.
- 7. Ibid.
- 8. Source: Aguilar, Antonio. "Weekly Rollup-September 26, 2023." Caleb & Brown. September 25, 2023.
- 9. Source: CoinMarketCap. As of June 5, 2024.
- 10. Source: CoinTelegraph. "How to build a DApp on Ethereum." October 16, 2023.
- 11. Source: "Top NFT Collectibles—BTC." Crypto Slam. March 31, 2024.

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