

ETH 2.0 AND ITS IMPACTS BASED ON EIP-1559

KuCoin Labs keynote Report

2021.8

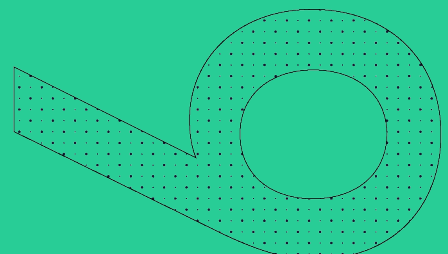
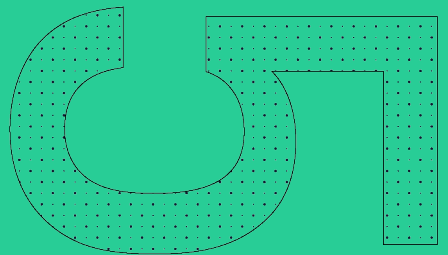
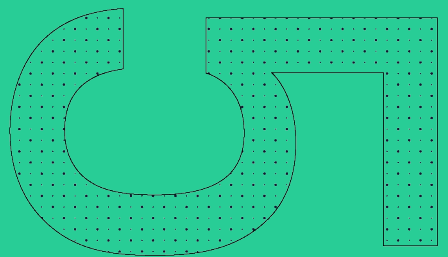
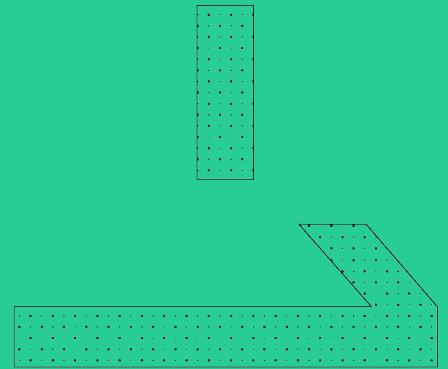
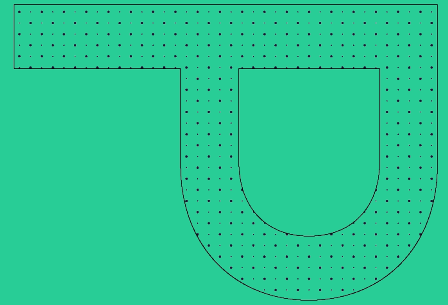
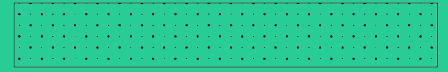
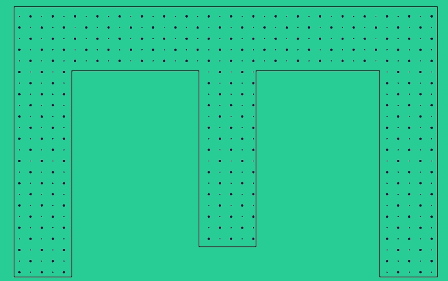
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1.

Definitions and event background

- ① About EIP
- ② About EIP-1559
- ③ London Upgrade event



Definitions and event background

1 About EIP

EIP refers to Ethereum Improvement Protocol. This protocol is designed for developers to submit Ethereum (ETH) community operation schemes through special channels to optimize existing ETH operation standards and extend its functions.

Unlike Bitcoin, ETH is an open and extensible public chain ecology born in 2014. Developers worldwide have proposed many amendments to the ETH community, which finally forms EIP. Its openness helps ETH rank the second (after Bitcoin) by market value among digital currencies. EIP contributes greatly to the iteration and innovation of the ecology.

Ethereum Request for Comment (ERC) is a collection of EIPs that are compiled by developers to record application-layer development standards and protocols for the ETH community and approved by the committee. Typical examples are ERC-20, ERC-721, and ERC-825 for the Token standard.

2 About EIP-1559

EIP-1559 is an improved protocol in five proposals named "London Upgrade Event" to change the calculation logic of the gas fee and influence the ETH burn-out mechanism. Rapid growth of DeFi in the ETH ecology results in extremely strong ETH transaction demands but also increases the transaction congestion and fees.

Under the original mechanism, traders attract miners by offering high gas fees and miners pack their packets to the chain and choose transactions based on their gas fee ranking to get high rewards, forming a miner extractable value (MEV). In the ETH community, MEV is a great market generating a value of USD 1 to 4 million per day.



Source: QKL123, KuCoin Labs

EIP-1559 has changed the calculation logic of gas fees based on the first auction price (i.e., "the highest bidder wins"). Under EIP-1559, users need to pay a "base fee" for transactions. If they want miners to give priority to their transactions, they can add a "tip", which is called "priority fee". The base fee of each transaction will be burned out and the "tip" will be paid to miners.

The base fee is not fixed. When the usage rate of ETH network exceeds 50%, the base fee will be raised, and when the usage rate is lower than 50%, the base fee will be lowered. For miners, EIP-1559 adds some taxes and greatly reduces transaction fees received by miners, but the burned out base fee reduces the circulation of ETH and thus increases the ETH value.

Considering future ETH transaction prosperity, the burn-out volume of base fee is expected to be higher than the issuance volume, resulting in ETH deflation and ETH scarcity. Then, the ETH gas fee will be priced by the transaction confirmation persons instead of the miners.

③ London Upgrade event

London Upgrade was proposed first on the EDCON 2015 in London. On the evening of August 5, 2021, permanent divergence under the London Upgrade program was completed for ETH, which was a key step towards ETH 2.0.

London Upgrade aims to improve the ETH network performance and user experience, and reduce the gas fee and chain congestion. The event is a key progress toward ETH 2.0. Compared with ETH 1.0, ETH 2.0 does not just mean fixing existing bugs. It aims to create a brand-new system that contains the Casper consensus algorithm, sharding technology and new virtual machines. The consensus mechanism has changed from Proof of Work (PoW) to Proof of Stake (PoS) to improve the ETH network performance and reduce the gas fee.

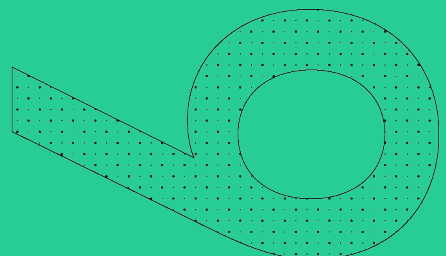
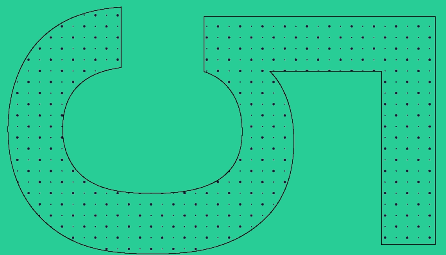
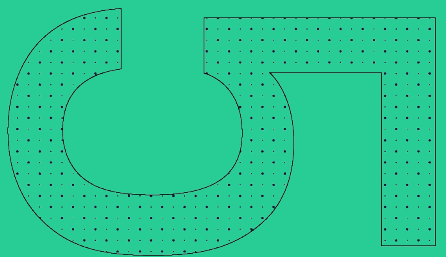
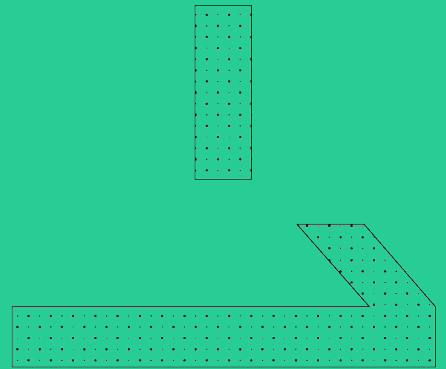
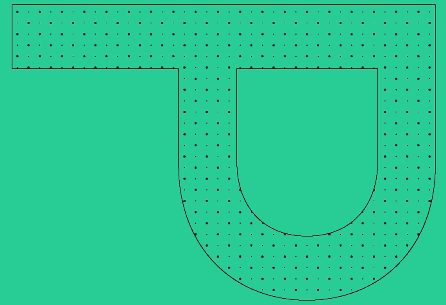
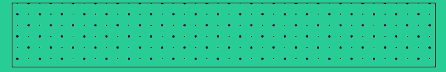
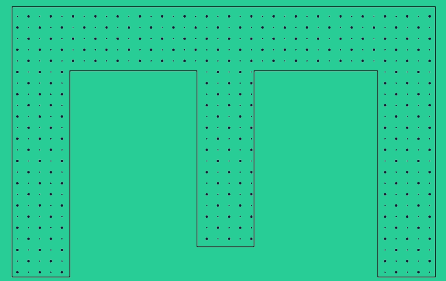
During permanent divergence under the London Upgrade program, the following five EIPs are activated:

- 1.EIP-1559 that changes the gas fee calculation logic and influences the ETH burn-out mechanism;
- 2.EIP-3554 that delays the difficulty bomb;
- 3.EIP-3198 that improves the smart contract user experience;
- 4.EIP-3529 that reduces non-impact refund.
- 5.EIP-3541 that facilitates ETH mainnet code update.

2.

Logic and impact of EIP-1559

- ① ETH milestones and their impact
- ② About MEV
- ③ Changes to public opinion after London Upgrade



Logic and impact of EIP-1559

① ETH milestones and their impact

The following table lists milestones and technical upgrades since the release of ETH Whitepaper. Each major technical upgrade for the ETH ecology brings some definite technical vulnerabilities and performance problems. Such continuous improvements and divergences help the ETH network withstand the pressure brought by the DeFi boom in 2020 and the ups and downs of the market in 2021 to a certain extent.

Year	Date	Event	Description	ETH price
2013	2013.11.27	Whitepaper released	The whitepaper is an introductory paper released by ETH founder Vitalik Buterin in 2013 before the project was launched in 2015.	-
2014	2014.04.01	Yellowpaper released	The yellowpaper is compiled by Dr. Gavin Wood to define the ETH protocol technically.	-
	2014.09.02	Ether sale	Ether sale started and lasted for 42 days. Users can use BTC to buy Ether.	-
2015	2015.07.30	Frontier release	ETH was implemented for the first time after passing Olympic test. It was designed for technical users, especially developers. The gas limit per blockchain was 5,000.	-
	2015.09.07	Frontier thawing	The frontier thawing fork canceled the gas limit of 5,000 and changed the default gas price to 51 gwei. Then a 21,000-gas transaction was supported.	\$1.24
2016	2016.03.14	Homestead	The Homestead fork integrated changes to protocols and networks to support further ETH network upgrade.	\$12.50
	2016.07.20	DAO fork	The DAO fork was designed to defend against DAO attacks in 2016. At that time, more than 3.6 million of ETHs were lost due to a DAO attack. The fork transferred funds from an insecure fork to a new contract and only had the function of withdrawal. Any user who suffered fund loss can withdraw 1 ETH by using 100 DAO tokens.	\$12.54

Year	Date	Event	Description	ETH price
2016	2016.07.20	DAO fork	This action plan was voted by the ETH community. Any ETH owner could vote through transactions on the voting platform. Passing the fork required more than 85% of the votes. Some miners rejected the fork because they thought that the DAO event was not caused by the protocol defect.	\$12.54
	2016.10.18	Tangerine whistle	The Tangerine Whistle fork was the first response to denial-of-service (DoS) attacks in September/October 2016.	\$12.50
	2016.11.22	Spurious Dragon	The Spurious Dragon fork was the second response to DoS attacks in September/October 2016.	\$9.84
2017	2017.10.16	Byzantium	The Byzantium fork: Reduced the mining reward per blockchain from 5 ETHs to 3 ETHs. Delayed the difficulty bomb by one year. Supported calling other contracts in non-state-changing mode. Added some cryptography methods to support extension on the second layer.	\$334.23
	2017.12.02	Crypto Kitties - First high sale	The price of one Crypto Kitties NFT was 246.9255 ETHs (about \$117,712).	\$463.45
2018	2018.05.31	EOS ICO	EOS sales lasted for a whole year and raised \$4 billion, marking an ATH for ETH crowdfunding.	\$577.64
2019	2019.02.28	Constantinople	The Constantinople fork: Ensured that the blockchain will not be frozen before PoS was implemented. Optimized the gas cost for some EVM operations. Increased interaction with addresses not created.	\$136.29

Year	Date	Event	Description	ETH price
2019	2019.12.08	Istanbul	The Istanbul fork: Optimized the gas fee for some EVM operations. Enhanced restoration from a DoS attack Improved performance of Layer 2 extension solutions based on SNARKs and STARKs. Allowed Ethereum and Zcash to operate each other. Introduced more creative functions for contracts.	\$151.06
2020	2020.01.02	Muir Glacier	The Muir Glacier fork introduced the difficulty bomb delay. The difficulty of creating a blockchain based on the PoW consensus mechanism was increased due to increase in transaction sending time and Dapp waiting time, threatening the ETH availability.	\$127.18
	2020.10.14	Staking deposit contract deployed	The stacking deposit contract introduced deposit to the ETH ecology. Although a mainnet contract, this contract directly affected the Beacon chain startup schedule and was an important upgrade for Eth 2.0.	\$379.04
	2020.12.01	Beacon Chain genesis	Beacon Chain requires 16,384 deposits of 32 ETHs to be shipped safely. This occurred on November 27, and thus Beacon chain would start to generate blockchains since December 1, 2020. This was an important step toward the Eth 2.0 vision.	\$586.23
2021	2021.04.15	Berlin	Berlin Upgrade optimized the gas cost for some EVM actions and supported more types of transactions.	\$2,454
	2021.08.05	London	London Upgrade introduced EIP-1559 to reform the gas fee and modified the gas refunding method and ICEAGE schedule.	\$2,621

Source: KuCoin Labs

List of major milestones
since establishment of ETH

Berlin Upgrade and London Upgrade are two important events in 2021 for progressing from ETH 1.0 to ETH 2.0. A total of 10 EIPs are enabled.

The five EIPs enabled during Berlin Upgrade are EIP-2565, EIP-2315, EIP-2929, EIP-2930, and EIP-2718. They mainly optimize the ETH mainnet performance and contracts, improve the gas efficiency, update the code reading mode for ETH virtual machines (EVMs), and protect against Distributed denial of service (DDoS) attacks, and thus reduce the gas fee and improve the security of ETH transactions.

- EIP-2565: This proposal is a repricing plan of EIP-198. It reduces the cost of ModExp pre-compiled contracts and reduces the gas cost of this module to that of other operations.
- EIP-2929: This proposal increases the gas consumption of state access opcode, relieves interfaces of existing ETH protocols vulnerable to DoS attack, and allows restricting the witness size in a stateless environment after ETH implementation.
- EIP-2930: To cope with gas consumption increase of EIP-2929, this proposal provides optional access lists and allows users to specify an access list when submitting a transaction to specify the transaction state to be accessed, so as to reduce the gas fee to be lower than that specified in EIP-2929.
- EIP-2718: This proposal supports standard transactions, reduces the ETH complexity in combination with EIP-1559, and makes the implementation of EIP-1559 easier.

The five EIPs enabled during London Upgrade are EIP-1559, EIP-3198, EIP-3529, EIP-3541, and EIP-3554.

- EIP-1559: This proposal copes with changes to the ETH 1.0 fee market and aims to improve the gas fee auction efficiency. It introduces a base fee for each transaction and embeds the base fee into the formulation, thus reducing information asymmetry and improving auction efficiency.
- EIP-3198: This proposal aims to optimize the user experience of smart contracts and strengthen security of Fraud Proof Layer 2 networks (including State channels, Plasma, and Optimistic Rollups). It adds an opcode BASEFEE to enable EVMs to know the base fee of the current block.
- EIP-3529: This proposal removes the gas returned by the contract SELFDESTRUCT and reduces the gas returned by SSTORE to solve attacks based on the current gas return mechanism and release more available block resources.
- EIP-3541: This proposal denies new addresses started with 0xEF to facilitate future ETH updates.
- EIP-3554: This proposal delays the difficulty bomb to December 1, 2021. The difficulty bomb, also known as Ice Age, is a mechanism introduced to ETH to freeze mining when the network mode transits to PoS. The difficulty bomb has been delayed three times through Metropolis Upgrade (EIP-649), Constantinople Upgrade (EIP-1234), and Muir Glacier Upgrade (EIP-2384).

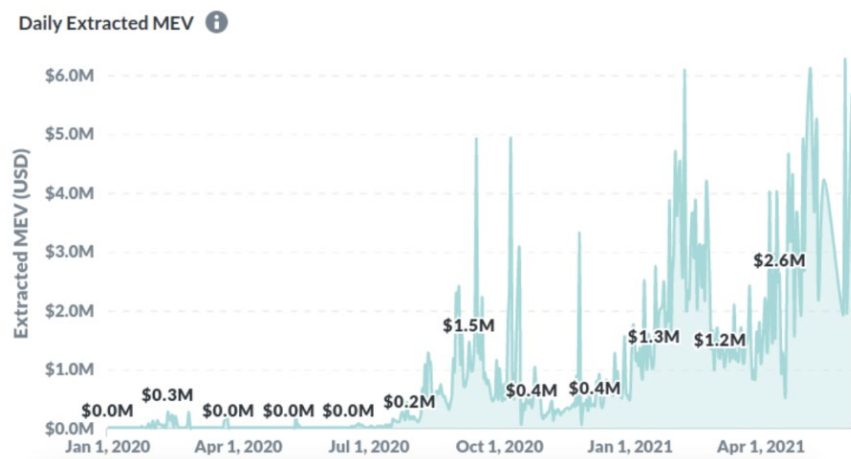
EIP-1559 in London Upgrade is the most concerned by the market. To prevent miner cheating and economic abstraction problems, EIP-1559 burns out the base fee and introduces tips quoted by users independently to encourage miners to package transactions. Although inevitably affecting the interests of the miner group, the base fee burn-out mechanism benefits the ETH holders, which makes this proposal extremely controversial. Before understanding EIP-1559, you must know the concept MEV.

2 About MEV

MEV refers to the profit that miners (or verifiers, sequencers, or other privileged protocol participants) can extract from including, excluding, and reordering transactions. MEV includes transaction fees, profits of block rewards, and profits of miners through transaction reorganization, transaction insertion, and transaction review.

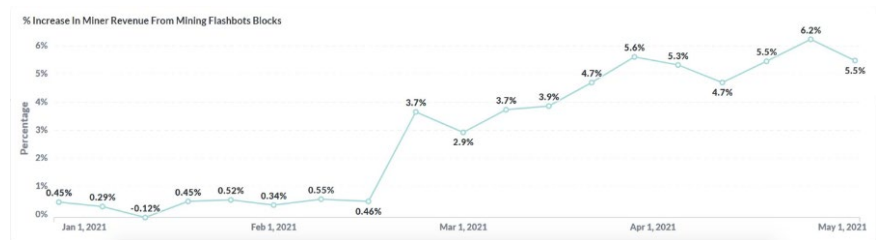
In the ETH community, MEV increases quickly, generating a value of USD 1 to 4 million per day. MEV is important for its direct impact on availability and security of the blockchain, in addition to its market size and potential profit opportunities.

Daily extracted MEV



Source: Flashbots, KuCoin Labs

Percentage of MEV in trading fees

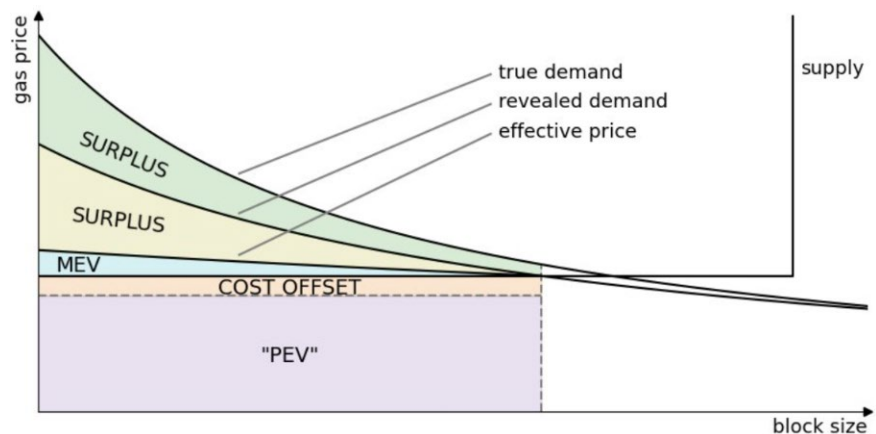


Source: Flashbots, KuCoin Labs

Except for value extraction, miners also benefit indirectly from trading fees of structural arbitrages of DeFi traders. Uniswap price arbitrage transaction is just an example: Taking advantage of incorrect asset pricing of the Uniswap fund pool, traders make arbitrages to flatten the price of the Uniswap fund pool with the prices of other trading venues. Instead of profiting from trading fees of traders, miners can maximize their profits by making arbitrages themselves.

Ansgar.eth (@adietrichs), an ETH protocol developer and researcher, made a research on supply and demand of the transaction packaging market:

Supply-demand curve in transaction packaging market



Source: @adietrichs (<https://hackmd.io/@adietrichs/eip-1559>), KuCoin Labs

In the preceding figure, "PEV" in purple represents the revenue of miners under the uniform price auction settings, which is a natural result in any market balance with fixed supply and high demand. The size of the purple area cannot be reduced, and it is the value that miners can obtain anyway. "MEV" in cyan represents the additional revenue of miners able to earn from differential pricing. Users complain that the current market overcharges many users, which is one of the main problems that EIP-1559 is trying to solve.

3 Changes to public opinion after London Upgrade

Popular comments about the ETH upgrade on Twitter (from August 4 to 19, 2021)

After London Upgrade, the public opinion of ETH is positive. Users are mainly concerned about the base fee burn-out mechanism, under which the base fee is burned out, not paid to miners. In this way, miner cheating is avoided: firstly, miners can only submit their transactions to a block without consuming any fee and thus can hardly profit from generating transactions on their own; secondly, transactions can only be made on ETH and paid by ETH, preventing economic abstraction.

1	binance	2021-08-18 00:26
Over 61,000 #Ethereum have been burned since the London hard fork. That's \$188 million worth of \$ETH		
2	RichardDixonART	2021-08-17 14:02
pinned #cryptoart 1 of 1 original #art #crypto #ethereum #ETH2 #eip1559. 📌🔗		
3	takenstheorem	2021-08-15 12:51
Gas price estimated from 100,000 blocks, before/after #Ethereum London. (...less volatility also)		
4	WeekInEthNews	2021-08-13 12:31
📌 Latest Week in Ethereum News! 2E ~17% of transactions are Type 2 (EIP1559) and growing 📈 @0xPoly		
5	DeFiNewsNetwork	2021-08-17 02:23
recent London upgrade (#EIP1559). @VitalikButerin, the co-founder of Ethereum, explained why the		
6	hbar1000	2021-08-18 20:54
\$HBAR #HelloFuture #FinTech #Finance #Investing #Bitcoin #BTC #Blockchain #Ethereum #Cardano #ADA		
7	BabyLondonbsc	2021-08-18 04:40
@davidgokhshtein Hey David we have passive ethereum rewards here at baby London! Come check us out		
8	WeekInEthNews	2021-08-18 06:30
#MuchClicked @imallowxyz BYO algorithm @EF_ESP @ethereum teams Q2 @RafaelaBaralao airdrop @TimB...		
9	token2049	2021-08-17 18:19
Co-inventor of ZK-STARKs. StarkWare is helping scale the Ethereum blockchain via its StarkEx trading		
10	zoescaman	2021-08-18 15:37
number of significant changes to both stabilise the Ethereum blockchain and move faster towards Eth2		

Collected by: KuCoin Labs

Comments about the ETH upgrade on Twitter show that, the market focus is still on the impact of this upgrade on the ETH price and ETH performance and mechanism. Most discussions are neutral, without obvious emotional tendency or judgment preference.

Keywords of discussions about the ETH upgrade on Twitter (from August 4 to 19, 2021)

earn bitcoin \$eth users defi margin cards month primexbt uniswap kind million tokens banking miners helps today news blockchain market crypto cardano like network increased world price year money launched significant following markets time worth levels join altcoin does telegram hardfork group's fintech litecoin use massive cryptocurrencies futures binance hard business cryptocurrency asset btc attention daily bonus ecosystem eth times currency problem start week team user platform upgrade mining it's fee eth's scale leading account latest enter soon mechanism link trading burned using new finance predictable gas trade fees coins technology major high change fork security recent right means scenario

Collected by: KuCoin Labs

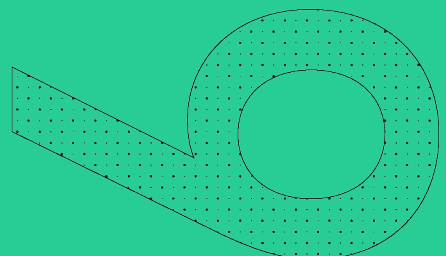
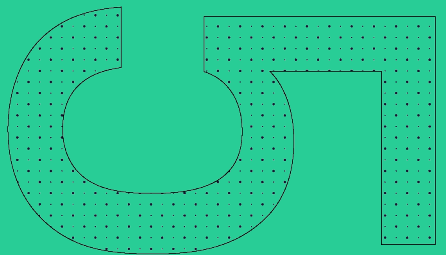
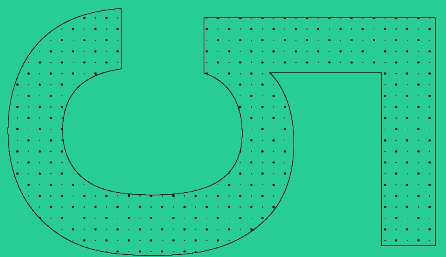
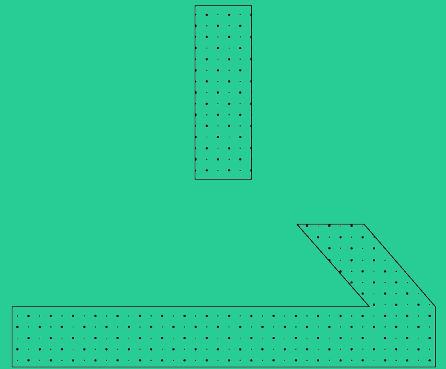
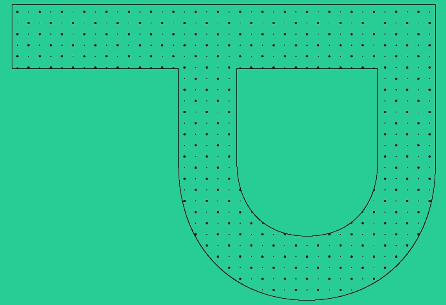
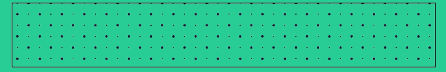
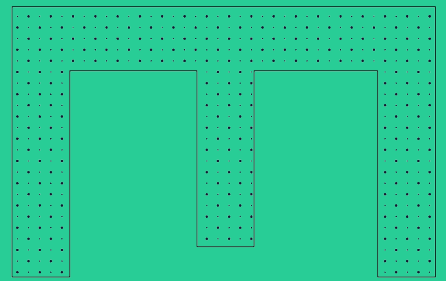
#FederalResGraph #FBAR #DLT #DLT1
\$HBAR #HelloFuture #Fintech #Finance
will be missed... (until we meet again on
#Layer2)

Collected by: KuCoin Labs

3.

Data analysis after EIP-1559 upgrade

- ① ETH burned and supply
- ② ETH price
- ③ Exchanges and on-chain data
- ④ User experience
- ⑤ Miner revenue



Data analysis after EIP-1559 upgrade

ETH is a key function of the ETH network because users must use ETH to pay their gas fees. ETH is also the reward for miners for their transaction verification and blockchain update efforts.

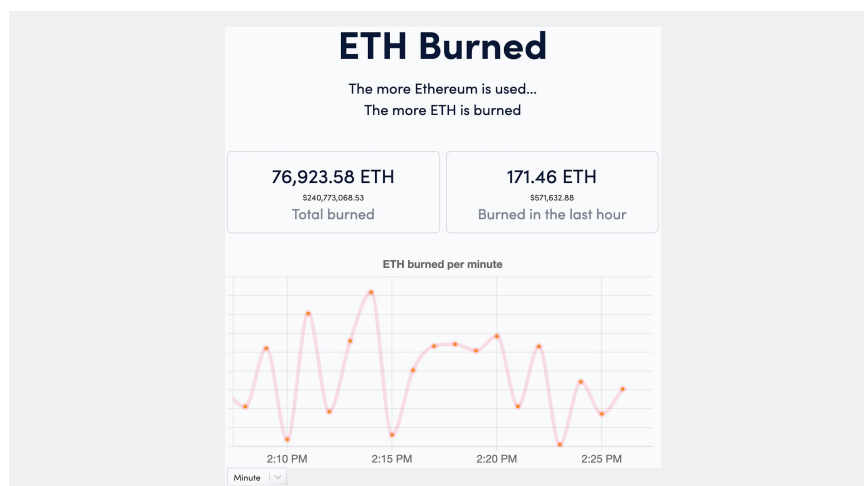
As mentioned above, EIP-1559 provides a transaction pricing solution for the ETH network, which has fundamentally changed the ETH transaction mechanism. This protocol adjusts the gas upper limit per block and adds the base fee and tip mechanisms. The base fee is paid by users but is burned out by the protocol, instead of being paid to miners. The tips are paid by users to miners but the amount is determined by users, which can accelerate transactions. Upgrades influence both ETH and players of the ETH ecology. The following analyzes different data items after London Upgrade.

1 ETH burned and supply

After London Upgrade, EIP-1559 introduces a base fee to blocks on the network, influencing the number of ETHs required by transactions on ETH and the final ownership of such ETHs. The base fee traces the gas price of transactions accepted by the network based on the block space demand. It benefits the wallets and users by helping them more efficiently evaluate the correct gas fee of each transaction. The base fee is determined by the network demand and will be burned out to be removed from the current ETH supply.

According to statistics of Crypto Fees, since London Upgrade, a total of 76,923 ETHs (worth about \$240,716,830.64) have been burned out from August 5 to August 23, 2021, accounting for about 30% of ETHs issued within this period. This amount increases continuously. Just like the expression in the picture below: "The more Ethereum is used, the more ETH is burned".

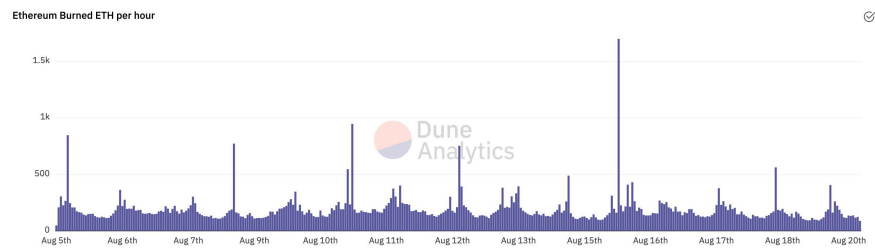
Total ETH burned



Source: Crypto Fees, KuCoin Labs

As shown in the figure below, the number of ETHs burned per hour ranges from about 48 to about 1,697, with an average of about 2 to 3 per minute. The base fee has no substantial impact on the number of ETHs currently paid. But the generated base fees are burned and thus can directly affect the current supply of ETHs, and the long-term cumulative benefits of all ETH investors, which, to most community participants, is a major improvement to the ETH network economy.

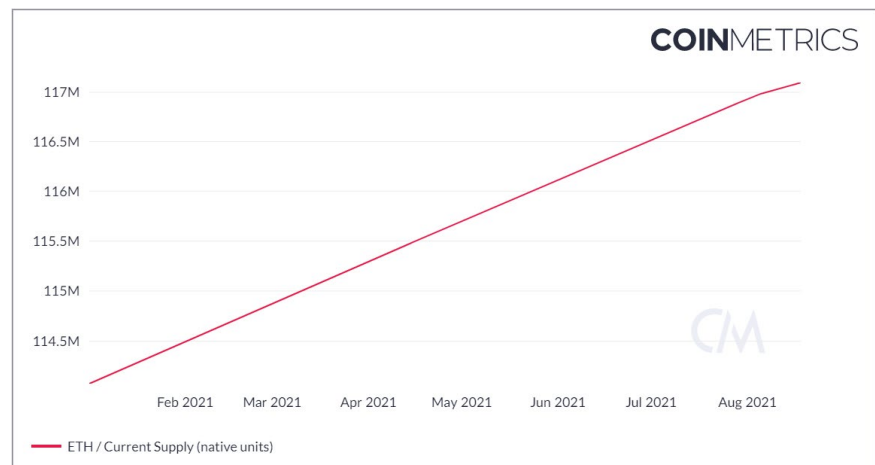
ETH burned per
hour after London
Upgrade



Source: Dune Analytics, KuCoin Labs

Next, let's see the ETH supply in 2021. Before EIP-1559, the ETH supply had been surging, and the ETH circulation had slowed down since August. More ETHs will be burned out with more transaction fees paid and more activities on the chain. It proves that, the base fee mechanism successfully concerts economic activities on the ETH blockchain to ETH token scarcity and slows down the efficient ETH issuance.

ETH supply in 2021



Source: Coin Metrics, KuCoin Labs

② ETH price

The following two figures show the comparison of the price change trend of ETH in the past six months and the price change of ETH after London Upgrade. It can be seen that, in the downward trend after the market adjustment in 2021, the ETH price experienced a continuous upward trend after the London fork, which, believed by the public, is a positive influence of the London fork.

ETH price trend in the past six months



Source: KuCoin Labs

ETH price trend before and after London Upgrade



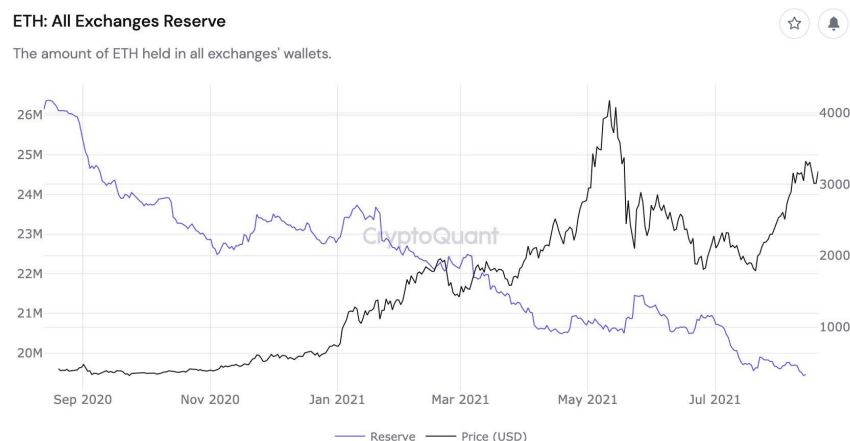
Source: KuCoin Labs

London Upgrade has little impact on the ETH price in the short term, but will definitely increase the ETH price in the long term. As mentioned above, about 76,923 ETHs have been burned out since the date of London Upgrade to August 23. Just like the importance of Bitcoin halving, the slowdown in ETH supply will directly affect the ETH scarcity. If users are willing to invest in ETH based on the scarcity of ETH and the forecast of future demand before London Upgrade, the ETH price will definitely increase due to its scarcity and more players will join the ETH ecology after the London fork.

3 Exchanges and on-chain data

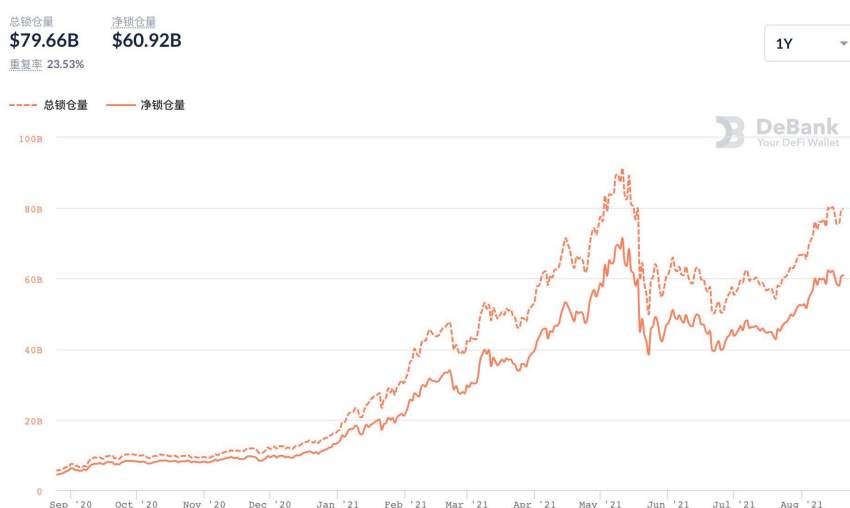
Statistics show that, the number of ETHs held in exchanges' wallets has been decreasing from 22 million on January 1 to 19.5 million now. This is caused by increasing concern about and preference for the decentralization mode.

ETH reserve in CEX



While the ETH reserve in exchanges is decreasing, the number of ETHs held in smart contracts has continued to rise this year. A possible reason is the continuous expansion of the ETH ecology. The current demand for ETH in various decentralized applications in the DeFi protocol is very large, due to its liquidity, profitability, or liquidity mining strategy.

Locked ETH in DeFi



ETH locked in smart contracts can generate revenue for a long time, more suitable for conservative investors. A large number of ETHs are staked, and some ETHs burned as transaction fees will no longer be in circulation, which further increases the scarcity of ETHs in circulation.

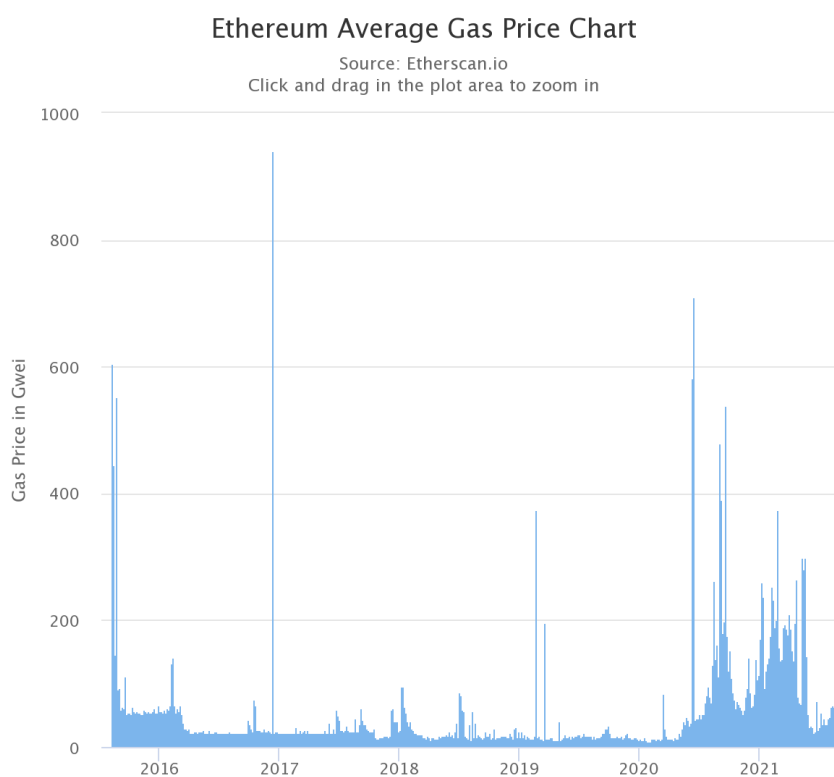
4 User experience

Before EIP-1559, the gas price was auctioned and determined whether transactions could be packaged to a great extent. The auction mechanism allows miners to bid based on the gas price to determine whether to include their transactions in a block. Currently, the ETH network can process up to 15-20 transactions per second. If the ETH network is busy, a user must offer a higher gas fee to attract miners to accept his transaction; otherwise, his transaction may be delayed indefinitely.

In this mode, users not only have to pay a high gas fee but also can hardly predict the gas fee accurately, making their transactions always in pending state. Besides, users have to wait until their previous transaction is accepted by miners before they can initiate another transaction, no matter what the gas fee they offer. It not only wastes time and energy, but also increases the basic cost of the ETH network because users have to pay more ETHs for a transaction.

The figure below shows the daily average gas fee of the ETH network in the past few years, which has been fluctuating greatly. The gas fee per day ranges from 10 gwei (109 gwei = 1 ETH) to 939 gwei, which means the fee of one transaction may be as high as hundreds of dollars.

Daily gas fee in ETH



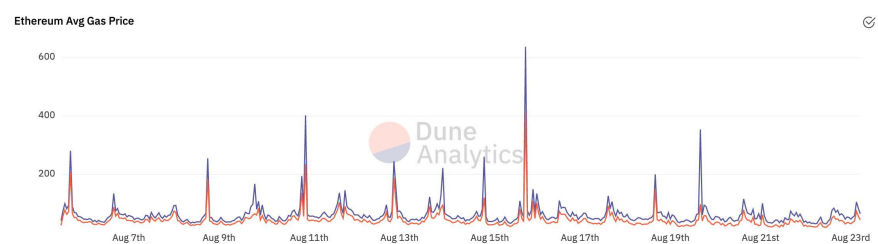
Source: Etherscan, KuCoin Labs

To solve this problem, EIP-1559 cancels the gas fee auction mechanism and adds a base fee (which will be burned later). Under the new mechanism, users do not need to estimate the gas price when packaging transactions. They only need to set the highest gas fee (tip) they are willing to pay to submit and package the transactions, without worrying about paying too high a fee.

Users can also pay tips to miners to increase the priority of their orders and make their orders enter a block first. Only when the maximum fee offered by a user is greater than the sum of the base fee and the tip, the transaction is valid, and the excess will be refunded to the user. Therefore, the actual transaction fee paid by a user is the sum of the base fee and the tip.

The figure below shows the ETH gas fee per hour after EIP-1559. The base fee ranges from about 28 gwei to about 413 gwei, and the gas price ranges from about 36 gwei to 637 gwei, which changes little compared with the gas price before EIP-1559.

Changes to ETH gas fee after London Upgrade



Source: Dune Analytics, KuCoin Labs

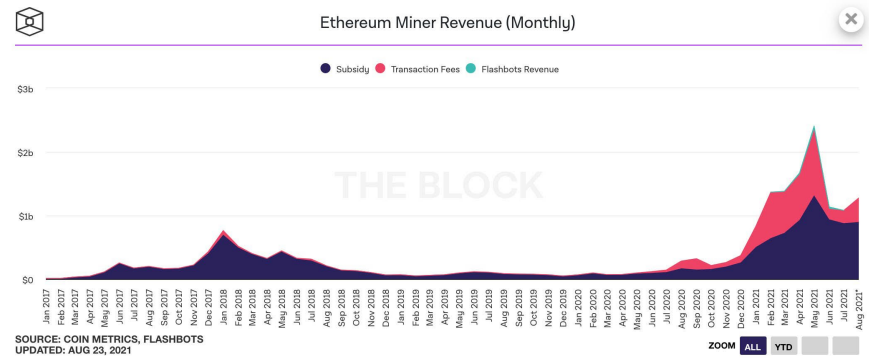
In the long run, EIP-1559 cannot fundamentally solve the problem of excessive gas fee. The gas fee is determined by market supply and demand. Expansion is the root solution for this problem. EIP-1559 is not an expansion and thus cannot reduce the gas fee. EIP-1559 targets at the auction-based pricing problem. It improves the gas fee estimation accuracy and prevents users from paying unnecessary more ETHs for a transaction.

5 Miner revenue

There are wide discussions on the impact of EIP-1559 upgrade on miner revenue. The base fee added by EIP-1559 will be burned instead of being paid to miners. In this way, miners cannot obtain the trading fees any longer, greatly changing the miners' revenue structure. Miner revenue consists of the block rewards and tips. The tip amount is determined by users independently. Theoretically, users may pay no tips. However, users may pay more tips to attract miners to package their transactions firstly.

According to The Block statistics, the ETH miner revenue in the beginning of 2021 is about \$800 million, of which about 38.24% are trading fees. The ETH miner revenue reached ATH (\$2.35 billion) in May, of which about 37.95% are from trading fees. Therefore, in the auction mechanism, trading fees account for the majority of miner revenue.

ETH miner revenue



Source: The Block, KuCoin Labs

Percentage of trading fee in ETH miner revenue



Source: The Block, KuCoin Labs

Miners blame this upgrade most for their reduced revenue. However, data shows their revenue is still showing an upward trend. But no matter what the future is, accepting EIP-1559 may be the best choice for miners.

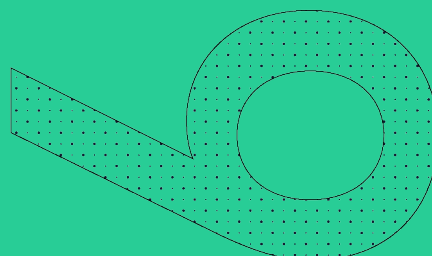
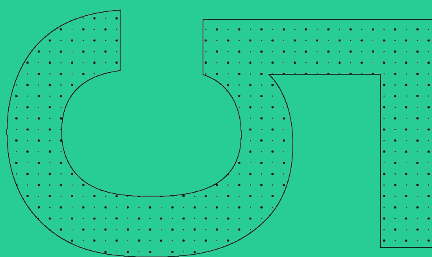
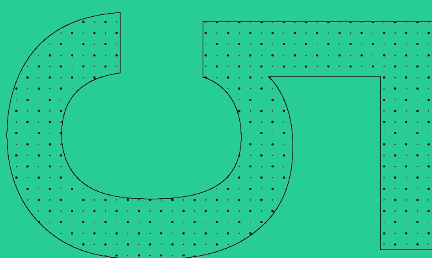
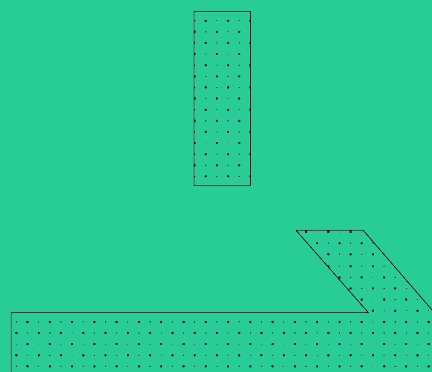
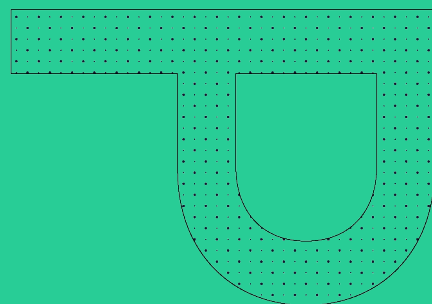
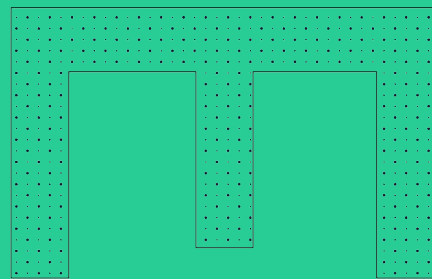
According to Coin Metrics statistics, after EIP-1559 was implemented, the daily average miner revenue in USD was increased by 7.1% and remained at a two-month high. There are two possible reasons:

1. Firstly, the ETH price increases. Anand Gomes, founder of Paradigm, believes that, the higher ETH price after London Upgrade has attracted some institutional investors. The loss of miners' native ETH revenue is compensated by ETH price rise.
2. Besides, miners can still get the priority fee. Since London Upgrade, ETH users have paid 7,141 ETHs as the priority fee, hoping their transactions can be processed by miners first.

4.

Long-term impact and thinking of London Upgrade

- ① From PoW to PoS
- ② Way to ETH 2.0
- ③ EIP-1559 applications outside ETH
- ④ Outlook



Long-term impact and thinking of London Upgrade

① From PoW to PoS

Like Bitcoin, ETH 1.0 works based on the PoW consensus mechanism.

PoW has been increasingly questioned and criticized for its CPU price speculation and looming global environment pollution since the birth of Bitcoin. To solve problems of this mechanism, public chains which emerged after Bitcoin and ETH are exploring new consensus mechanisms and network maintenance methods. Then, PoS applied in EOS, Cosmos, and other ecosystems becomes the most competitive option in the consensus market.

The booming DeFi, soaring NFT market, and flourishing ETH ecology bring changes to the market, network, and environment. One ETH transaction consumes electricity equivalent to the average electricity consumption of an American household in a week, and its carbon footprint is equivalent to that of 140,893 Visa credit card transactions or that of watching YouTube videos 10,595 hours.

On December 1, 2021, ETH launched the PoS test beacon chain. Over 16,384 active verifiers now are running simulations on this chain. The beacon chain will be merged with the current ETH chain that saves the history of ETH transactions to create ETH 2.0. We believe that the PoS consensus mechanism will effectively limit the number of ETHs in circulation, because while a large number of ETHs are staked on the chain, the base fees incurred by the verifiers for processing transactions will also be burned.

ETH 2.0 is also a milestone for the ETH ecosystem to replace PoW with PoS. PoS aims to reduce network energy consumption by more than 99%, and will complete a transition through the Merge event in early 2022, forming a "more scalable, safer, and more sustainable" ETH network.

PoS is widely applied in ETH competitors, such as Cosmos, Avalanche, Cardano, and Flow. Public chains adopting PoS from the very beginning have attracted many developers to expand the ecosystem applications for their speed and cost effectiveness.

However, the blockchain is a license-free network and must allow anyone to join fairly and create opportunities for anyone to profit from it. PoW is complained for its high requirements on hardware computing power, limiting participation of users with insufficient hardware resources. PoS is complained for its token staking threshold.

Large exchanges and platforms hold most of ETHs. Dominant exchanges even have their own mining pool teams to provide staking services to their end users.

As for the performance, ETH 2.0 FAQ clearly stated that the Merge event would not influence the user experience. The ETH network speed and fees problems are to be solved by a series of feature and function upgrades, including Rollup and Sharding, after the Merge event. Vitalik Buterin, founder of ETH, said that, after iterations of functions and performance, the ETH network would be able to process 100,000 transactions per second.

② Way to ETH 2.0

The way to ETH 2.0 consists of four stages and the beacon chain is just the start. It is not until the Merge event to be completed in early 2022 that ETH can completely transfer to PoS and implement sharding after London Upgrade. After that, the circulation of ETH is expected to decrease significantly, and EIP-1559 can truly realize the deflation of ETH tokens.

According to the roadmap previously announced by ETH 2.0, after the beacon chain in phase 0, ETH will focus on sharding in phase 1, smart contracts in phase 2, and off-chain state storage in phase 3, and sharded contracts in stage 4. In general, ETH will further decentralize the Layer 1 network, and introduce great innovations to the Layer 2 network, making it more convenient and simple for developers to use ETH.

However, there are also many unsolved problems in the ETH ecosystem.

From the perspective of the community, it will take a lot of time for major ETH developer teams to persuade all ETH community players to accept the new ETH 2.0 solution, focusing on vested interests under the current mechanism to give up part of their interests. For example, EIP-1559 has been questioned and opposed by miners.

From the perspective of the technology, the difficulty bomb embedded in the ETH code to increase the mining difficulty has been delayed from July 2021 to December 2021. The implementation of this mechanism designed in 2015 is risky. Especially with the growth of the ETH ecosystem and the transition from PoW to PoS, changes to these major rules may result in interests unbalance, community dispute, and even consensus fork, breaking the current stable situation.

From the perspective of the market, new concepts and innovations such as DeFi, NFT, and Metaverse are raising new requirements on the ETH performance. More efforts should be made to innovate Layer 2 expansion solutions to transit to stable ETH 2.0, such as ZK Rollup, Optimistic Rollup, and zkSync 2.0.

③ EIP-1559 applications outside ETH

ETH upgrade and transformation also affects the iteration and upgrade of the on-chain infrastructure. They together promote progress to the ETH 2.0 network. For example, Metamask, the most widely used wallet on the ETH chain, has launched an interface adapted to EIP-1559 for all users in mid-August 2021.

Many public chain ecosystems other than ETH are considering and using the new transaction sequencing mechanism of EIP-1559, such as IPFS-based Filecoin and ETH-based Polygon (Matic) ecosystems.

EIP-1559 coming
soon to Polygon



Source: Polygon, KuCoin Labs

According to Juan Benet, founder of Filecoin, EIP-1559 is especially suitable for Filecoin transactions that are frequent and chained at a specific rhythm.



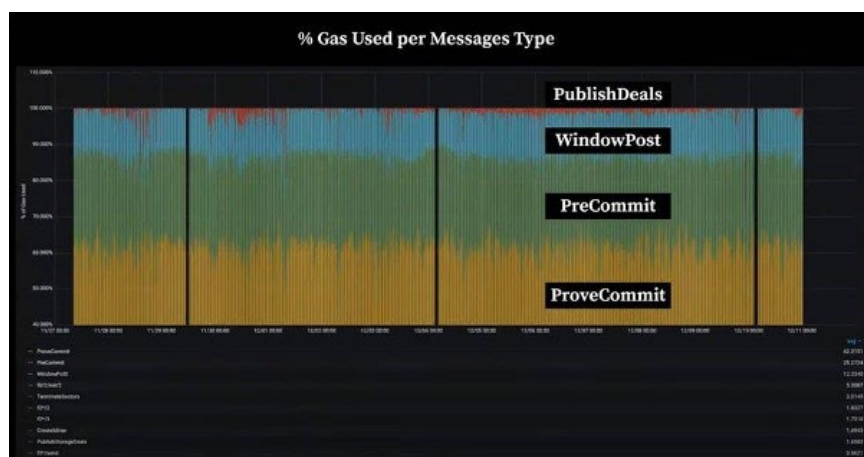
Source: @juanbenet, KuCoin Labs

In general, transactions with high values are well supported in the Filecoin network. At the user experience level, greater predictability makes programs and tools more concise. Besides, the cost of miners and developers is also reduced.

But EIP-1559 also brings negative impact on small miners in Filecoin. The main reason is that, rise in gas price due to Filecoin network congestion results in surging windowpost expenditure of miners.

Each time congestion will cause gas price to rise and increase the windowpost cost, which is very unfriendly and frustrating. It means that the daily windowpost expenditure required by miners will greatly increase until its upper limit.

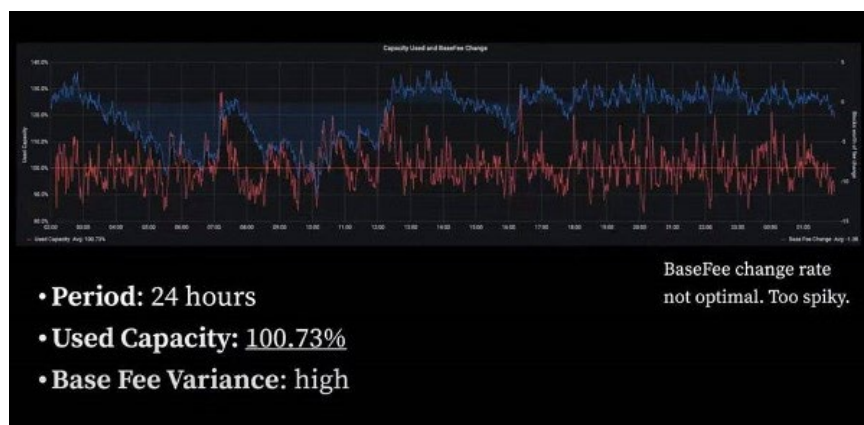
Gas used in
Filecoin network



Source: @juanbenet, KuCoin Labs

The used capacity of Filecoin blocks and change rate of the base fee show that, the base fee mechanism is effective within 24 hours, with a used capacity of 100.73%. But the used capacity may surge to 130% or 200% sometimes, making it hard for miners to estimate their benefits. Filecoin's protocol lab is improving the EIP-1559 mechanism in terms of operational control and data to reduce the expenditure and fluctuation of gas fees.

Used capacity
and base fee
change rate



Source: @juanbenet, KuCoin Labs

In general, the ETH ecology is still dominating the blockchain technology development with its technological innovation and rule changes.

4 Outlook

EIP-1559, adopted during London Upgrade in the way to ETH 2.0, has changed the MEV market rules and situation, and has a profound impact on miners, developers, and currency holders. Innovations of the ETH ecology radiate the development of the entire blockchain industry technology, and refine major public chain ecosystems and platforms.

- Small miners may cooperate with each other, or run some off-chain sequencing systems in the form of DAO, and then return MEV to token holders.
- Robot developers can use generalized front-running services such as Flashbots and MiningDAO that may be more popular and easier to use in the future.
- New public chains compatible with ETH may have high risks to use EIP-1559 or similar proposals. If they do not use EIP-1559, they may attract miners who object to this proposal to form a strong public chain ecosystem, which may be another way.
- Public chain ecosystems following the ETH development direction will be easier to enjoy the benefits of the ETH in the long run, including but not limited to miners, developers, currency holders, commercial resources, and compliance resources.

