JULY 2024

Solana Report

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Solana Overview

Solana, launched by Anatoly Yakovenko, is designed to democratise the world's financial systems while supporting high-frequency, high-growth applications across sectors such as finance, payments and gaming. As a high-performance, permissionless blockchain, it is renowned for its swift processing capabilities and minimal transaction costs, making it a robust framework for widespread adoption and continuous innovation.

Operating as a single global state machine, Solana is distinguished by its unique Proof of History (PoH) consensus mechanism, which acts as a cryptographic clock to optimise efficiency and scalability. This feature, along with Solana's capacity to process thousands of transactions per second, positions it among the fastest blockchains available.

Solana appeals to developers as it allows them to focus on refining their applications to achieve market fit, rather than getting bogged down by underlying blockchain optimisations. The platform's low fees, quick 400ms confirmation times and a comprehensive suite of development tools available in languages like Rust, TypeScript and Python enhance its accessibility and appeal. These features enable developers to build user-friendly applications that are both economical and accessible worldwide.

The architecture of Solana incorporates several cutting-edge technologies, including the Tower BFT consensus, the Turbine block propagation protocol and Archivers for data storage, all contributing to its formidable throughput and scalability. Additionally, the SOL token, Solana's native cryptocurrency, facilitates transactions and staking within its growing ecosystem of decentralised applications (DApps).

Solana continues to evolve, promising further enhancements and providing a solid foundation for future developments. This ongoing evolution signals its potential for more substantial improvements and enduring relevance in the blockchain space.

Comparison: Ethereum vs Solana

Aspect	Ethereum	Solana
Year of Launch	2015	2020
Founders	Vitalik Buterin, Gavin Wood, Anthony Di Iorio, Charles Hoskinson, and others	Anatoly Yakovenko
Consensus Mechanism	Proof of Stake (PoS)	Proof of History (PoH)
Throughput (TPS)	15-30	Up to 65,000
Gas Fees	Variable, upwards of $1	Significantly lower, ~0.0001 SOL
Network Congestion	Common, especially during high demand periods	Rare, but has experienced performance issues and outages
Programming Language	Solidity, Vyper	Rust
Smart Contract Capabilities	Pioneered smart contract technology, extensive dApp library	Parallel processing capabilities, high-speed dApps
Native Token Utility	ETH used for transaction fees, computational services, staking, investment	SOL used for transaction fees, staking, network security, investment

Source: kucoin.com/learn/crypto/solana-vs-ethereum-key-differences-and-insights

Ethereum and Solana are two of the leading Layer-1 blockchains and decentralised app (dApps) ecosystems, each excelling in different aspects of cryptocurrency and blockchain technology.

Ethereum, established in 2015 by Vitalik Buterin and others, has significantly influenced the development of dApps and decentralised finance through its introduction of smart contracts. Its ongoing transition to Ethereum 2.0, initiated with the Beacon Chain in December 2020, aims to improve scalability and energy efficiency through a shift to Proof of Stake (PoS).

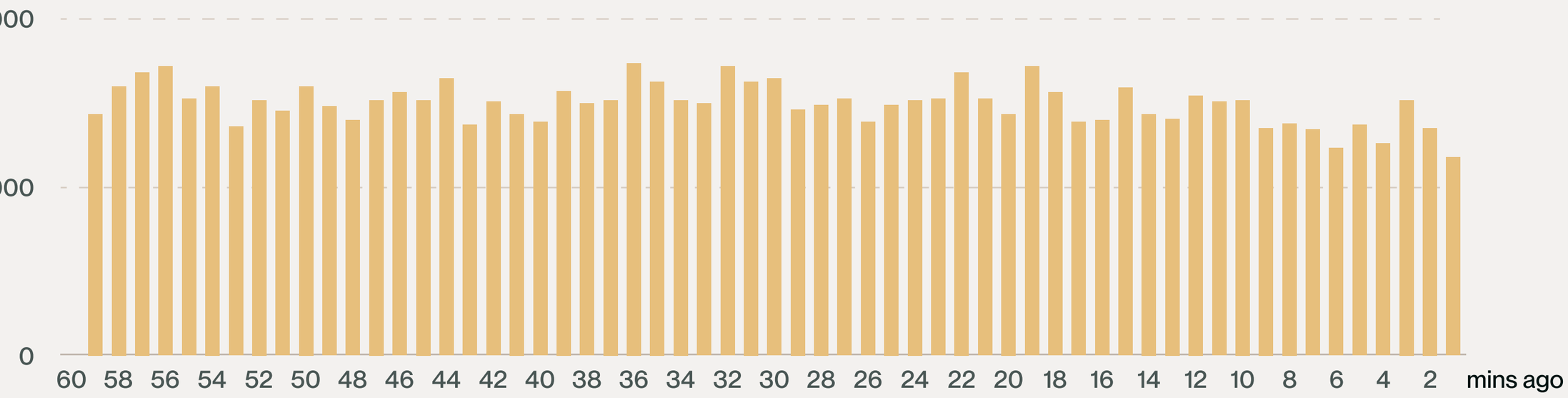
Solana sets itself apart with its high throughput and low transaction costs, underpinned by its unique Proof of History consensus mechanism alongside PoS.

Key achievements for Solana include hosting the Wormhole bridge for cross-chain transactions and demonstrating peak throughput capabilities, positioning it as a viable platform for widespread adoption and complex applications.

Both Ethereum and Solana have carved significant niches in the blockchain environment: Ethereum as a foundational layer for dApps and DeFi and Solana as a faster, more efficient competitor. Each platform employs distinct technological frameworks to address the challenges in decentralised finance and smart contracts. Ethereum has recently transitioned from PoW to PoS for greater energy efficiency, while Solana combines PoS with PoH to optimise transaction speeds up to 65,000 transactions per second, far surpassing Ethereum's current capacity.

Solana's Transactions Per Second as of July 11th 2024

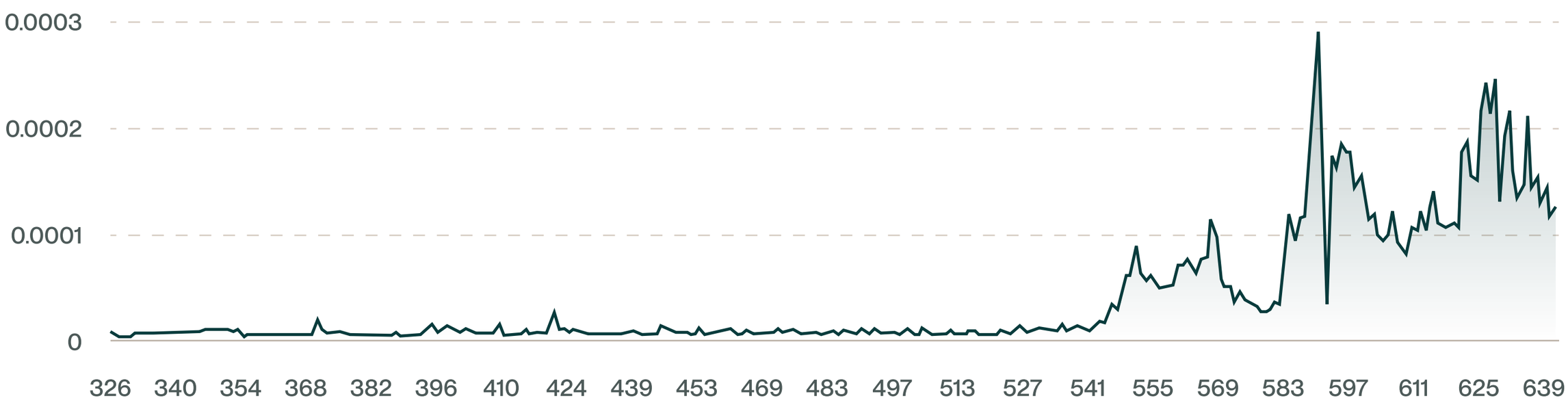
Source: solanacompass.com



In terms of transaction costs, Ethereum's gas fees vary and can be quite high, particularly during periods of network congestion. In contrast, Solana's architecture ensures much lower transaction costs, making it attractive for high-frequency transactions.

Solana's Historical Average Network Fees

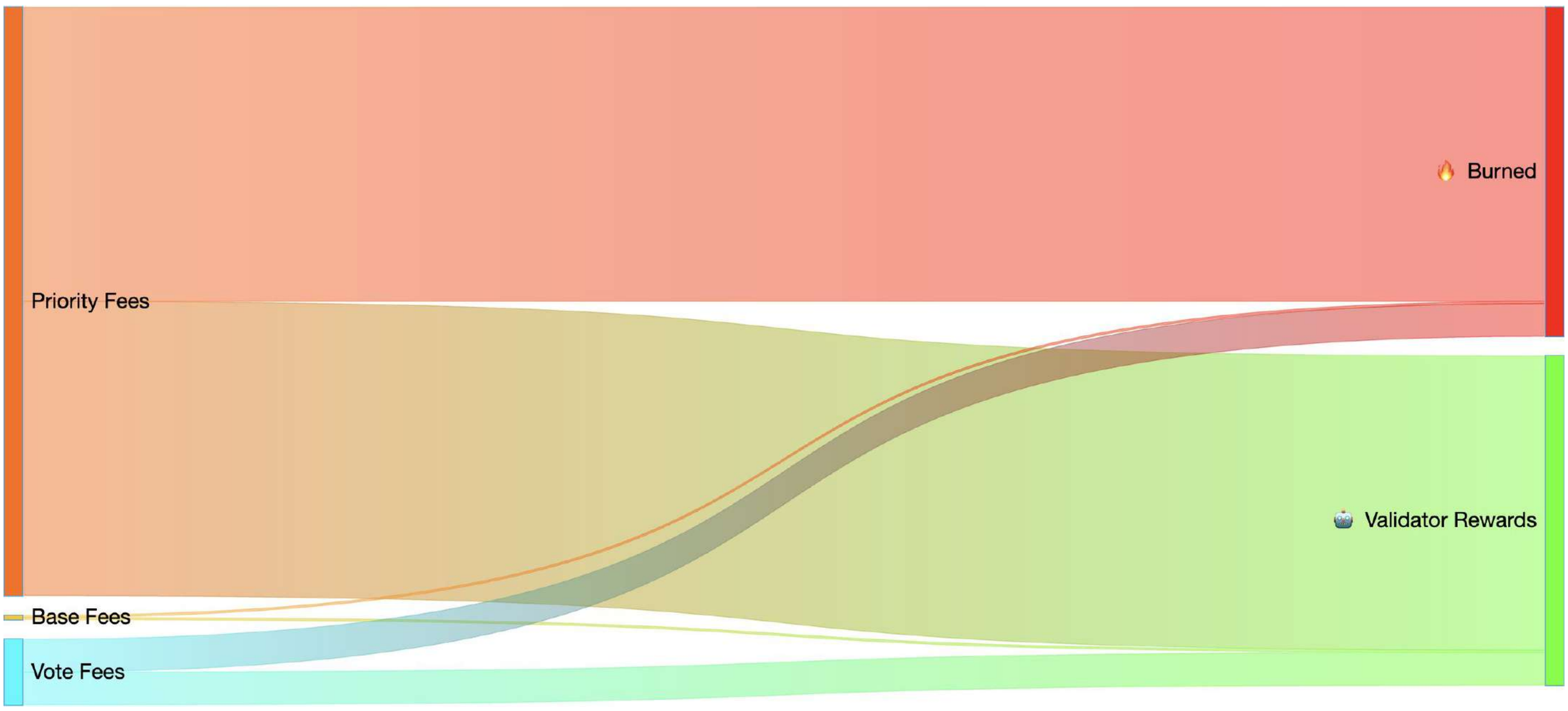
Source: solanacompass.com



In the last epoch, the average transaction fee paid by Solana users, excluding vote transactions, amounted to 0.000117065 SOL. This average covers all non-vote transactions, including those with priority fees. While many users paid the minimum fee of 0.000005 SOL, others opted to pay higher fees to ensure priority processing of their transactions.

The displayed average fee per epoch reflects the costs incurred by network users, such as browser wallets or trading bots. Generally, most human users incur low to no priority fees. However, trading bots often pay higher fees to secure timely execution of their trades, thus increasing the average fee.

Currently, 50% of all fees collected on Solana—this includes base fees, vote fees and priority fees—are burned. The other half is allocated to the primary validator responsible for proposing the block.



Source: solanacompass.com

The table on the right provides a snapshot of key Solana transaction metrics over 24 hours on July 11th, 2024.

This data includes the total fees collected, the amount of SOL burnt, the average fee for transactions excluding voting and the percentage of transactions where users paid a priority fee.

Solana Fees + Burn Tracker
last 24 hours (July 11th 2024)

Source: solanacompass.com/statistics/fees

Fees (24h)	9,510.705 SOL
SOL Burnt (24h)	4,755.352 SOL
Average Non-Vote Fee (24h)	0.000 145010 SOL
User Transactions Paying Priority (24h)	81.42%
Nominal Staking APY	6.73%
Node Versions	1.18.15 (95.9%), Others (4.1%)

From a programming perspective, Ethereum uses Solidity and Vyper for smart contracts, while Solana uses Rust, offering parallel processing capabilities that significantly increase throughput. These programming languages and smart contract capabilities reflect the platforms' differing focuses and technological approaches.

The native tokens of each blockchain, ETH for Ethereum and SOL for Solana, play crucial roles in network operations, including paying for transaction fees and staking, with each also serving as an investment asset. As both blockchains continue to develop and evolve, they offer diverse opportunities and challenges for developers, users and investors, making them central figures in the ongoing expansion and innovation within the blockchain industry.

Solana Validators

A validator is a computer tasked with operating the Solana network. It runs software that maintains all accounts within the Solana cluster and verifies transactions added to the network. Solana would not function without the presence of validators.

The network's resilience against attacks or failures increases with the number of independent entities operating validators.

Becoming a validator involves contributing to network growth, gaining practical understanding of Solana's operational fundamentals and joining a community of committed operators.

Solana Validators Overview

Validators	1,526
Superminority	20
Weighted Skip Rate	5.9%
Non-weighted Skip Rate	6.6%
Nominal Staking APY	6.73%
Node Versions	1.18.15 (95.9%), Others (4.1%)

Source: solanabeach.io/validators

Consensus vs RPC

These play differentiating roles within the network, the same validator software can be configured to run either a voting/consensus node or an RPC node. An RPC node facilitates user interaction with the blockchain but does not participate in voting due to performance considerations.

Proof Of Stake

Solana utilises a proof of stake architecture where token holders can stake their tokens with a chosen validator. Stakers maintain ownership of their tokens and can unstake at any time. Staked tokens indicate trust in the validator and stakers receive token rewards for contributing to network operation and security. A validator's influence in the consensus increases with the amount of staked tokens, enhancing its likelihood of producing network blocks. The validator currently producing blocks is identified as the leader.

Proof Of Work: For Contrast

Unlike proof of work systems where computers (miners) solve cryptographic challenges to earn rewards, often requiring substantial energy resources, Solana does not incentivise validators to use multiple computers for computational tasks.

Proof Of History

Solana’s Proof of History (PoH) is a groundbreaking consensus mechanism that transforms the processing and verification of blockchain transactions. It serves as a cryptographic clock, employing timestamps and hashes to chronologically record transactions.

Proof of History Core Principles

Verifiability

Creates a transparent historical record for trust.

Efficiency

Rapid transaction processing, high transactions per second.

Decentralization

Relies on few nodes, maintaining a distributed blockchain.

Scalability

Supports thousands of transactions per second, attractive for complex applications.

Security

Ensures fast and secure transactions by sequencing transactions securely.

Source: webisoft.com/articles/solana-proof-of-history

The PoH mechanism establishes a historical sequence by utilising a Verifiable Delay Function (VDF) to produce a series of hashes, each dependent on the previous ones. This method generates a verifiable chronological order of events.

The primary benefits of PoH include:

Enhanced transaction speed

Solana is capable of handling up to 65,000 transactions per second.

Increased scalability

Solana is capable of handling up to 65,000 transactions per second.

Boosted security

The sequential timestamping discourages tampering with the transaction history.

Greater energy efficiency

Compared to traditional Proof of Work systems, PoH is less energy-intensive.

PoH operates in tandem with Solana's Proof of Stake system, enhancing the blockchain's efficiency and security. This dual-layered approach allows network nodes to confirm the order and timing of transactions more swiftly, significantly reducing latency and enhancing network performance.

Validator Role

Overall validators play a key role in securing the network by producing and voting on blocks and by operating an independent node, they enhance network decentralisation. Validators participate in network governance discussions and are responsible for the maintenance, security and software updates of their systems. Effective performance of a validator builds trust with stakers, who in turn reward the validator with more staked tokens. It is crucial for validators to have plans in place to handle outages at any time to maintain network reliability.

Solana's Decentralisation Statistics as of July 11th 2024

5753	20	47
Total Nodes	Nakamoto Coefficient	Unique Countries
215	525	518229
Unique Cities	Unique Data Centers	Serving Total Stakers

Source: solanacompass.com/statistics/decentralization

Firedancer: Revolutionising Solana's Validator Clients

Firedancer, a major initiative by Jump, represents a groundbreaking development in Solana's blockchain technology, promising to enhance speed, reliability and validator client diversity.

Blockchain	MB/s Throughput
Ethereum	0.008
Polygon	0.1
Ethereum 2.0	1.3
Celestia	1.4
Avail	6.3
Eigenlayer	15
Sui, Aptos, Next Gen Blockchains	100
Solana	125
Solana Firedancer	1250

Source: Frictionless Capital

What is Firedancer?

Firedancer is a new validator client developed from scratch in C by Jump, utilising their extensive experience in high-frequency trading to optimise blockchain performance. It aims to improve upon the existing Solana Labs client by addressing speed and reliability with a completely redesigned architecture comprising modular components.

Validator Clients and Diversity

As previously discussed, validators are critical in maintaining the blockchain's integrity, processing transactions and securing the network. Diversity in validator clients enhances network resilience, minimising the risks from bugs or failures in any single implementation. Firedancer introduces a second, independent client, increasing the diversity and robustness of the network.

Technical Deep Dive

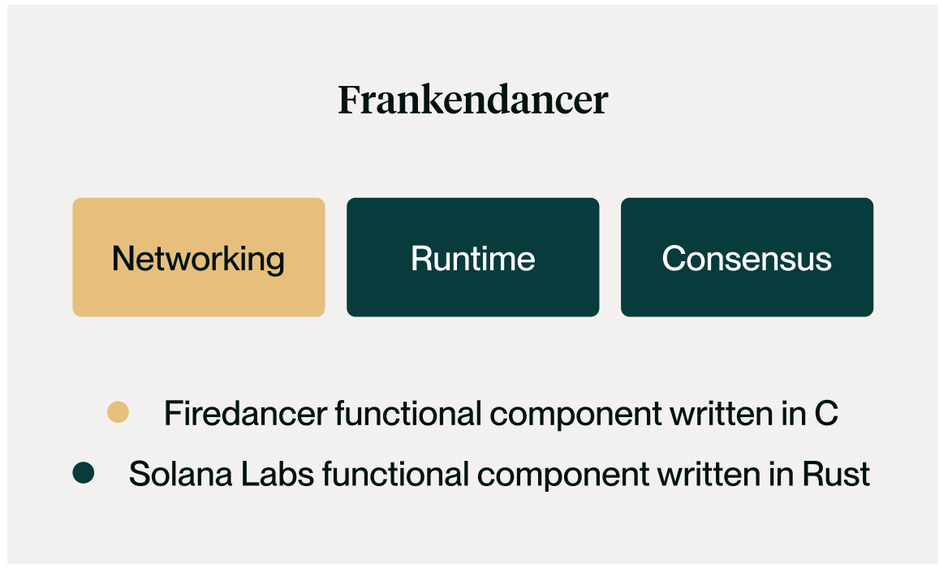
Firedancer leverages a modular architecture called "tiles," each running independently as Linux C processes, which enhances system robustness and upgrade flexibility. This architecture allows for minimal disruption during upgrades compared to the existing Rust clients, which require complete restarts. Its network processing capabilities are designed to handle high transaction volumes effectively, utilising advanced technologies like QUIC for efficient data transmission and congestion control.

Security and Reliability

Firedancer's design incorporates advanced security features to mitigate vulnerabilities inherent in C programming, such as memory safety issues. It employs OS sandboxing and tile isolation to minimise the risk of widespread system compromise from any single point of failure.

Current Status and Future Prospects

Currently, Firedancer is operational in a testnet environment, showcasing its capabilities in real-world conditions alongside other validators. Its development strategy includes continuous integration of components into the existing infrastructure, known as Frankendancer, allowing for incremental improvements and testing.



Climate-Conscious

Carbon Neutral

The Solana Foundation initiated the real-time measurement of emissions for the Solana blockchain, making it the first major smart-contract blockchain to implement such a system.

The emissions tracker was developed in collaboration with Trycarbonara, a carbon data platform. It incorporates software within Solana nodes to provide precise and comprehensive measurements of the blockchain's environmental footprint. Adjustments to the measurements are made in real-time, taking into account the activity and status of individual validators and the changing configuration of the network.

Key advancements in data capture include:

- Direct emissions measurement from RPC nodes via instrumentation of the underlying hardware.
- Detailed emissions data at the server level, incorporating the geolocation of both validator and RPC nodes.
- Marginal emissions analysis, evaluating the impact of additional demand against the grid supply and considering the diversity of renewable energy sources.
- Measurement of embodied emissions from the lifecycle stages—production, transportation and disposal—of the network's hardware.
- Calculation of Power Usage Effectiveness (PUE), which gauges data center efficiency.

How the Solana Foundation and the wider community are developing a more sustainable, energy-efficient web3:

Solana Climate Details

840 Joules

Average energy used per Solana transaction

5,219 Joules

Average energy used per Solana nonvoting transaction

10,086 tons of CO2

Annual carbon footprint

0

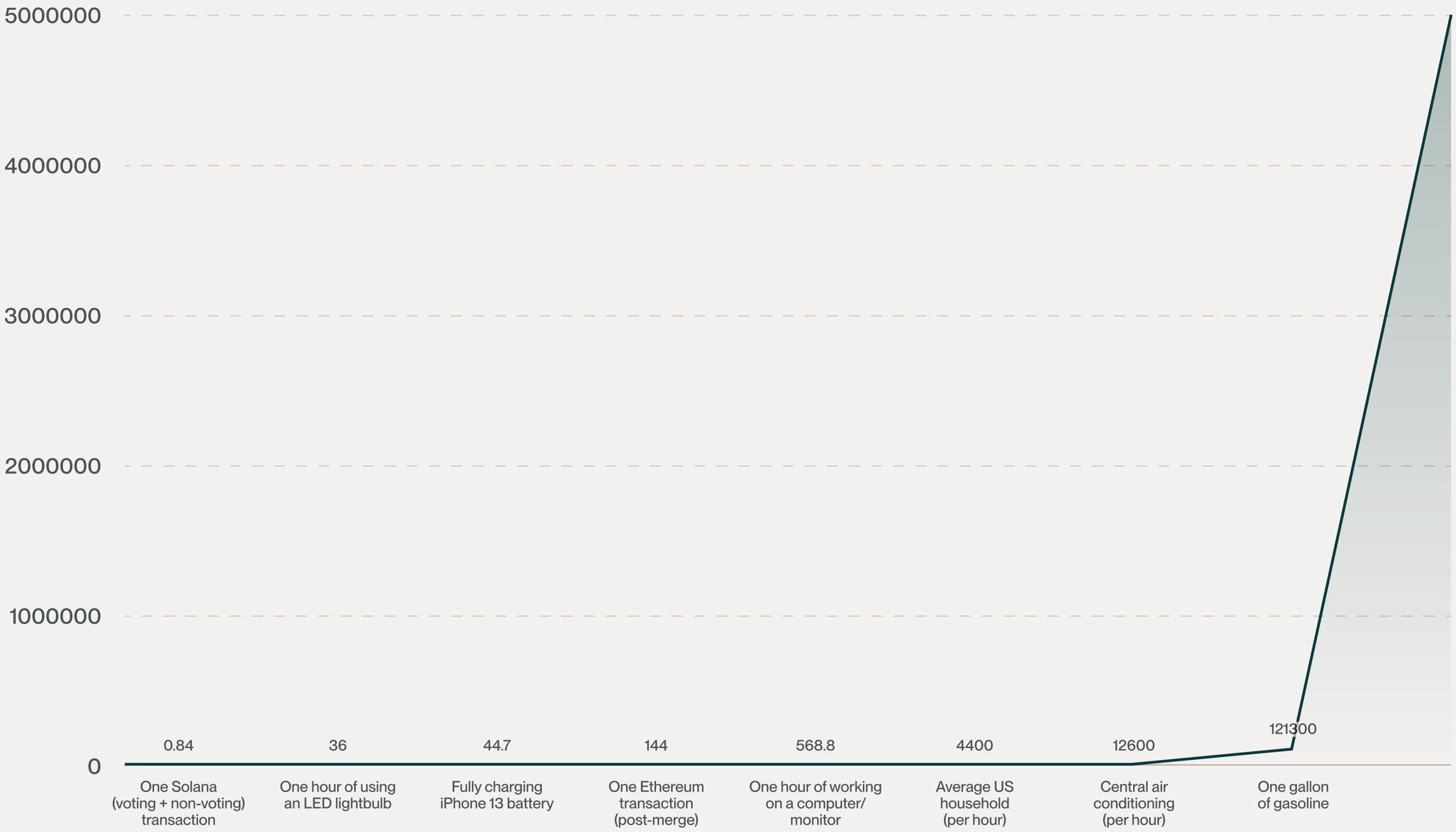
Net carbon impact

Source: solana.com/environment

Below is a snapshot of the climate impact of the Solana network compared to other common use cases, taken April 19th of 2023:

Comparative Energy Consumption of Common Activities and Transactions
Energy Used (kj)

Source: solana.com/environment



Since November 2021, the Solana Foundation has consistently engaged independent third parties to evaluate the emissions of the Solana network. The Foundation is dedicated to enhancing the precision and comprehensiveness of these assessments over time.

Solana Key Metrics Overview

The table below outlines key metrics for Solana as of July 11th, 2024, detailing various aspects of its performance and network status:

Solana Key Stats
as of July 11th 2024

Price of SOL	$141.34
1W Price Change	4.71%
TPS in Past 24 Hr	2,875
# of Active Validators in Past 24 Hr	1,624
SOL Total Supply	579.68M
SOL Staked Supply	395.32M
Fully Diluted Market Cap	$81.93B
Staked Ratio	68.20%

Source: 21co dune dashboard

Solana's Decentralised Finance Landscape
as of July 11th 2024

Solana DeFi Activity
as of July 11th 2024

Total Volume (USD)

The platform's trading volume reached $393.71 billion, indicating robust market activity and user engagement.

$393,711,197,822

Liquidity TVL (Total Value Locked)

The liquidity TVL stands at $865.97 million, reflecting substantial assets held in liquidity pools, which are crucial for supporting trading activities.

$865,973,528

Total Traders

Since its inception, Solana's decentralised finance landscape has attracted 24,591,311 traders.

24,591,311

Total Swaps

The platform has executed 1,847,335,349 swaps, highlighting its high transactional activity and efficiency.

1,847,335,349

Source: 21co dune dashboard

These statistics collectively depict a highly active and functional decentralised finance landscape for Solana.

Solana Top 10 DeFi Protocols
as of July 11th 2024

Source: defillama.com/chain/Solana

Rank	Name	Category	Total Value Locked (TVL)
1	Jito	Liquid Staking	$1.639b
2	Marinade	Liquid Staking	$1.102b
3	Kamino	Liquid Staking	$1.071b
4	Raydium	Dexes	$946.57m
5	Sanctum	Liquid Staking	$802.72m
6	SPL Governance	Services	$702.37m
7	Jupiter	Derivatives	$459.08m
8	marginfi	Derivatives	$371.16m
9	Drift	Derivatives	$340.63m
10	Pyth Network	Oracle	$322.59m

Core findings from the above table include:

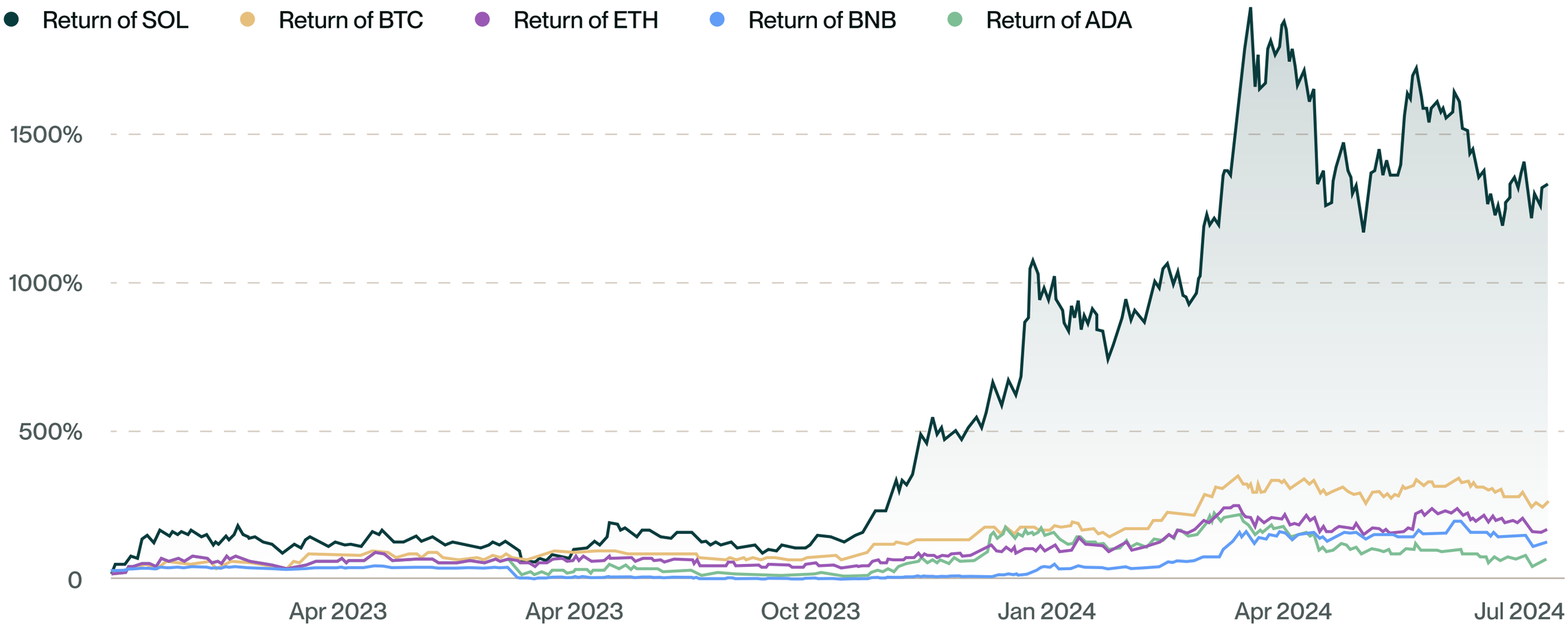
Liquid Staking Dominance:
The top three positions are held by liquid staking protocols (Jito, Marinade, Kamino), indicating a strong preference for these services among users on the Solana blockchain.

Diversity in Categories:
The list features various categories, including DEXes, Services, Derivatives and Oracle, showcasing the versatility of the DeFi ecosystem on Solana.

High TVL:
The top protocols have significant TVL, with the leading protocol (Jito) having over $1.6 billion locked, underscoring the substantial investments in these platforms.

This distribution reflects both the popularity and the financial commitment within the Solana DeFi space across different types of financial services.

$SOL Token Performance



The chart provided depicts the investment returns from April 2023 to July 2024 for various cryptocurrencies, illustrating a comparative analysis in an investment simulator.

The key findings based on the chart:

1

Solana (SOL) has shown the most significant growth among the cryptocurrencies listed, with a return of 1326.12%. This steep rise began around January 2024, marking it as an exceptional performer during this period.

2

Bitcoin (BTC), while showing more modest growth compared to SOL, has also performed well, ending the period with a 246.85% return. Its growth trajectory has been relatively steady throughout the period.

3

Ethereum (ETH) follows BTC in performance with a return of 156.12%. Its growth pattern is fairly steady with slight fluctuations.

4

Binance Coin (BNB) and Cardano (ADA) showed more modest increases. BNB ended with a return of 110.62% and ADA with 51.39%, both exhibiting relatively flat growth lines with slight increases compared to the more volatile growth of SOL and BTC.

Overall, the chart highlights a diverse range of performance outcomes across different digital assets, with SOL clearly leading in growth over the analysed period.

Fundamentals Drive Price

Fees

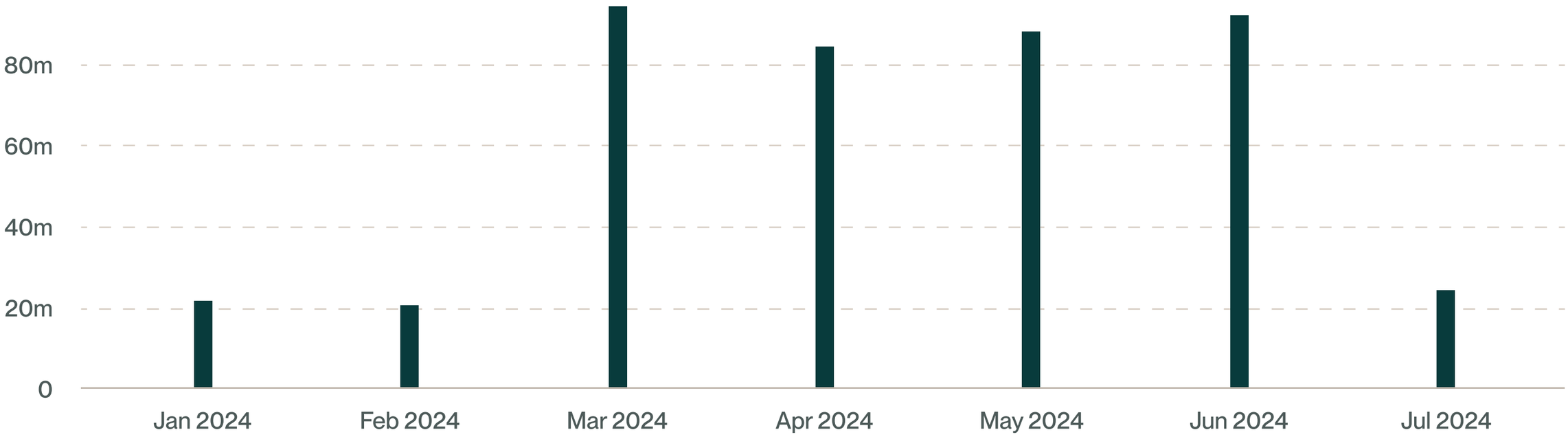
Blockchain fees are a crucial indicator of the blockchain's utility, essentially acting as the price for accessing on-chain products. When users willingly pay transaction fees, it highlights the perceived value of those products. They can be thought of as protocol revenue.

The aim of every blockchain is to offer as many useful products as possible to attract users. Higher fees indicate greater usage and demand, showcasing strong user engagement and adoption.

According to Dune Analytics, since March 2024, Solana's fees have consistently remained high, averaging around $80 million per month. Despite a market cooldown, these fees have not decreased.

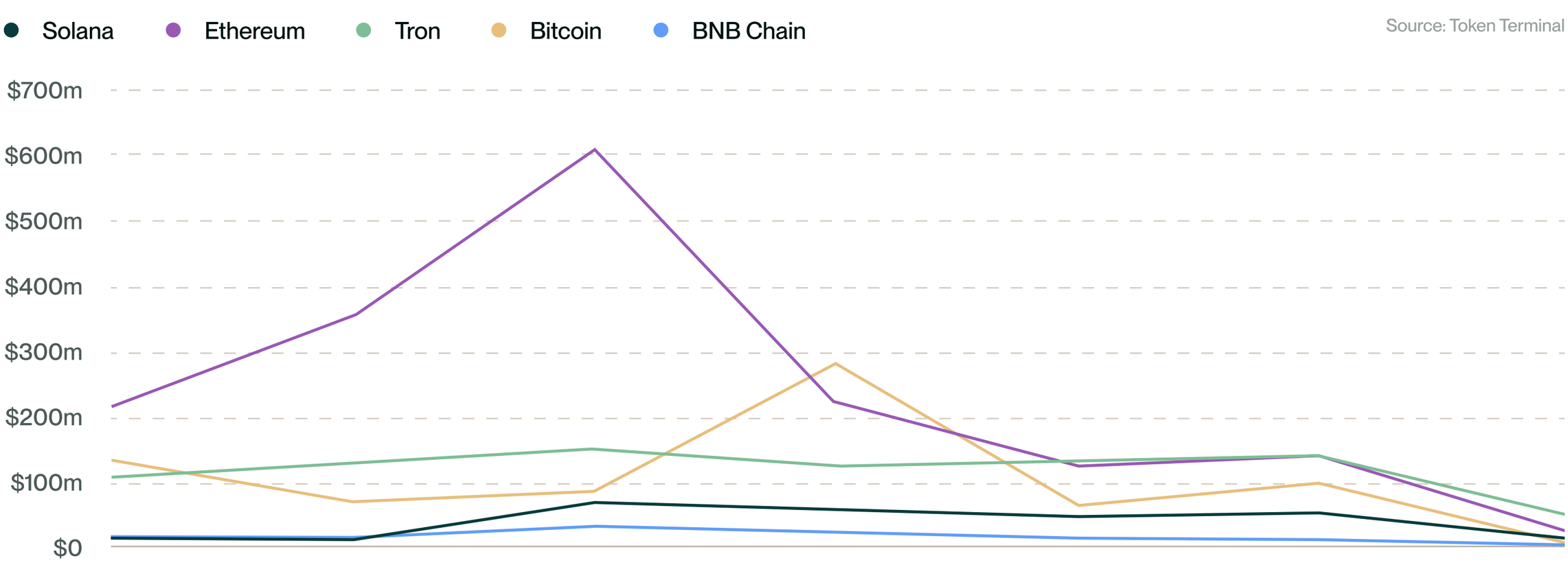
Monthly Transaction Fees on Solana (USD)

Source: Dune Analytics



In June 2024, Solana ranks fourth in fee generation compared to other blockchains, behind Ethereum, Tron, and Bitcoin. This is a very positive sign for the Solana blockchain, indicating sustained user activity and engagement.

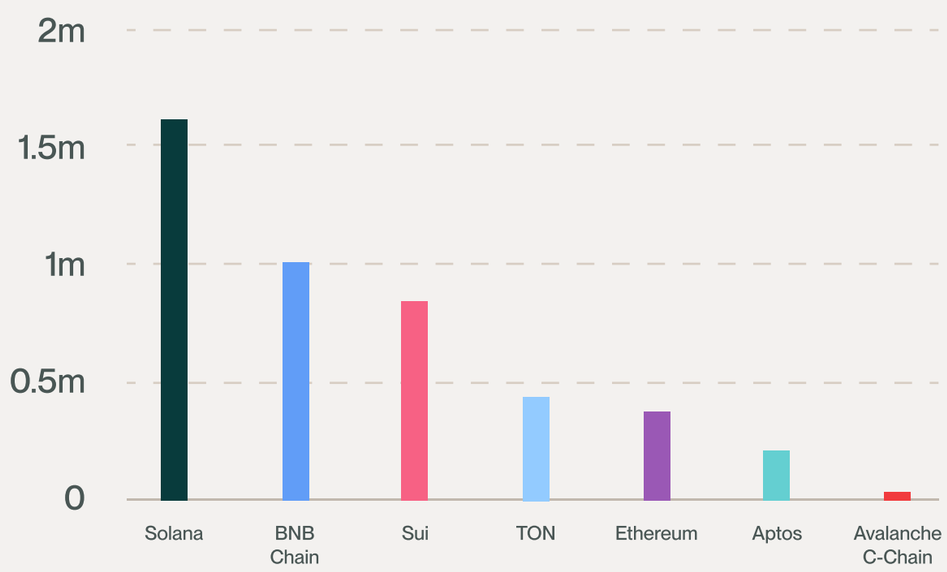
Source: Token Terminal



Users

Solana has demonstrated superior user experience through its impressive userbase, as demonstrated by active Solana wallet addresses. A higher number of active addresses indicates more users, which indicates a user-friendly experience. User-experience can be improved by lower fees, faster throughput, and more applications. In June 2024, Solana garnered more users than all other chains with 1.6M+ active addresses. This is a very positive sign for Solana as users drive network effects and fee generation.

Average Active Addresses
June 2024



Source: Coin Market Cap

Solana ETF filings

Recent filings for Solana spot ETFs have captivated the cryptocurrency market. On June 27 and 28, 2024, VanEck and 21Shares respectively submitted applications to the U.S. Securities and Exchange Commission for the first spot Solana ETFs. These applications aim to establish regulated funds that would directly hold SOL tokens and reflect their market value, enabling investors to engage with Solana without owning the tokens directly.

The announcements sparked a surge of optimism within the cryptocurrency community, evidenced by an 11% increase in Solana's price to approximately $150. This uptick is viewed as a potential turning point for Solana's broader acceptance and could attract institutional investors.

No Solana ETF has been approved yet, but analysts cautiously expect that approval could come by mid to late 2025, given the SEC's evolving stance on crypto ETFs and potential regulatory changes following the U.S. presidential elections. The approval of a Solana ETF in North America could significantly boost SOL's price and market visibility, leading to higher valuations.

These filings follow the successful launch of the spot Bitcoin ETF and the acceptance of spot Ethereum ETFs, indicating a growing trend of integrating cryptocurrencies into traditional financial markets.

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Valour Solana

Valour, a leading digital asset ETP issuer in Europe, offers a Solana ETP tracking the price of Solana and thereby providing investors access to one of the best performing cryptocurrencies through their traditional stock trading accounts. Valour was one of the first issuers in the world to offer a Solana ETP, and it has quickly become the most popular product. It is available for trading in both EUR and SEK on leading European exchanges such as Nordic Growth Market, EuroNext, Boerse Frankfurt, and more.

Investors may also access Solana in Valour's Digital Asset Basket 10 (VDAB10) ETP. The Valour Digital Asset Basket 10 (VDAB10) ETP tracks the performance of the top 10 largest crypto assets based on market capitalization with a cap of 30% for any constituent, providing investors a diversified exposure to the evolving crypto landscape. Holdings include Solana, Bitcoin Ethereum, TON, Doge, and more.

To learn more about Valour's ETPs, please visit valour.com or email us at

hello@valour.com

Conclusion

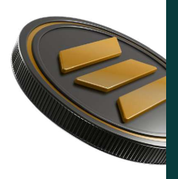
As we examine the trajectory of blockchain technology, Solana distinguishes itself as a noteworthy platform with its innovative approach and robust performance metrics. Solana has developed a high-performance, permissionless blockchain that delivers efficiency and scalability. Its unique Proof of History combined with Proof of Stake allows for transaction speeds of up to 65,000 transactions per second, significantly surpassing many of its peers in terms of throughput.

The architecture of Solana is tailored to support a wide range of applications, making it a versatile platform for sectors including finance, payments and gaming. Moreover, Solana's competitive edge is further enhanced by its low transaction fees and rapid processing times, which lower barriers for developers and encourage the creation of user-centric applications. This has resulted in a strong user base and impressive fee generation for the protocol.

With growing interest from large institutions, highlighted by their filings for spot Solana ETFs, the asset could be poised to be exposed to an entirely new pool of prospective capital. Valour allows investors to gain exposure to Solana today in an efficient and easy manner, bridging the gap between traditional finance and decentralised finance.

Overall, Solana's technical foundations and ongoing enhancements suggest its potential to remain a significant player in the blockchain industry, providing a scalable and efficient platform for the development of a wide array of decentralised applications.

For European investors, Valour offers easy and secure access to Solana through their traditional brokerage accounts through the Valour SOL ETP and through Valour's Digital Asset Basket 10 (VDAB10) ETP.



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