

The Evolution of Crypto :

The Chain

Key Takeaways

- The growth of active addresses on Ethereum slowed from 2019 to 2021, indicating that performance bottlenecks limit user expansion.
- Since its launch, Solana has experienced a surge in users, peaking at over 3 million. Despite the impact of FTX, narratives like Memes have helped it regain momentum.
- In 2022, BNB Chain approached 2 million users and exceeded Ethereum in trading volume, but its growth rate slowed due to increased competition.
- While Layer 2 solutions like Arbitrum and Base have seen rapid growth in Total Value Locked (TVL), Ethereum remains the primary hub for DeFi funds.
- Ton has quickly attracted users and developers with its unique narrative and Web2 user base, demonstrating strong growth momentum.
- The market capitalization, active addresses, TVL, and trading volume of public blockchains are positively correlated, indicating a flywheel effect of cooperative growth within the ecosystem.
- Developer activity is crucial for the long-term growth of public blockchains, and it is less correlated to market fluctuations in the short term.

Keywords:

Gate Research, Blockchain



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1 Introduction

With the proliferation of digital assets and decentralized applications (DApps), public blockchains have become the foundation of the Web3 ecosystem. Major public blockchains have emerged as representative figures during various market cycles, leveraging their unique narratives and technological advantages. If we categorize the crypto journey by price bull markets and halving cycles, it can roughly be divided into three stages, represented by the following public blockchains:

1. 2013-2017: The emergence of Ethereum significantly lowered the barriers to creating on-chain applications and issuing on-chain assets, introducing smart contracts, and laying the technological foundation for diverse on-chain applications.
2. 2018-2021: As on-chain applications became more diverse, Ethereum faced scalability challenges. BNB Chain attracted many developers and users with low fees and EVM compatibility, surpassing Ethereum in several metrics. Solana also drew in many users and developers due to its high performance and low costs.
3. 2021-2024: Layer 2 solutions became Ethereum's officially recognized scalability solution, with Arbitrum leading the space and locking over \$13 billion in value. During this phase, newer Layer 2 solutions like Base and the previously affected Solana achieved remarkable results due to the FTX collapse. Furthermore, Ton, backed by the social giant Telegram with hundreds of millions of users, became the fastest-growing blockchain regarding users and on-chain activity in 2024.

This article will systematically analyze key metrics such as trading volume, active addresses, Total Value Locked (TVL), network stability, and security to explore the performance and development trends of mainstream public blockchains like Ethereum, BNB Chain, and Solana. It will reveal changes in the market's competitive landscape.

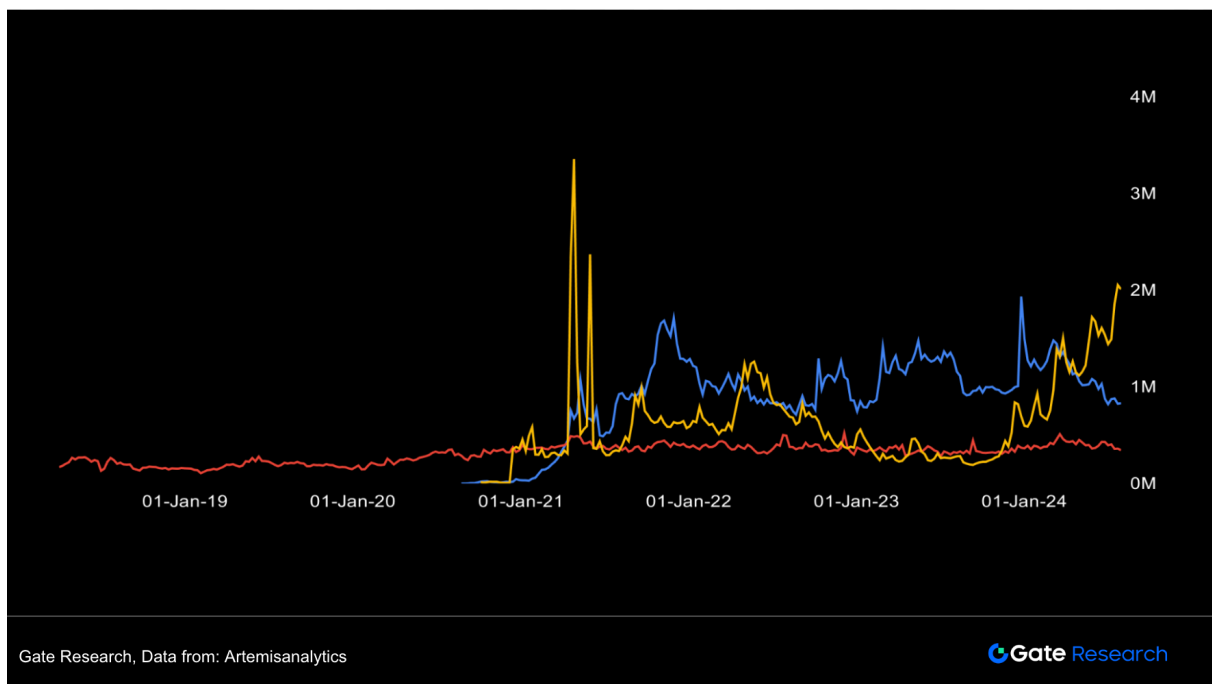
2 Public Blockchain Activity Trends: Dominant Forces and Emerging Competitors

2.1 Evolution of User Activity and Competitive Landscape

The changes in user activity among mainstream public blockchains reflect the market's sensitivity to performance and fees, revealing how user preferences evolve with market conditions and technological advancements. As Layer 2 solutions mature, major public blockchains face increased challenges, necessitating more flexible strategies to respond to emerging ecosystems.

In recent years, user activity on prominent blockchains like Ethereum, BNB Chain, and Solana has experienced significant fluctuations. As an early leader in DeFi, Ethereum's user growth slowed after 2021 due to performance bottlenecks and high gas fees, prompting users to migrate to more efficient on-chain ecosystems. BNB Chain rapidly expanded its user base during the DeFi boom in 2021, leveraging low fees and EVM compatibility; however, its growth stabilized as market competition intensified. Despite facing market shocks, Solana managed to reactivate its user base through the rise of trending applications, benefiting from its high performance and low costs.

Figure 1: Trends in Active Address Numbers for Ethereum, BNB Chain, and Solana (2018 - 2024))

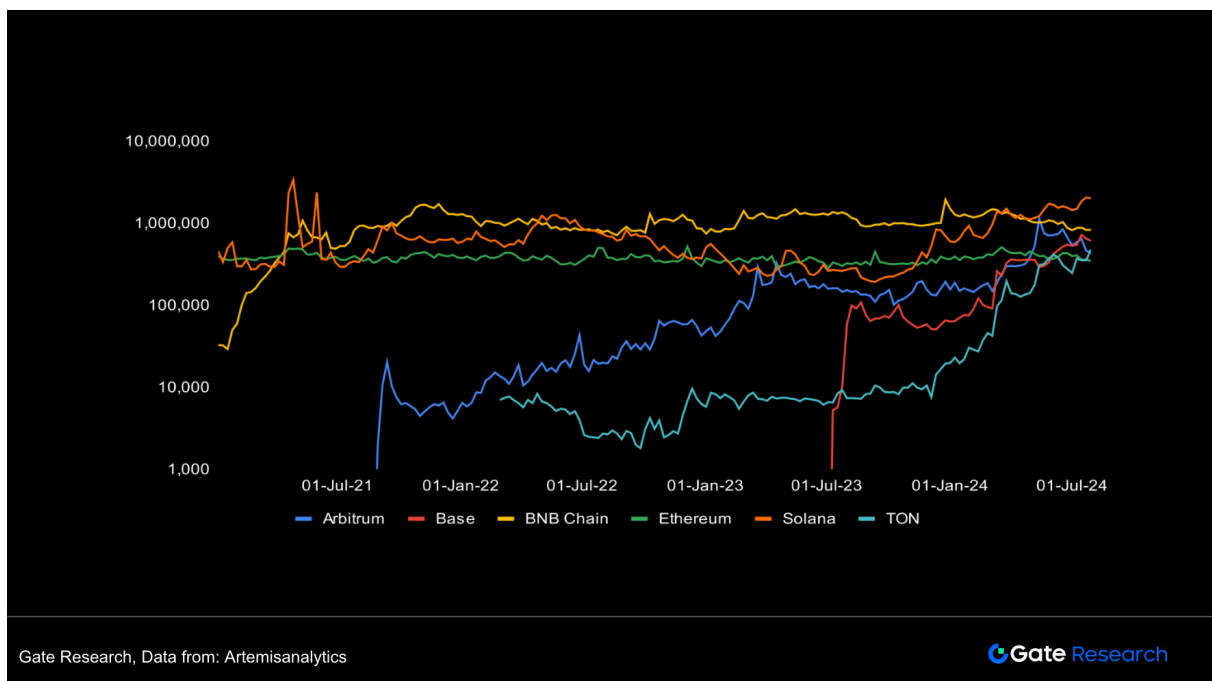


2.2 The Rise of Emerging Public Blockchains and Narrative Strategies

Emerging public blockchains like Arbitrum, Base, and Ton have rapidly risen through differentiated strategies. Layer 2 solutions, such as Arbitrum and Base, have attracted many users and developers with low fees and fast transactions, creating a competitive edge. Base has quickly grown to become one of the fastest Layer 2 solutions in terms of activity and trading volume, supported by social applications and popular projects.

Ton has leveraged its integration with Telegram and unique narrative to establish a strong presence in the Web3 space. The success of these emerging blockchains illustrates the potential to rapidly attract users and developers through specific narratives and market positioning, highlighting the diversification trend in the development of public blockchain ecosystems.

Figure 2: Trends in Active Address Numbers for Major Public Blockchains (2021 - 2024)

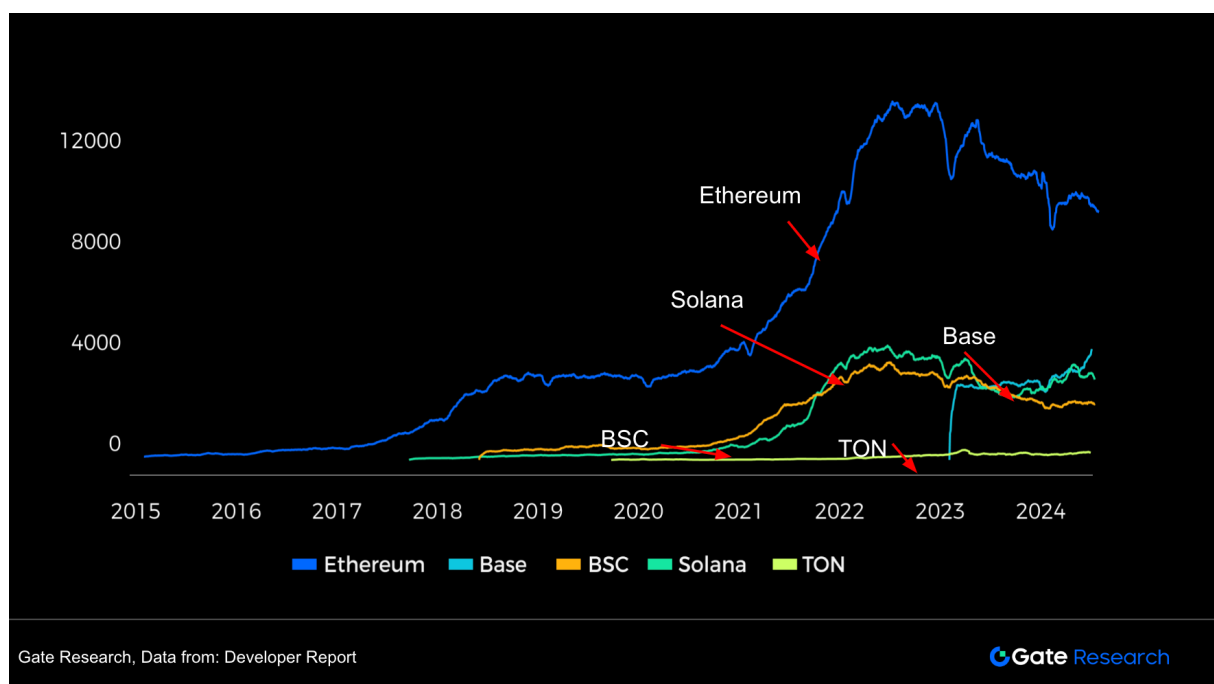


2.3 Trends in the Number of Developers on Public Blockchains

EVM-compatible public blockchains (like Ethereum) have a significant advantage in developer numbers, with over 12,000 active developers as of 2021. This success stems from extensive support for development tools, abundant ecosystem resources, and strong network effects. In contrast, non-EVM chains (like Solana) thrived between 2021 and 2022, attracting many developers with high-performance and low-cost transaction processing. However, their developer numbers declined due to market shocks like the FTX collapse.

Non-EVM chains have adopted different narrative strategies to address these challenges, successfully luring developers back through projects focused on memes and decentralized physical infrastructure networks (DePIN). For instance, Base has seen rapid growth in developer numbers in 2023 by lowering development barriers through EVM compatibility and leveraging Coinbase's resources. Similarly, Ton is gradually building its developer community through deep integration with Telegram and a unique narrative strategy. Whether non-EVM chains can further narrow the gap with EVM chains through innovative strategies like incentive mechanisms and cross-chain collaborations will be a key focus for the development of public blockchain ecosystems.

Figure 3: Trends in On-Chain Active Developer Counts (2015 - 2024)



3 DeFi Activity Levels: Driven by Technological Expansion and Market Fluctuations

3.1 DeFi Potential and Challenges of Layer 2

As the core of the early DeFi ecosystem, Ethereum has maintained a dominant position in Total Value Locked (TVL) over the long term. Its TVL peaked at \$106 billion in 2021; although it subsequently fell to over \$25 billion due to market corrections, it still demonstrates a strong market foundation. However, this landscape is beginning to face challenges with the rapid development of Layer 2 solutions.

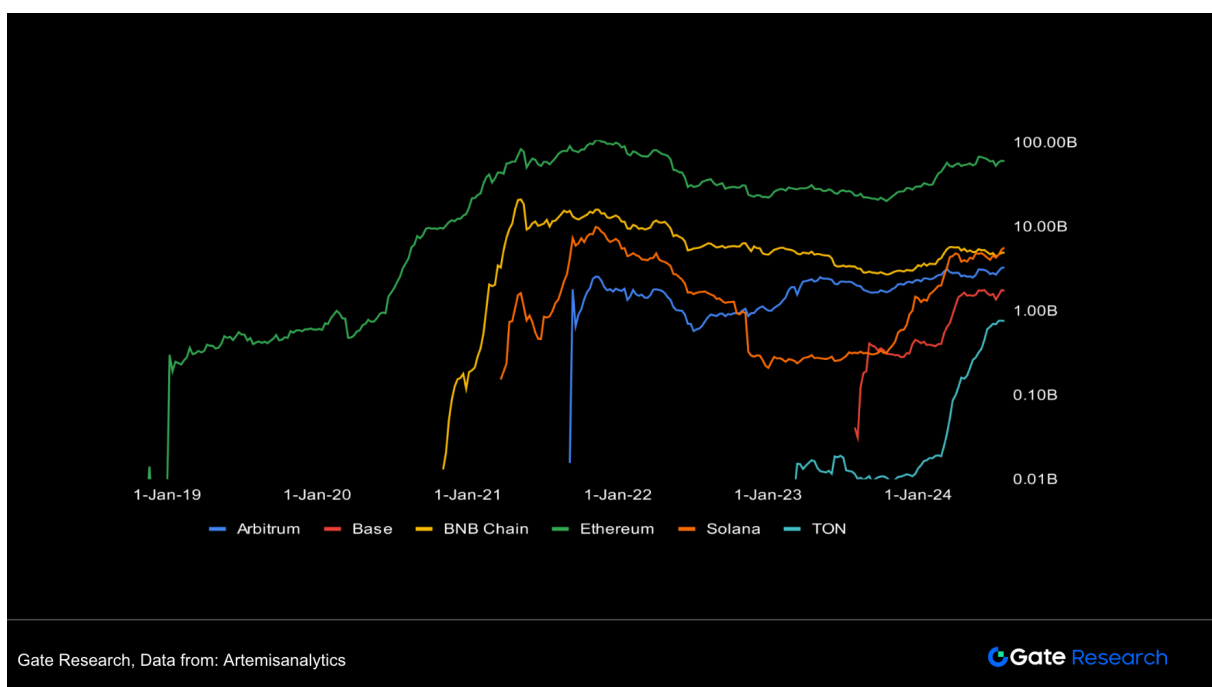
Arbitrum and Base, as representative Layer 2 scaling solutions, have attracted numerous DeFi projects and users by significantly lowering transaction fees (to below \$0.10) and alleviating network congestion. In 2024, Arbitrum's TVL rose to \$3.2 billion, making it the highest among Layer 2 platforms. Base reached \$1.5 billion, becoming one of the fastest-growing Layer 2 platforms. Despite these Layer 2 platforms significantly enhancing transaction efficiency and cost-effectiveness, they have not yet fully replaced the Ethereum mainnet in accommodating large-scale DeFi funds. There remains a complex relationship of synergy and competition between Layer 2 solutions and the Ethereum mainnet.

Despite early active performances in the DeFi market by EVM-compatible chains like BNB Chain and non-EVM chains like Solana, both have faced challenges as the market matures and competition intensifies. BNB Chain's TVL has gradually declined, while Solana has experienced significant volatility due to market events, such as the FTX collapse.

Emerging public blockchains like Ton are expanding their DeFi ecosystems by leveraging unique user bases and narrative strategies, although their TVL remains relatively low.

Overall, the scalability and innovation of Layer 2 solutions have injected new vitality into the DeFi market. Still, more technical and ecological challenges must be overcome for them to become the primary hubs for capital. For non-EVM chains, capturing specific application narratives can lead to rapid growth, but significant investment is necessary to truly surpass existing DeFi ecosystems.

Figure 4: Trends in Total Value Locked (TVL) for Major Public Blockchains (2019 - 2024)



3.2 Periodic Changes in On-Chain Transaction Volume of Public Blockchains

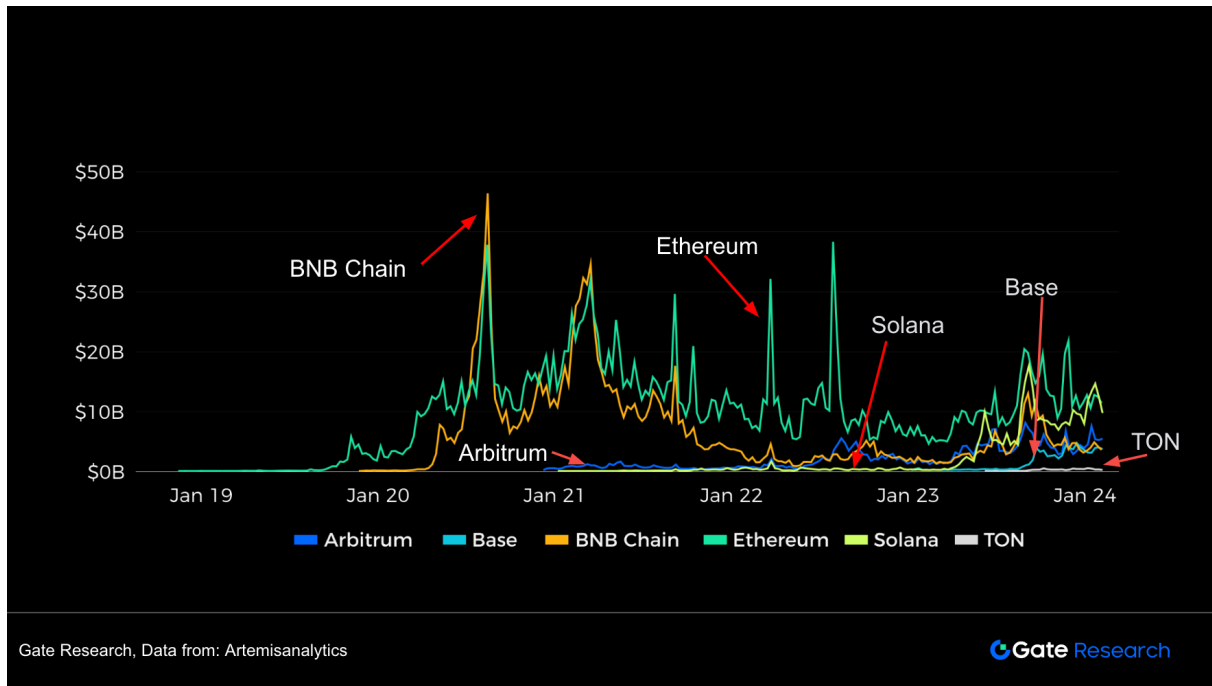
The fluctuations in on-chain transaction volume often reflect market enthusiasm and shifts in the narrative. As the primary platform for DeFi and NFTs, Ethereum saw its on-chain DEX transaction volume exceed \$30 billion in 2021, reaching an all-time high. However, subsequent market adjustments led to significant volatility in transaction volume. In contrast, while BNB Chain emerged as a strong competitor to Ethereum in 2021, its transaction volume gradually declined in 2022, indicating a shift in market focus and increased competition.

Layer 2 solutions like Arbitrum and Base experienced record-high transaction volumes from 2023 to 2024, particularly Base, which saw its daily transaction volume surge from \$20 million in 2023 to hundreds of millions by 2024, hitting a new high of \$1.2 billion in April 2024. This growth is attributed to technological and cost optimizations and successful narratives and project selections, such as Meme and SocialFi.

Leveraging multiple narratives like Depin and Memes, Solana once surpassed Ethereum in transaction volume, showcasing the powerful appeal of narrative-driven market strategies. This phenomenon indicates that while Layer 2 solutions are increasingly seen as effective alternatives to Layer 1, highly narrative-driven blockchains like Solana can still achieve significant market performance through specific application scenarios and innovative strategies.

Overall, the volatility in transaction volume across major public blockchains reflects the rapid changes characteristic of the DeFi market. The rise of Layer 2 solutions and the narrative innovations of non-EVM chains are reshaping the competitive landscape. Blockchain builders must stay attuned to these changes and adapt their strategies to address future challenges and opportunities.

Figure 5: Trends in DEX Transaction Volumes for Major Public Blockchains



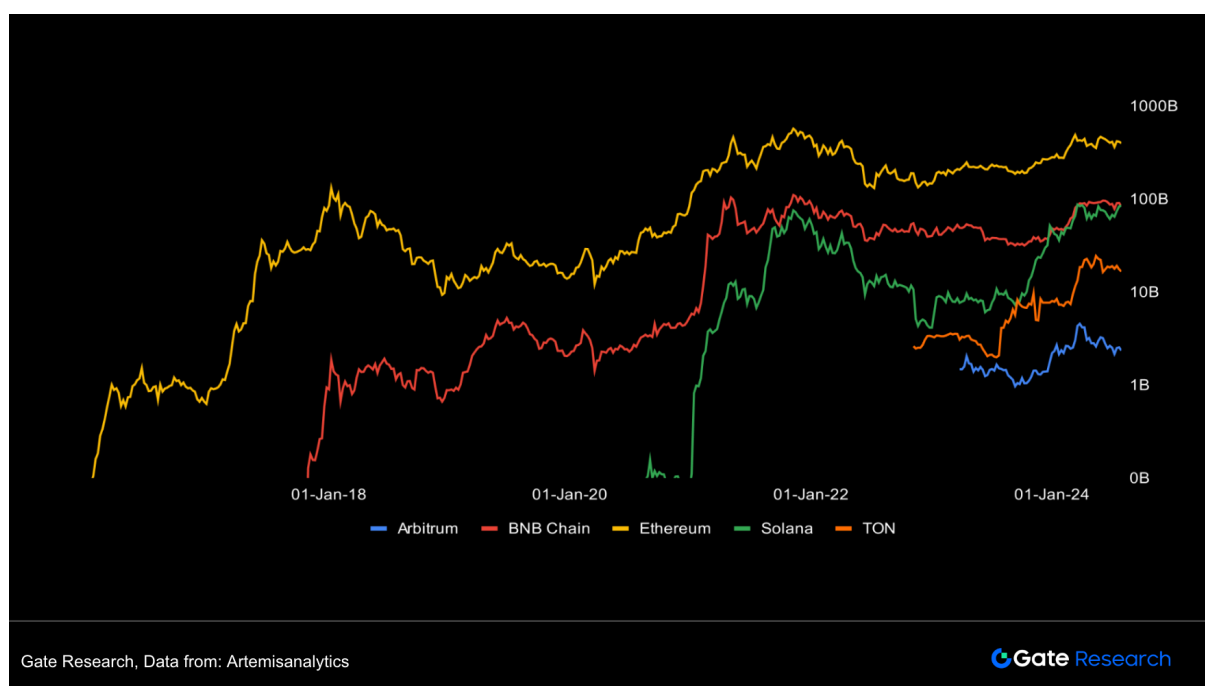
4 Trends in Market Capitalization of Public Blockchains

Public blockchains are the foundation of the Web3 ecosystem, and their valuation reflects the market's recognition of their decentralized infrastructure. Since its launch in 2015, Ethereum has leveraged its first-mover advantage and robust ecosystem to grow its market capitalization from \$131 billion in 2017 to \$571.6 billion in 2021, establishing itself as a benchmark for industry valuation. Although it experienced a correction due to the bear market in 2023, Ethereum's market cap has recovered to over \$200 billion in 2024, indicating market confidence in its long-term prospects.

BNB Chain reached a peak market cap of \$107 billion during the 2021 DeFi boom, benefiting from strong support from the Binance ecosystem. By 2024, its market cap has stabilized around \$90 billion. After facing significant challenges following the FTX incident, Solana has returned to the top five in market capitalization in 2024, demonstrating that it has regained market trust through high performance and innovative applications.

Emerging public blockchains like Arbitrum and TON exhibit rapid growth potential. Arbitrum's market cap rose from \$1.4 billion in 2023 to \$3.2 billion in 2024, a growth of 129%. Meanwhile, TON, bolstered by its deep integration with Telegram, saw its market cap surge from \$3.4 billion in 2022 to \$22 billion in 2024, an impressive increase of 547%. The market capitalization changes of these emerging blockchains reflect the market's expectations regarding their unique narratives and user bases.

Figure 6: Trends in Circulating Market Capitalization of Major Public Blockchain Tokens (2016 - 2024)



5 Correlation Analysis of Public Blockchain Data

Through the analysis of multiple key metrics, we observe a significant positive correlation among various data points within the public blockchain ecosystem, highlighting their importance in assessing these chains' health and growth potential. Firstly, the correlation between Total Value Locked (TVL) and market capitalization is particularly evident in Ethereum and Solana, with coefficients of 0.93 and 0.79, respectively. This indicates that market capitalization rises in tandem as on-chain funds increase and ecosystem projects thrive. Conversely, increased market capitalization attracts more funds, creating a positive feedback loop.

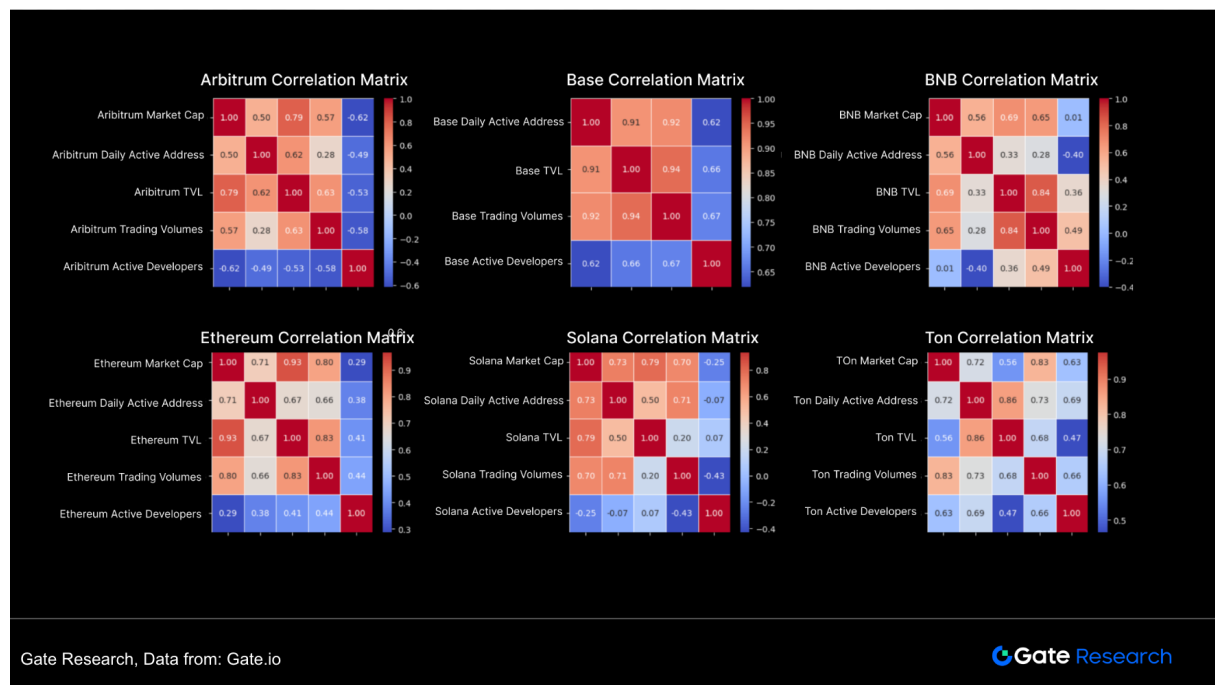
Similarly, the correlation between active user numbers and on-chain transaction volume is very significant, especially on the Base chain, where the correlation coefficient is as high as 0.92. An increase in user numbers directly drives growth in on-chain transaction activity, suggesting that user participation and transaction frequency are crucial drivers of on-chain activity. This phenomenon is particularly pronounced in emerging Layer 2 solutions, which typically attract many users and trading activity through lower fees and faster transaction speeds.

However, despite the strong positive correlations observed among market capitalization, active address count, TVL, and transaction volume across different ecosystems, the correlation between developer activity and market capitalization is relatively weak. This suggests developers focus on long-term ecosystem building rather than short-term market fluctuations. While

the number and activity level of developers may not immediately impact token values, they are crucial for a public blockchain's long-term success and sustainability. A strong and active developer community fosters more innovation and ongoing ecosystem expansion, representing the potential value that short-term market performance cannot capture.

It's important to note that while these positive correlations can help us understand the health and growth potential of public blockchain ecosystems, they also have limitations. For instance, significant external events (such as regulatory changes or failures of major platforms) can weaken or alter these correlations. Therefore, it's essential to incorporate qualitative analyses and market insights rather than relying solely on historical correlations when making investment or ecosystem development decisions.

Figure 7: Correlation Between Circulating Market Capitalization, Active Address Counts, TVL, Transaction Volumes, and Developer Numbers for Major Public Blockchains



6 Conclusion

Over the past decade, the public blockchain ecosystem has evolved significantly, driven by changing market cycles and narrative trends. While many emerging projects have surfaced, established blockchains like Ethereum and BNB Chain maintain their dominant positions due to their early technological advantages and robust ecosystems. In contrast, new entrants like Solana and Ton have rapidly gained market attention through differentiated narratives and unique ecological strategies, highlighting the critical role of narrative-driven approaches in the rise of public blockchains.

From the DeFi TVL and DEX transaction volume perspective, different public blockchains exhibit distinct advantages, leading to a diversified ecosystem. The rapid growth of Layer 2 solutions and the development of modular blockchain technology have made the deployment of customized chains more accessible. As the number of public blockchains increases, user retention, engagement, and developer activity have become critical for blockchain development. For instance, Ronin reached new daily highs due to the gaming boom. At the same time, Solana's Meme trend drove transaction volume back to its peak, further demonstrating the importance of narrative in attracting users and developers.

Innovations in underlying technology remain fundamental to differentiation in the increasingly fierce competition among public blockchains. Key considerations include high performance, low barriers to entry, and security. Some public blockchains now offer features like account abstraction and zero Gas fees, making it easier for new users to get started. At the same time, the degree of decentralization is a critical factor influencing security. For example, Ethereum has increased its network user base by lowering node entry barriers, helping to avoid centralization risks.

Technological innovation is the foundation driving continuous advancement in the public blockchain sector. In contrast, narrative innovation is key to the rapid rise of new blockchains and the consolidation of established ones. The future blockchain market will be an ecosystem driven by technology and narrative. Projects must balance these aspects to achieve long-term success in a competitive landscape.

The cryptocurrency market has seen extraordinary growth in the last decade. Therefore, Gate Research has launched a special series titled '10-Year Review of the Cryptocurrency Market' to detail this growth. The series aims to explore the industry's evolution using detailed data analysis and charts to identify key trends. The report is divided into four parts: token issuance methods, cryptocurrency trading platforms, development of public blockchains, and trends in market capitalization and user growth. This article is the third in the series. To view the remaining reports, please click [here](#).

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