

FCAT BLOCKCHAIN

Tracking Blockchain Health

BNB Chain emerges as a popular third blockchain, though questions remain.

By: Ethan Atwood | November 2023

EXECUTIVE SUMMARY

Since Ethereum first launched in 2015 as the first peer-to-peer smart contract platform, numerous competitors with a similar vision have emerged. When comparing these blockchains, media outlets and investors typically focus on the price and market cap of a blockchain's native token, while other indicators of success, such as usage, development, and decentralization are often overlooked. This paper explores blockchains through the latter lens and establishes a framework for assessing blockchain health.

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Intro

While media outlets and investors focus on the price and market cap of blockchain native tokens, other indicators of success, such as usage, development, and decentralization are often overlooked. Usage is the primary driver of utility; Development indicates innovation and maintenance; Decentralization coupled with cryptography is widely considered the security innovation that blockchains provide. Blockchains are fit for purpose, and their success or failure should be measured by how well they attract users and provide a secure platform for the processing and record keeping of transactions.

Scope

Proof of stake and proof of work networks serve different purposes, and the health of these networks is not easily measured using a single standard. For example, Bitcoin's original purpose was a medium of exchange, Ethereum is meant to be the world's computer, and Cosmos is meant to create a cohesive interoperable system. These blockchains might not value development, usage, or decentralization equally, and thus this standardized analysis should be considered a jumping off point, rather than a final diagnosis.

This research paper considers 10 leading blockchains, ranked by the market cap of their native token, and analyzed from 01/01/23 – 7/31/23. Most are smart contract platforms utilizing proof of stake consensus, though Bitcoin and Bitcoin Cash, which serve different purposes, are also included due to recent developments on these networks. The native tokens are listed below, along with a description of each blockchain:

*Table 1 - Source Sherlock 7.31.23 (*XRP and TRX excluded from analysis due to data availability)*

Blockchain	Native Token	Market Cap	Blockchain Description
Bitcoin	BTC	\$ 569,135,711,633	Bitcoin is the first implementation of blockchain technology to create a distributed, permissionless, peer-to-peer payment settlement network. Bitcoin (BTC) is the native asset of the Bitcoin blockchain. Bitcoin was created to be an alternative monetary system by an anonymous developer, Satoshi Nakamoto, in 2009. The protocol uses a proof of work consensus mechanism.
Ethereum	ETH	\$ 223,813,641,443	Ethereum is a decentralized computing platform for smart contracts and decentralized applications. It's native currency (token) ETH serves as a means of payment for transaction fees and settlement on the network. Ethereum was founded by Vitalik Buterin, Anthony Di Iorio, Mihai Alisie, and others in 2015. The protocol recently switched to proof of stake (PoS) consensus.
BNB Chain	BNB	\$ 37,315,750,969	BNB Chain is Binance's smart contract platform used for decentralized applications. BNB is the native digital asset to BNB Chain which was created by Binance Exchange. The protocol runs proof of stake consensus.
Ripple	XRP*	\$ 37,157,825,595	Ripple is an open-source cryptographic ledger whose native currency XRP aims to increase speed and reduce cost of transferring money between financial institutions.
Cardano	ADA	\$ 11,028,996,500	Cardano is an open-source smart-contract platform that uses a proof of stake mechanism to secure the network. It was founded by one of the co-founders of Ethereum, Charles Hoskinson, so it shares many similarities to its main smart contract competitor.
Solana	SOL	\$ 9,816,173,591	Solana is a layer one smart contract platform that was created to improve scalability of Ethereum. Solana's main innovation is a Proof-of-History system combined with PoS. It was founded in late 2017 with the publication of the whitepaper Anatoly Yakovenko and was launched in 2020.
Tron	TRX*	\$ 7,176,861,770	Tron is a smart contract blockchain that uses a delegated Proof of Stake consensus mechanism which allows for increased performance

			at the cost of true decentralization and censorship resistance. Tron was founded in 2017 by Justin Sun.
Polkadot	DOT	\$ 6,529,870,404	Polkadot is a layer one smart contract platform that was designed to support a variety of interconnected blockchains known as parachains. These parachains are subchains that each developer can build according to frameworks created by the original developers to allow for a parachain to be built for a specific application. Polkadot was invented with its whitepaper in 2016 and was rolled out in a series of phases in 2020.
Bitcoin Cash	BCH	\$ 4,931,683,391	Bitcoin Cash is a Bitcoin hard fork with the goal of building a literal interpretation of Satoshi Nakamoto's Bitcoin description "peer-to-peer electronic cash system." Central to the protocol is the focus on low transaction fees and attempts to increase block sizes to achieve this goal. The BCH fork occurred in 2017.
Avalanche	AVAX	\$ 4,545,954,890	Avalanche is a smart contract platform that allows development of decentralized applications and enterprise blockchain solutions to happen in one interoperable ecosystem. Avalanche's main innovation is its use of a proprietary consensus mechanism known as Snow Consensus Protocol which allows for high transaction thruptud and developer customizability. Avalanche was created by Emin Gün Sirer in 2019.
Cosmos	ATOM	\$ 2,631,098,069	Cosmos is a network of interconnected, interoperable blockchains that communicate with each other using a protocol known as IBC (which was modeled after TCP/IP, the protocol that allows the internet to run). The Cosmos Hub, the main blockchain, is a proof of stake blockchain and the native token ATOM facilitates information sharing between the Hub and other blockchains. Cosmos was founded in 2016 by Jae Kwon and Ethan Buchman.
Hedera	HBAR	\$ 1,715,826,944	Hedera is a decentralized, open-source, proof-of-stake public ledger that utilizes the leaderless, asynchronous Byzantine Fault Tolerance (aBFT) hashgraph consensus algorithm. It is governed by a collusion-resistant, decentralized council of leading enterprises, universities, and web3 projects from around the world.

Summary

- Ethereum has the highest market share in terms of active developers, transaction fees, total value locked, and unlocked supply, and is in the upper tier for code commits, developer experience, active addresses, and reserved public token distribution. After Ethereum, the signals are less clear:

	<i>Development</i>	<i>Usage</i>	<i>Decentralization</i>
Positive Signals	Hedera (HBAR)	BNB Chain (BNB)	Bitcoin (BTC)
Negative Signals	BNB Chain (BNB)	Cosmos (ATOM)	BNB Chain (BNB)

- BNB Chain, formally Binance Chain, has emerged as a dominant third blockchain, claiming the highest market cap after Bitcoin and Ethereum
- While BNB Chain has high usage, it lags other blockchains in code commits, active developers, and decentralization metrics.
- Visit [SherlockAnalytics](#) to track blockchain activity across fundamental blockchain data categories

Background

Satoshi Nakamoto conceived Bitcoin, the first blockchain, as a permissionless peer-to-peer network and medium of exchange of value. Since inception, Bitcoin's second purpose, as a possible store of value, has also flourished amongst users. My colleague, Travis Beaulieu, covers these topics in depth [here](#). In the last few years however, a third purpose for Bitcoin has emerged. In addition to serving as a medium of exchange of value, Bitcoin is also being used as the underlying consensus layer for the exchange of information – see [Bitcoin Ordinals](#) and [BRC-20s](#).

Since Bitcoin launched, numerous other blockchains have emerged. These blockchains, listed in the table above, are known as smart contract platforms and Layer 1s (L1s), because they enable code-based systems to transfer value and information through predefined logic, and serve as the infrastructure layer for the development of more complex applications. Together, all these blockchains are competing for blockspace, or the place where code and data is stored. See the crypto glossary at the end of this article to learn about L1s, blockspace, native tokens, and more.

Market Analysis

When considering market cap, a critical data point for investors, Bitcoin is the most dominant digital asset, with Ethereum its only meaningful competitor (Figure 1). Bitcoin alone at \$569B (as of 7/31/23) is greater than the next 9 blockchains combined, and Ethereum alone at \$223B (as of 7/31/23) is greater than the next 8 blockchains combined. BNB Chain, with a market cap of \$37B (as of 7/31/23) stands above the remainder as the most valuable third entity.

Blockchains by Market Cap

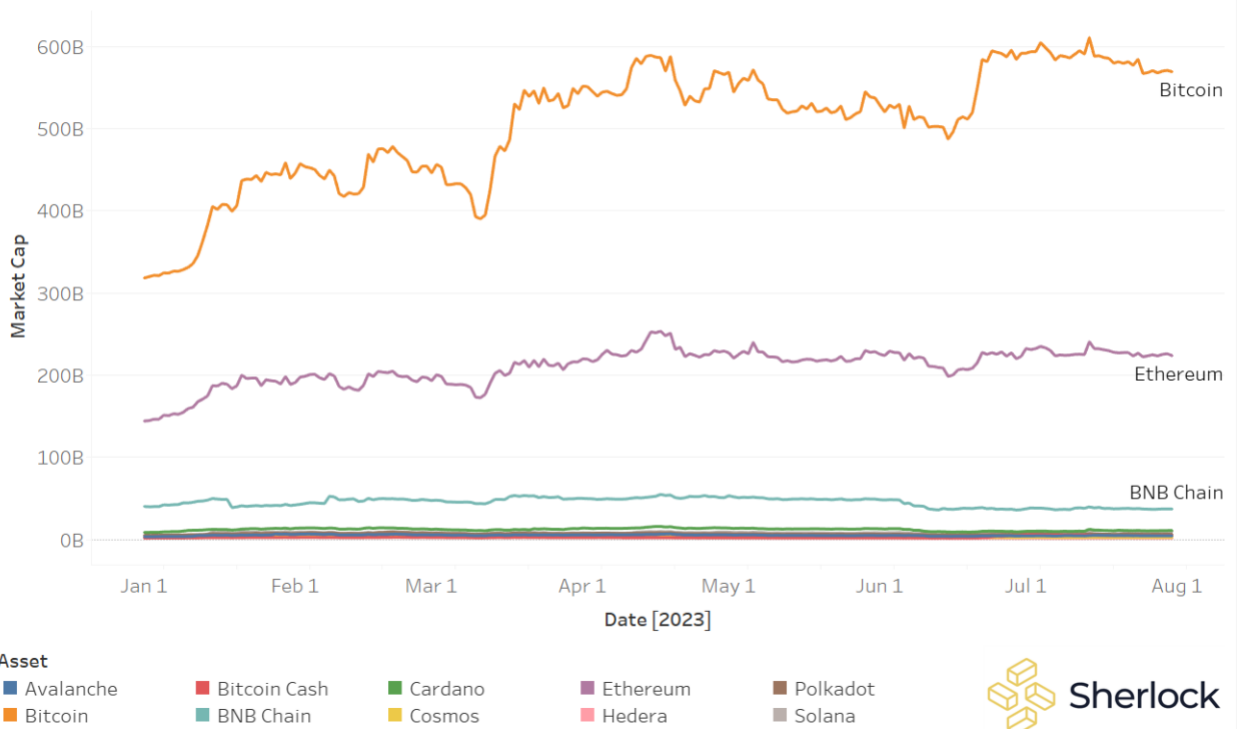


Figure 1 – Amberdata

Blockchain Health Analysis

When going beyond market data, investors should consider metrics related to development, usage, and decentralization. To analyze blockchain health across these various metric categories, it's helpful to consider a comparative metric, like market share, as well as an independent metric, like momentum, so that we can analyze both the current standings, and the trend over the last 90 days. All momentum scores in this report are calculated as of 07/31/2023.

Development Metrics

[SherlockAnalytics](#) specializes in monitoring core developer behavior across popular blockchains, which can be considered the “research and development” expense for a blockchain. Two popular metrics we track include code commits and active developers.

Code commits are changes submitted to a code repository. In this instance, a repository hosted on GitHub. While younger protocols rely on commits for enhancements and feature upgrades, mature protocols may be more focused on maintenance or security. A lack of development activity on a mature protocol like Bitcoin could be considered a sign of longevity, which is why the substance of code commits should be analyzed alongside the volume.

Active developers are individuals who have committed code to a project in the last 30 days. More active developers can indicate a protocol has growth potential, superior tech, a promising team, or a passionate community. Many blockchains are open-source and community led, meaning development is crowdsourced and subject to both the innovation and risks associated with public code.

Development Analysis

Positive Signal – Hedera

After Ethereum, when considering market share alone, Cardano stands out in both the number of developers working on the project, and the amount of net new code commits (Figure 2, Figure 3). Considering a relatively low market cap, Cardano is a blockchain to watch with growing developer activity and increasing utility. Notably, it has seen increased activity from Minswap, a decentralized exchange built on the platform, and via Milkomeda, a bridge which connects Cardano to EVM (Ethereum Virtual Machine) compatible chains.

However, considering both momentum and market share, Hedera emerges as the clear leader. Analyzing figure 4, while Hedera retains 18% market share in core active developers, those developers have increased commits by 34% over the last 90 days, second only to Ethereum among blockchains with a significant developer presence on Github. Hedera is governed by an impressive enterprise council including Boeing, Google, and IBM.

Core Developer Code Commits

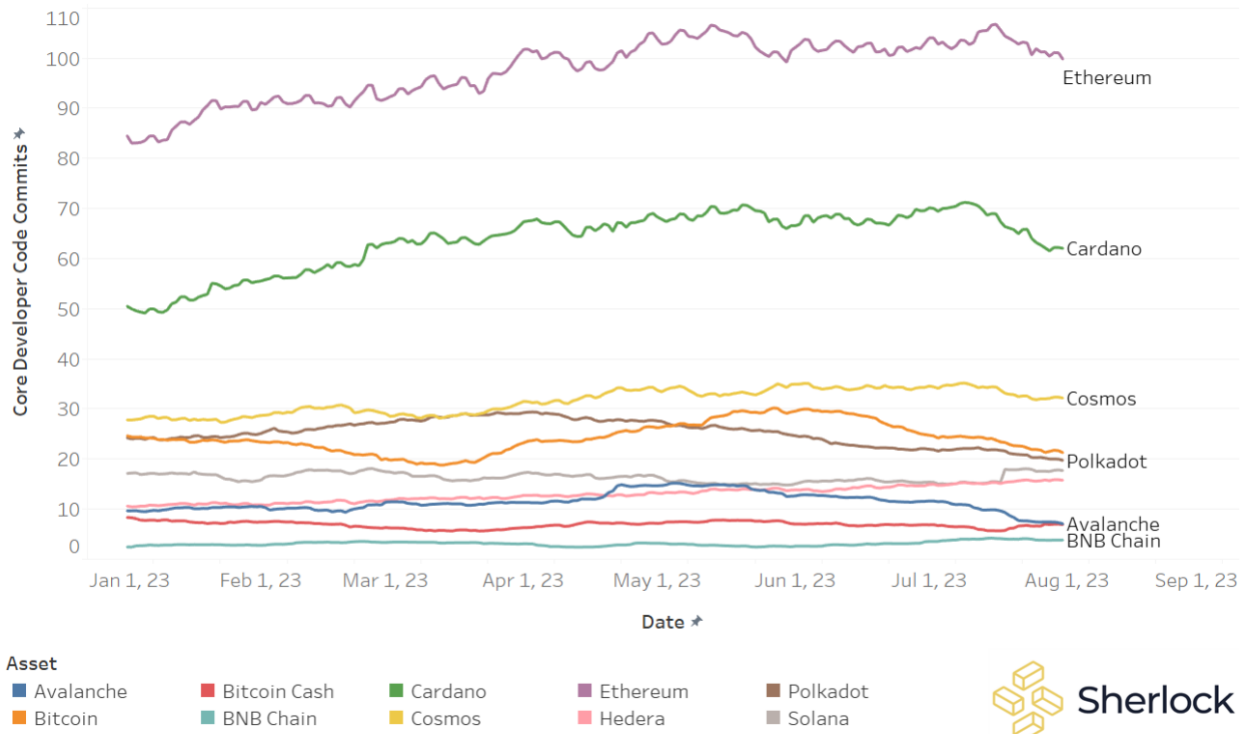


Figure 2 - Github

Active Developers

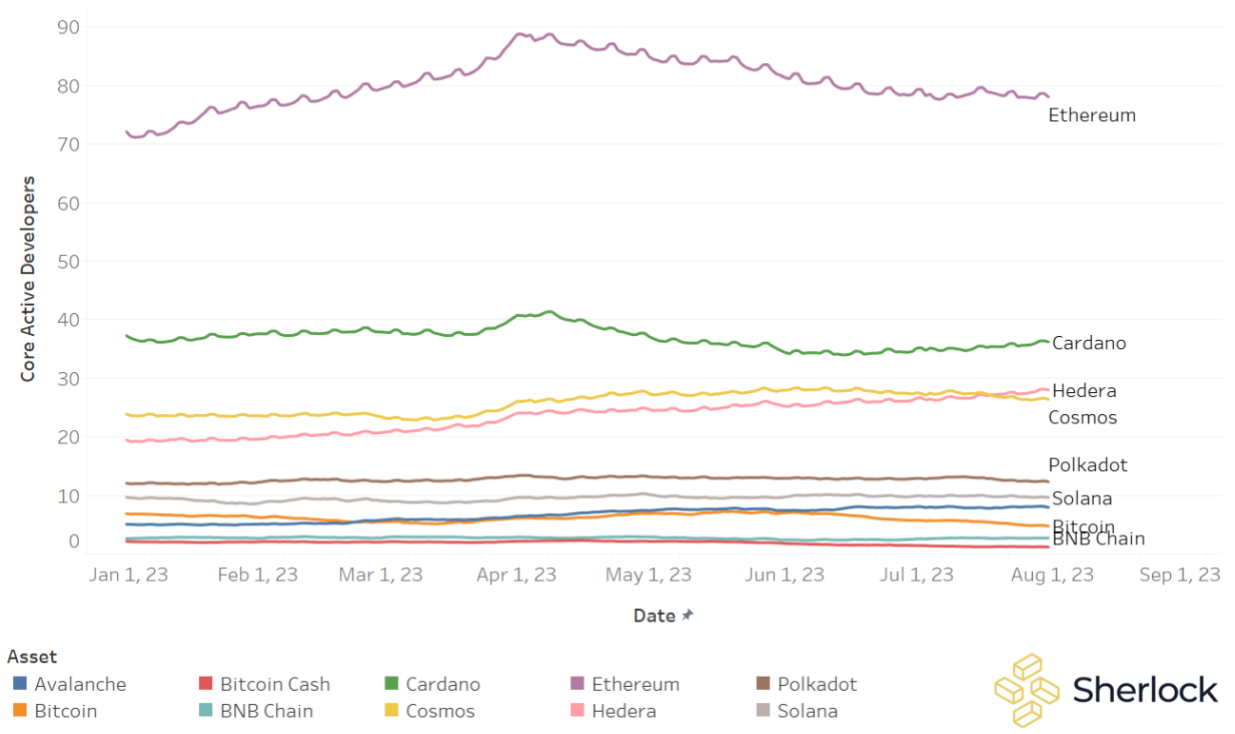
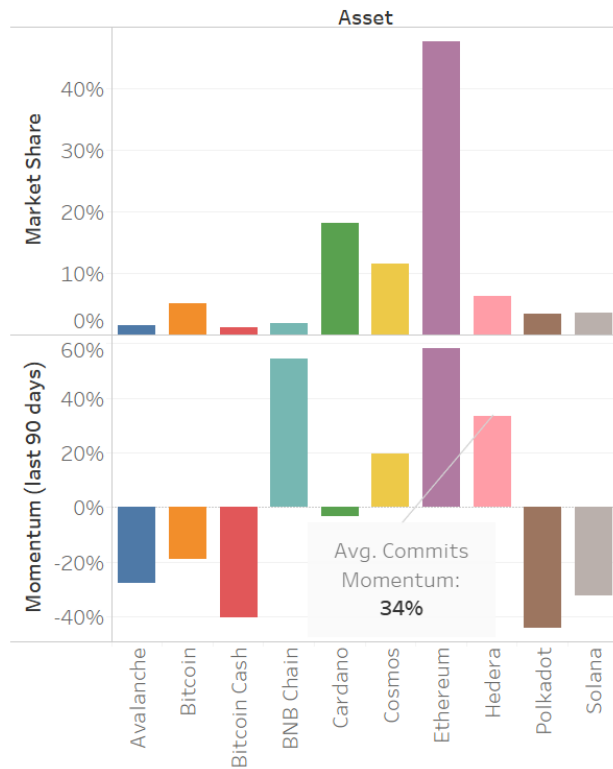


Figure 3 - Github

Code Commits



Active Developers

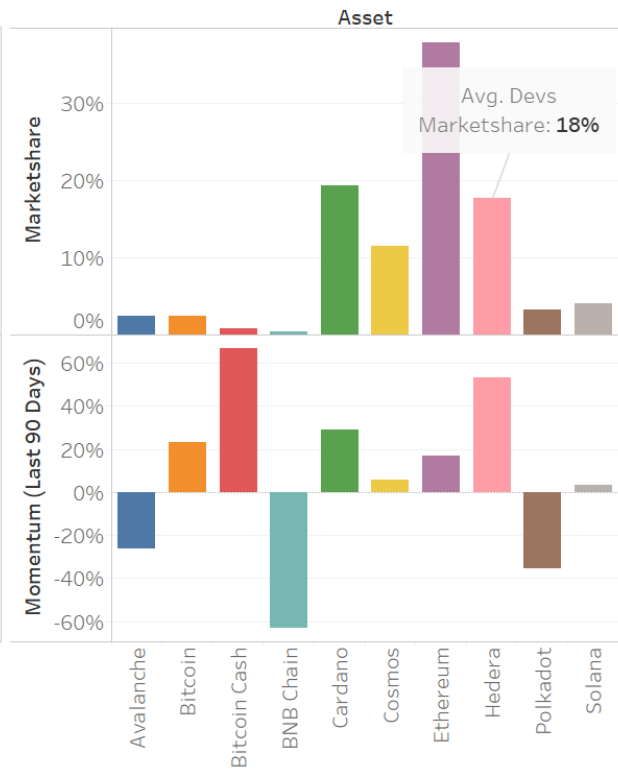


Figure 4 - Github

Negative Signal – BNB Chain

Despite having the third highest market cap and significant attention, BNB Chain has the least amount of code commits (Figure 6) and second to least amount of active developers (Figure 5). Whether this data is a result of closed-source development, or truly reflects development inactivity on BNB Chain, it is a noteworthy negative signal in comparison to other open-source blockchains.

Active Developers

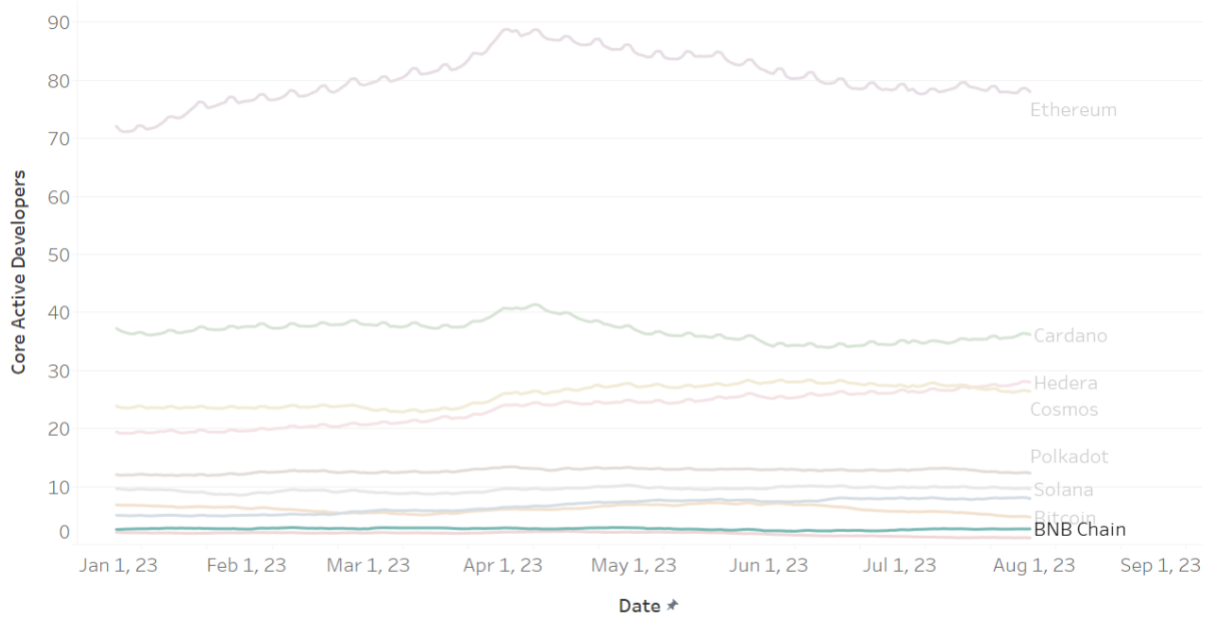


Figure 5 - Github

Core Developer Code Commits

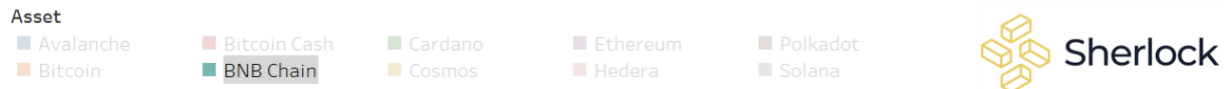
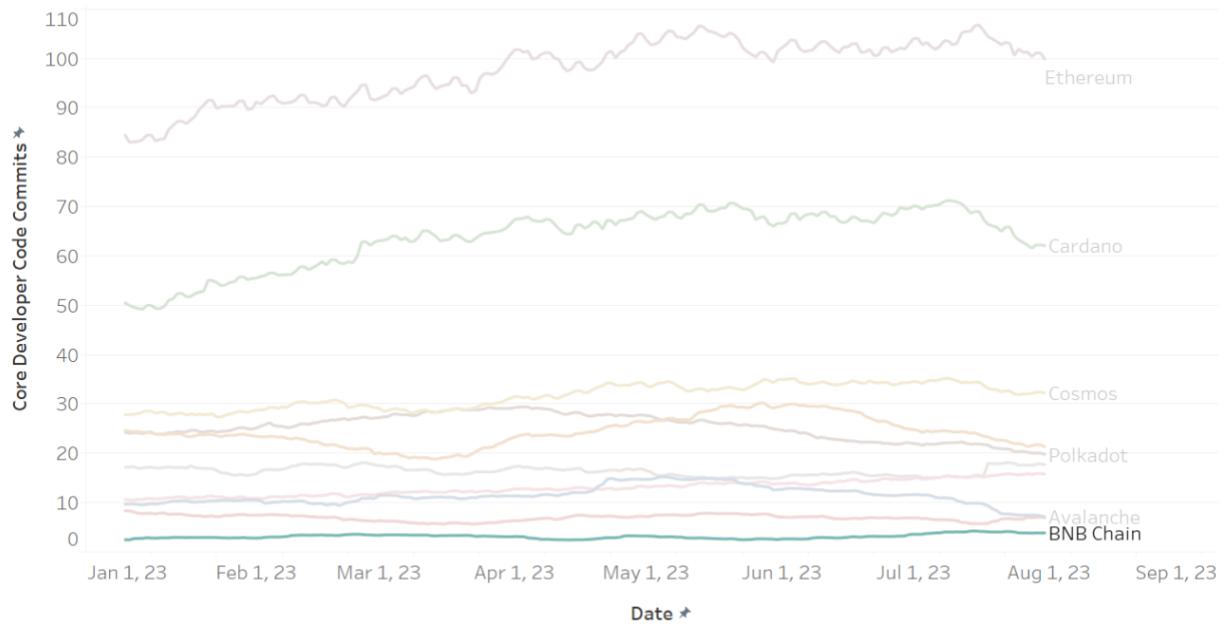


Figure 6 - Github

Usage Metrics

[SherlockAnalytics](#) helps gauge mass market adoption of a blockchain by tracking active addresses, transaction fees, and “total value locked”.

Active addresses are wallet addresses that have interacted with the blockchain in the last 24 hours. Thanks to the public nature of the blockchain, we can easily validate user engagement.

Transaction fees are paid by network participants to proof of work mining nodes and proof of stake validators. While some would argue high transaction fees indicate a network is not viable, others consider consistent transaction fees a sign of a healthy and sustainable ecosystem, where users are willing to pay for services rendered. Revenues generated by the decentralized applications within a blockchain ecosystem, and returned to token holders via burn mechanisms, are not included in this calculation.

Total Value Locked (TVL), is the USD value of all tokens locked in liquidity pools, staking mechanisms, or otherwise controlled and custodied by a smart contract. When users lock assets in a protocol and contribute to its TVL, they are signaling to the market a level of trust in some combination of the blockchains rewards distribution or return of capital.

Usage Analysis

Positive Signal – BNB Chain

In the first half of 2023, blockchain revenue from transaction fees has largely been generated by Ethereum. In May, that dynamic changed with a spike in [Bitcoin Ordinals](#) providing a surge in transaction fees for Bitcoin miners (Figure 7). Ordinals allow individuals to “inscribe” individual Satoshis, essentially turning them into non fungible tokens that can contain image data and other content. Ordinal activity has cooled recently, leaving Ethereum as the dominant fee generator .

What BNB Chain lacks in development, it makes up for in usage. It has over 40% market share in active addresses (Figure 8, Figure 10) and has the second most TVL, behind only Ethereum (Figure 9, Figure 10). In terms of momentum, TVL is largely driven by the price of the underlying token, so BNB’s decline does not necessarily indicate a drop in usage. Alternatively, active addresses are up 7% in the last 90 days, whereas all other platforms except BTC and BCH are in decline (Figure 10). Based on data from DefiLlama, Binance activity is driven by decentralized applications including Pancake Swap, Venus Finance, and Binance Staked Eth.

Transaction Fees

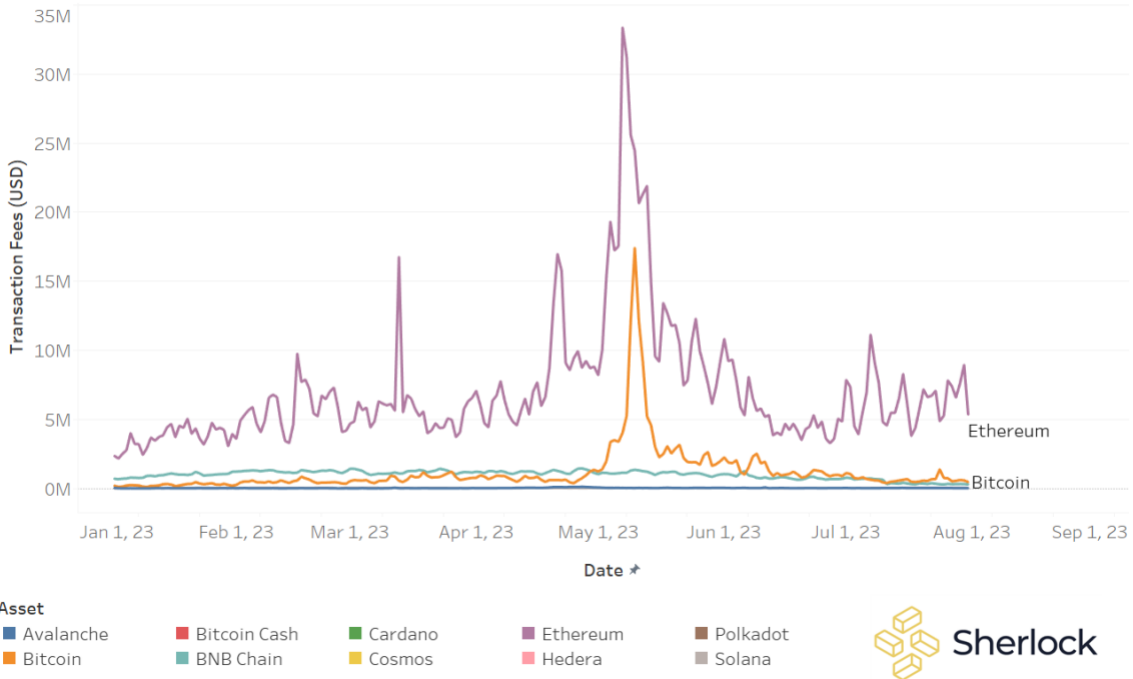


Figure 7 – Defillama

Active Addresses

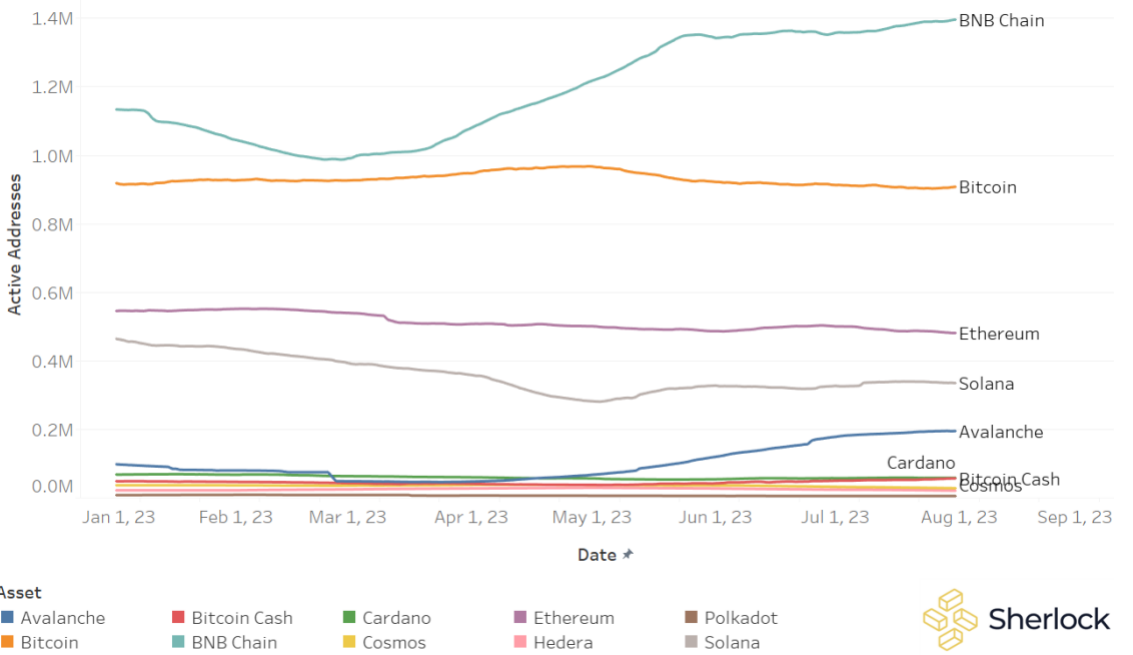
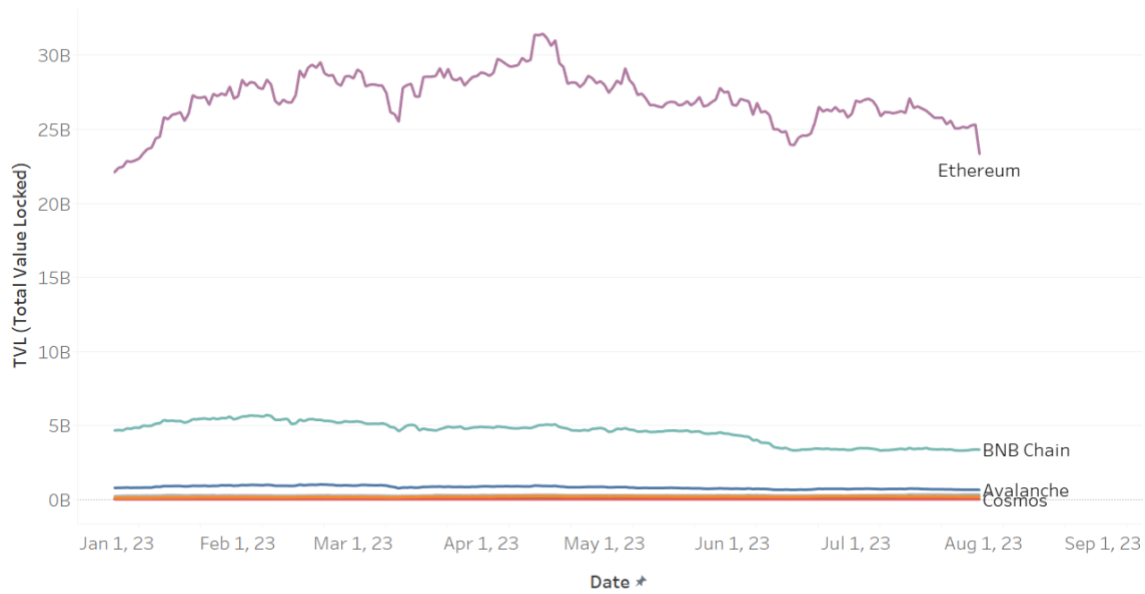


Figure 8 – Blockchair, BeaconCha.in, BSCScan, CardanoScan, Solana Metaplex, Polkadot Subscan, Avax Network, Mirrornode.hedera, Solscan, Atomscan, Dragonglass

Total Value Locked



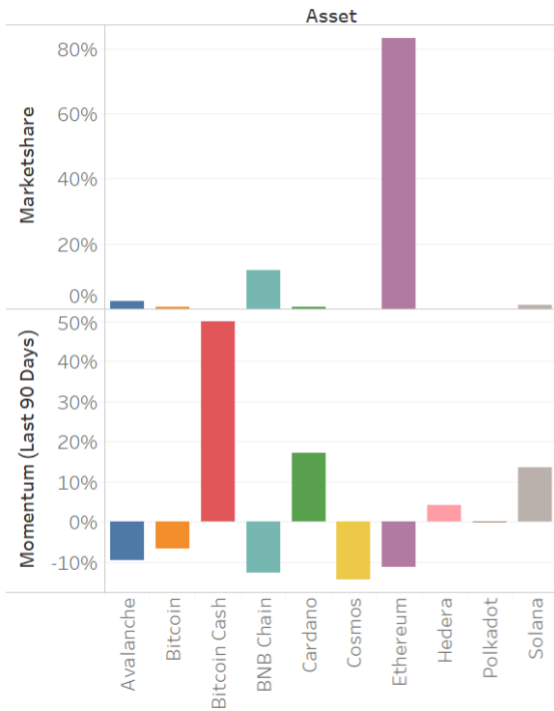
Asset

- Avalanche
- Bitcoin Cash
- Cardano
- Ethereum
- Polkadot
- Bitcoin
- BNB Chain
- Cosmos
- Hedera
- Solana



Figure 9 - DefiLlama

Total Value Locked



Active Addresses

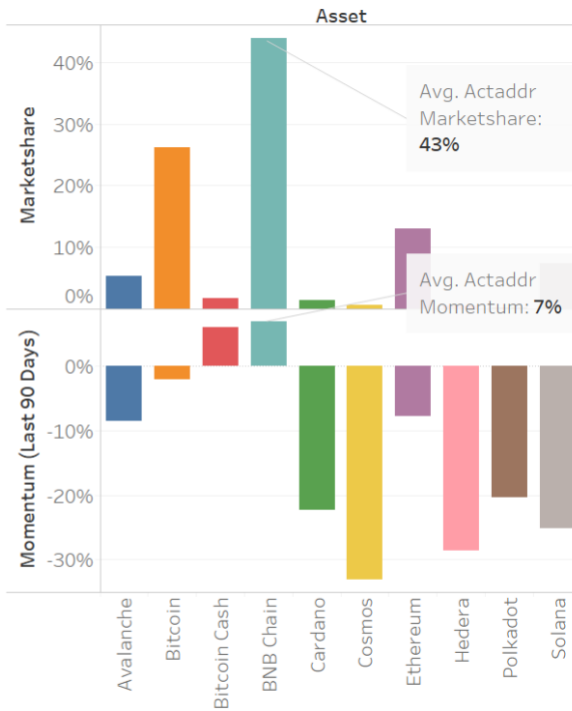


Figure 10 – DefiLlama (TVL), Public Scan Websites (Active Addresses)

Negative Signal - Cosmos

Looking across all the blockchains, Cosmos appears to be suffering the most. It is the loss leader in TVL and active address momentum (Figure 10), and barely registers on the corresponding time series graphs (Figure 11, Figure 12). One reason Cosmos might be struggling is the lack of utility served by its native token ATOM. By creating the Cosmos Hub and offering interblockchain communication, the network may have reduced incentives for driving value to ATOM¹. Cosmos celebrated a major win when the perpetual trading platform DYDX announced its move to Cosmos infrastructure, but this has not yet resulted in platform growth based on the measures used in this research.

Usage momentum is generally in decline across all blockchains (Figure 10), so it may be premature to assign winners or losers during this lull in activity. For example, Avalanche, a well funded smart contract platform founded by Emin Gün Sirer and Ava Labs, has struggled to make an impact amongst crypto users. Its widely popular decentralized exchange, Trader Joe, has recently migrated to Ethereum and other chains, signaling a need to diversify.

Total Value Locked

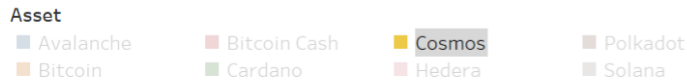
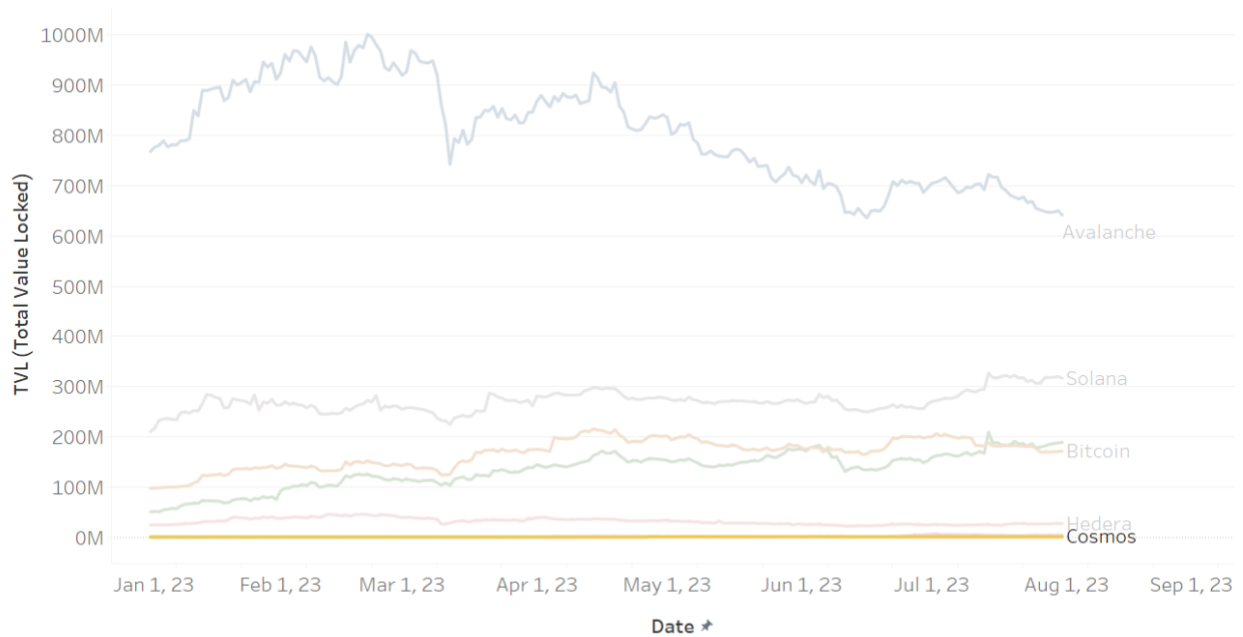


Figure 11 – DefiLlama (Ethereum and Binance hidden)

Active Addresses

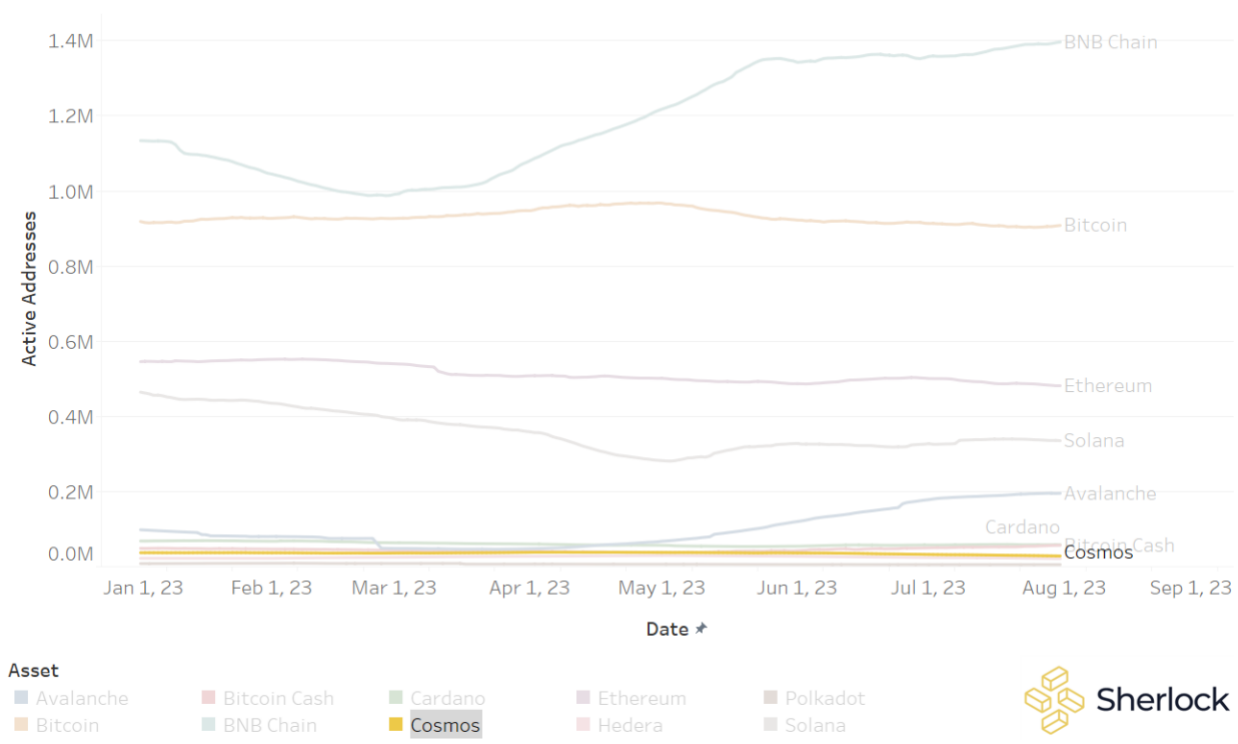


Figure 12 – Blockchair, BeaconCha.in, BSCScan, CardanoScan, Solana Metascan, Polkadot Subscan, Avax Network, Mirrornode.hedera, Solscan, Atomscan, Dragonglass

Decentralization Metrics

Sometimes referred to as distributed computers, blockchains like Ethereum leverage decentralization to benefit their users. Part of decentralization is the distribution of native tokens used to access a blockchain.

The reserved public distribution is the percentage of the initial supply of a token that is not allocated to founding members, investors, and other non-public individuals and entities. Protocols that reserve a large % for founding members can be subject to hyperinflation during token unlocks, and depending on the consensus mechanism, governance decisions may rest in the hands of a minority. The reserved public distribution percentage will decrease if token supply increases, and vice versa.

Unlocked supply ratio is the circulating supply divided by the maximum coin supply. A low unlocked supply ratio indicates the blockchain is subject to market manipulation by centralized actors, especially if token governance rules are anti-democratic. When the circulating supply is close to the maximum supply, the risks of hyperinflation go down significantly. For the purposes of this study, Ethereum's unlocked supply is set at 100%.

The validator count is the current count of unique validators which are part of a distributed network's consensus mechanism and production of new blocks. Most blockchains in this research leverage proof of stake or variations of proof of stake, which involve entities staking or locking their assets and validating new transactions. In exchange, validators are rewarded with additional native tokens. More

validators do not guarantee more participation from unique actors, since incentives can exist to both combine resources behind a single validator, or distribute resources across multiple validators, depending on the specific blockchain’s mechanics.

Decentralization Analysis

Positive Signal - Bitcoin

While lagging in smart contract platform functionality, which is expected given its purpose, Bitcoin is quite decentralized. 0% of Bitcoin was reserved for investors or founders (Figure 13), and the blockchain has a healthy unlocked supply ratio, with 93% unlocked as of 7/31/23 (Figure 14). Bitcoin supply is capped at 21M, which it is expected to reach around 2140². This rate of inflation is justifiable for the Bitcoin network since the newly minted tokens are rewarded to miners in exchange for verifying transactions and securing the network. Currently block rewards are 6.25 BTC, however they will decline to 3.125 BTC in 2024, and continue to decline until the maximum supply is reached, after which miners will be incentivized through transaction fees alone. Bitcoin does not suffer from the risk of hyperinflation, at least with respect to circulating supply. Bitcoin whales (wallets with outsized BTC positions) and previously dormant wallets could cause volatility across BTC markets.

Bitcoin has a globally distributed miner network (Figure 15). Since Bitcoin nodes are incentivized to pool resources, we can assume most participants in the Bitcoin network are not operating competing nodes. If Ordinals, the [Lightning Network](#), and other Bitcoin smart contract functionality continue to grow, the decentralized nature of the blockchain could make building applications on it very attractive. In the words of Coinbase co-founder Brian Armstrong, Bitcoin is “the most important asset in crypto”.³

Public vs Private Initial Token Distribution

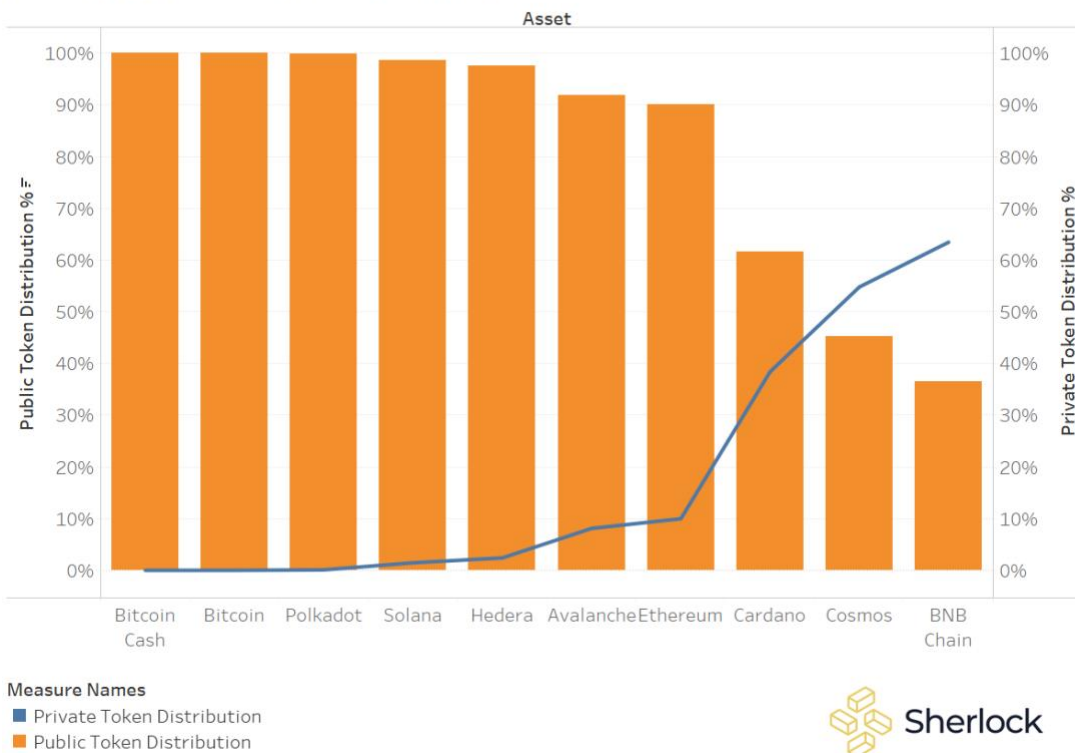


Figure 13 – Blockchain Whitepapers

Unlocked vs Locked Token Supply



Measure Names
 ■ Locked Token Supply %
 ■ Unlocked Token Supply %



Figure 14 - Amberdata

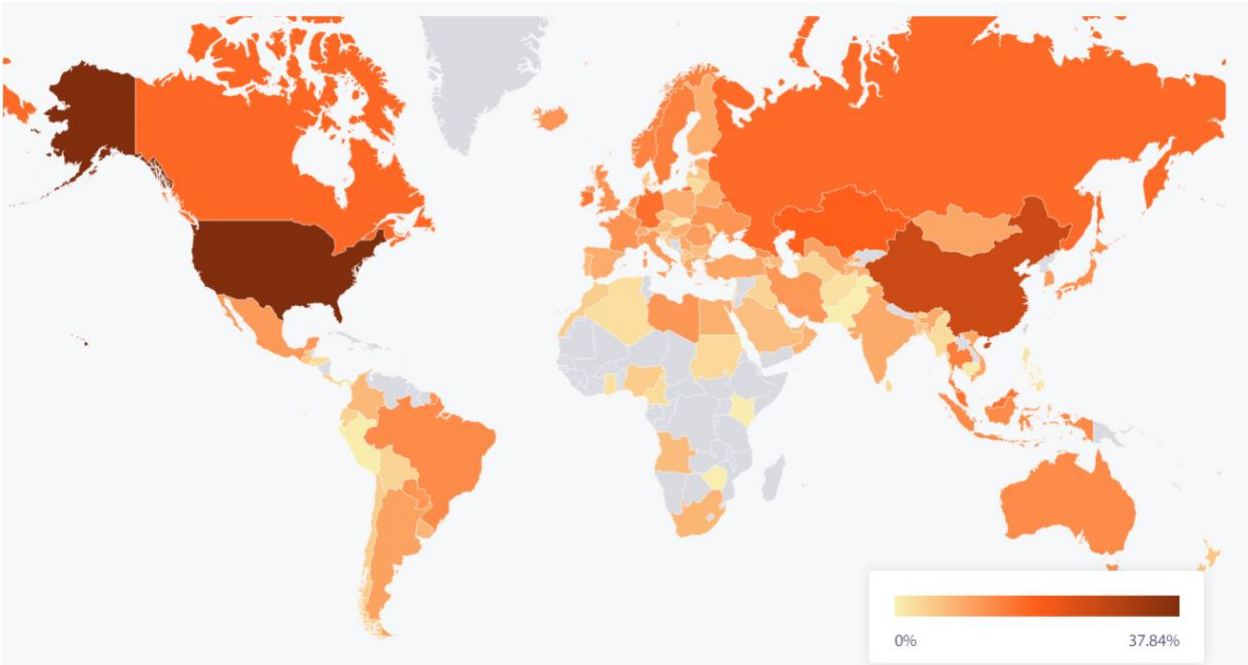


Figure 15 – Cambridge Center for Alternative Finance – Dec 21’ Bitcoin Mining Map (scale indicates Hashrate % market share)

Negative Signal – BNB Chain

BNB Chain is the most centralized compared to its competitors. Of the 78% of BNB tokens that have been unlocked, only 36% were reserved for the public (Figure 13). The remaining went to founders and investors in the platform. Equally concerning, as of 07/31/2023, we observed 25 public validators for BNB Chain, indicating a sybil attack could compromise the network.

Overall Blockchain Health

Looking across the metrics used in this paper, including development, usage, and decentralization, Ethereum stands out. Ethereum has the highest market share when considering active developers, transaction fees, total value locked, and unlocked supply, and is in the upper tier for commits, developer experience, active addresses, and reserved public token distribution (Figure 16). Ethereum has benefitted from first mover advantage among smart contract platforms and has inspired and provided a platform for some of the most dominant crypto applications and ecosystems, including decentralized exchanges Uniswap and Aave, ERC-20 powered stablecoins (USDT, USDC), liquid staking protocols (LIDO), and Layer 2 scaling solutions like Optimism, Arbitrum, and Base.

After Ethereum, BNB Chain may be the most polarized option. Unlike Bitcoin, which is well known and well capitalized, BNB Chain has striking positive and negative qualities. In terms of market cap, and usage, BNB Chain is dominant. In terms of commits, active developers, developer experience, validators, and reserved public token distribution, BNB Chain is in the lower tier (Figure 17). This imbalance can raise eyebrows, especially amid other controversy.

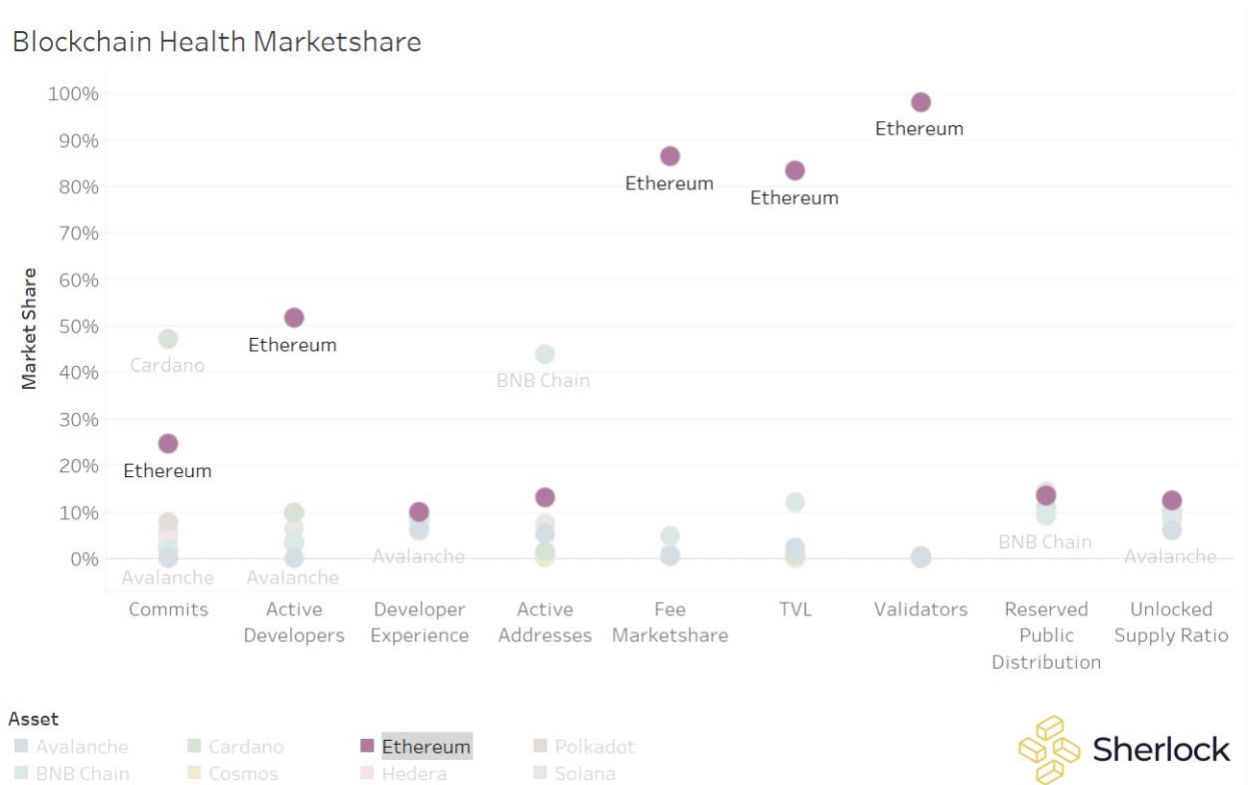


Figure 16 – Github, Public Scan Websites, DefiLlama, Amberdata – Bitcoin and Bitcoin Cash are excluded

Blockchain Health Marketshare

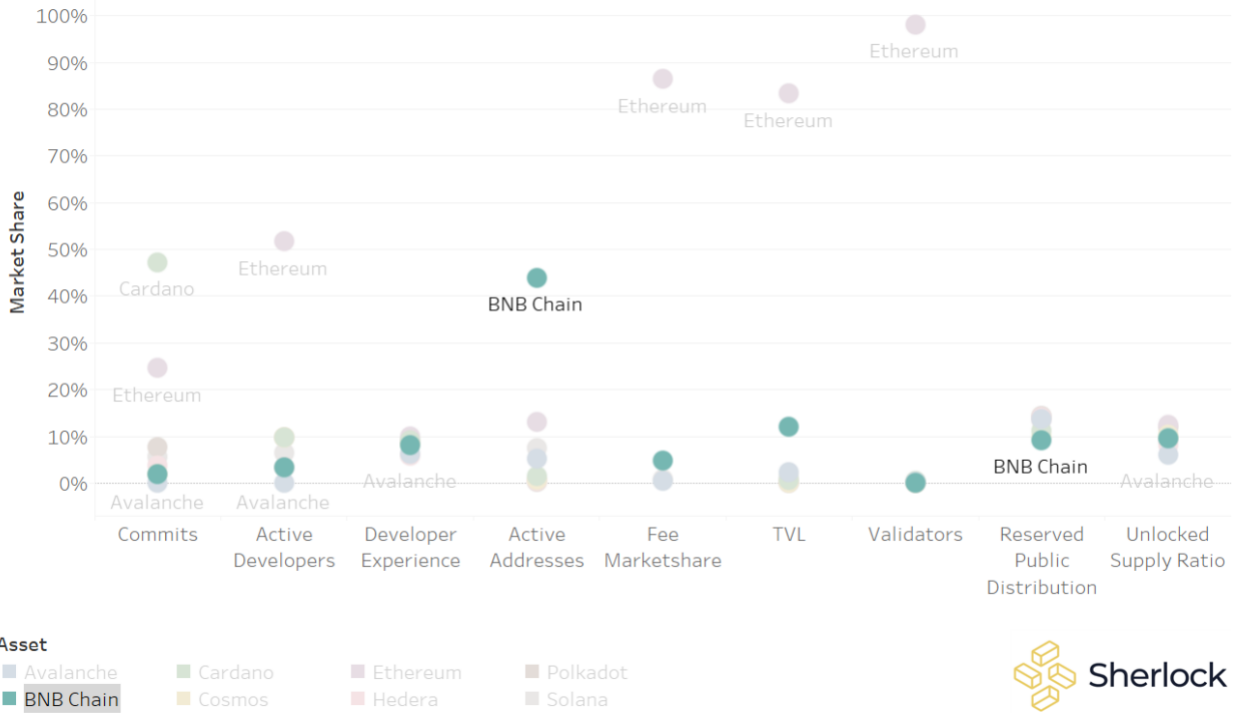


Figure 17- Github, Public Scan Websites, DefiLlama, Amberdata – Bitcoin and Bitcoin Cash are excluded

Conclusion

The following table highlights the most and least promising blockchains from the above analysis. Ethereum has been excluded from the table, since it is the obvious leader among smart contract platforms in the sample set.

	<i>Development</i>	<i>Usage</i>	<i>Decentralization</i>
<i>Positive Signal</i>	Hedera (HBAR)	BNB Chain (BNB)	Bitcoin (BTC)
<i>Negative Signal</i>	BNB Chain (BNB)	Cosmos (ATOM)	BNB Chain (BNB)

Blockchain systems are multi-dimensional. As shown above, BNB Chain appears to be both the most promising and most risky Ethereum competitor. Analyzing blockchains requires consistent recurring analysis and monitoring of many metrics, including but not limited to development, usage, and decentralization.

Research Limitations and Opportunities

Development Data Limitations

The development data used in this research is limited in variety of ways, including but not limited to:

- 1) The analysis only includes open source Github activity, meaning blockchains built in private or in other code repositories are excluded.
- 2) The analysis only considers core development of the layer 1 blockchain, meaning the development of decentralized applications that leverage the base layer are not included in the development activity count.
- 3) Code commits can be substantive or superficial, and further analysis is required to discover the impact of various code commits on the blockchains features and performance.

Usage Data Limitations

The usage data used in this research is limited in variety of ways, including but not limited to:

- 1) Revenue generated from high transaction fees could be considered a positive or negative, depending on if you are the recipient or payer of the fees. The crypto community consistently struggles with this paradox, as it involves tradeoffs between adoption and value capture.
- 2) TVL is measured in U.S. dollars, meaning the price of the underlying tokens can artificially skew the TVL analysis. By adjusting for token price or market cap, analysts can better compare the amount of value in a network over time.
- 3) Staked assets, staking yield, wallet activity and decentralized application activity are relevant measures of usage, not included in this analysis.

Decentralization Data Limitations

The decentralization data used in this research is limited in variety of ways, including but not limited to:

- 1) Highly centralized networks are more likely to experience inflationary pressure, but locked token supply is not always a measure of decentralization. Even if Bitcoin were 90% locked, it would hypothetically be distributed in a decentralized manner.
- 2) A raw count of validators should not be interpreted as a raw count of unique humans operating those machines. For example, individuals can operate one validator per thirty-two Eth. A geographic distribution of validators, while difficult to verify given the use of VPN's and other privacy tools, would be a valuable complement to this dataset.
- 3) The validator count for Ethereum includes RPC and Validator Nodes.
- 4) This paper does not explore Bitcoin's network of miners and nodes in depth, which is difficult to compare with Ethereum, given their alternative consensus mechanisms.

Next Steps

This research has inspired a variety of next steps, including but not limited to:

- Standardizing the data into a "blockchain health index" that is updated automatically

- Addressing some of the limitations and opportunities presented above, such as understanding code commit substance, adjusting TVL by market cap, and including measures around wallet activity and validator distribution.
- Including additional layer 1 blockchains like Ripple, Tron, Algorand, etc.
- Exploring layer 2 blockchains (Arbitrum, Optimism, Base, etc.) and decentralized applications (Uniswap, Lido, etc.) using a similar framework
- Investigating the correlations and potential causal relationships between blockchain health metrics and market related metrics like price and market cap.
- Finding an appropriate apples to apples comparison for decentralization between proof of stake and proof of work blockchains.

Crypto Terms Glossary

Blockspace

Blockspace, aptly named, is the available capacity of a blockchain system to store information and run smart contracts. It is a general term representing a networks available compute and storage capacity.

Decentralized Exchange

A decentralized exchange, or DEX, is a platform that enables peer-to-peer cryptocurrency trading without the need for a centralized intermediary. In contrast to centralized exchanges, a DEX runs on a decentralized blockchain network, allowing users to maintain control of their funds and trade directly with each other.

Ethereum Virtual Machine

The Ethereum Virtual Machine, or EVM, is the code that is used to run applications on the Ethereum network, and is accessible by anyone running an Ethereum node. In order to benefit from Ethereum security and network effects, many blockchains and crypto applications will build an EVM compatible product.

Layer 1

L1s represent the infrastructure layer of [decentralized finance](#). They provide the distributed ecosystem and processing power for the digital exchange of value and information, as well as the home for decentralized applications like DEXs (decentralized exchanges), CDPs (collateralized debt positions), Stablecoins (dollar pegged digital assets), oracles (real-time data providers), games, NFT's (Non-Fungible Tokens), perpetual trading protocols, lending protocols, cross-chain bridges and more.

Layer 0,2,3

As competition for Layer 1 blockspace has increased, transaction fees and latency have risen, prompting developers to build "Layer 2's", which are new scaling solutions powered by "optimistic" and "zero knowledge" rollups (secure transaction batching). "Layer 3's", aggregators of Layer 2 transactions in addition to the decentralized applications listed above, and "Layer 0's", blockchain indifferent

communication protocols. A common thread across almost all these contributors: they are powered by native tokens.

Native Tokens

Native tokens used to access blockchains are sometimes mistaken for the blockchains themselves (e.g. Ethereum is a blockchain powered by Ether, it's native token. To process a transaction on a blockchain, one needs to pay a fee in the native token, and that fee is subsequently distributed to the addresses working on behalf of the network, including validators, liquidity providers, and sometimes token holders or the project's treasury. Before a project has significant demand or adoption, native tokens are typically distributed to encourage participation and generate network effects. The price of a native token is a function of two factors: 1) markets willingness to pay for access to the system (e.g. utility) 2) markets expectation of future price. However, the native token is not the blockchain, and the blockchain's purpose is not native token price appreciation.

Satoshi

A Satoshi is the atomic unit of the Bitcoin network, representing 1/100000000 of a bitcoin, and named after the networks pseudonymous founder. Satoshi's are sometimes abbreviated as "sats".

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¹ Vieira, Sabrina. "Why Can Cosmos (Atom) Not Grow as Ethereum Killer?" *U.Today*, 27 Jan. 2023.

² Learn, Bybit. "21 Million Bitcoin Limit: What Happens When All the Bitcoins Have Been Mined?" *Bybit Learn*, BybitLearn, 31 May 2023.

³ Macdonald, Reed. "Coinbase CEO Calls Bitcoin 'Most Important Asset in Crypto.'" *Nasdaq*, Bitcoin Magazine, 13 Sept. 2023.