



DUKE  
FUQUA  
SCHOOL OF BUSINESS

Innovation & Cryptoventures

[FUQINTRD 697]

Martín Olivet

# Binance Smart Chain

March 2021

# Index

---

• Index	2
• Executive Summary	3
• The Binance blockchains	4
• The Binance Smart Chain [BSC]	5
• Proof of Staked Authority	6
• Wrapped Tokens	8
• DeFi and Ethereum analogues	10
• Binance support and funding	15
• Food for thought	16
• Binance Smart Chain landscape:	17
• Sources	18

# Executive Summary

---

- The Binance Smart Chain presents itself as a convenient alternative to Ethereum. With the same but faster, cheaper, and enhanced capabilities, projects in the Binance Smart Chain pose a great opportunity for DeFi.
- Being such a recent blockchain, the risks of developing, trading, operating, and storing value in assets that lay in the ecosystem are yet unknown.
- The Binance Smart Chain has growth potential as developers can easily replicate code, projects, dApps, and concepts from Ethereum.
- Network effects have grown exponentially (market cap, users, number of projects) since it launched in 2020, however, it is early to evaluate if it can pose itself as a contender to Ethereum, if it can coexist and grow as it has been doing so, or it will fade out once the hype is over.
- The blockchain's Proof of Staked Authority is extremely efficient in terms of block times and processing capabilities. It saves massive amounts of energy and unnecessary hardware resources.

# The Binance blockchains

Binance is the world's largest Centralized Exchange, but the Binance ecosystem expands way beyond that. Binance issues the third largest stablecoin by market cap, the BUSD. Its native token, the BNB is the third largest cryptocurrency only behind BTC and ETH. Binance runs the Binance Chain and Binance Smart Chain.

## Binance Chain & Binance Smart Chain

- **Binance Chain**: Launched in April 2019, the Binance Chain is a blockchain designed to allow fast (< 1 sec. block times) and cheap cryptotrading. With the Binance chain, BinanceDEX was created as an alternative with similar speed and features to the CEX. The blockchain serves as a platform for projects issuing new digital assets (tokens) and ICOs.
- **Binance Smart Chain**: The BSC takes the ecosystem to a new level. It is a parallel blockchain of the most basic and original Binance Chain. Having two blockchains retains the high performance (speed, throughput) of the native DEX blockchain and support Smart Contract function at the same time. Adding this characteristic brings competition to Ethereum as it presents an alternative with lower fees, same capabilities, more speed, and support from one of the main organizations in the blockchain industry.



# The Binance Smart Chain [BSC]

---

- Standalone Blockchain: The BSC is self-contained and can run well even if the BC stops for a short period.
- Ethereum Compatibility: BSC takes advantage of the Ethereum platform and makes the blockchain compatible with Ethereum. Most dApps running on Ethereum work on BSC. This allows projects to be copied or migrated to BSC without effort. Code can basically be copied saving developers and companies the resources and risks of changing blockchains. For users, applications that don't update to integrate BSC can easily be configured to work on BSC.
- Consensus and Governance: Staking-based consensus (see PoSA) saves energy and performs faster and better. Block times currently stands at 3 seconds while Ethereum is about 13 seconds.
- Native Token: The BNB is the ETH equivalent on the BSC. So the BNB, apart from its former uses of paying fees on Binance CEX and DEX, is now used to pay "gas" to deploy Smart Contracts on BSC and rewarded to validators that produce blocks. Unlike most protocols, there is no freshly created BNB tokens, making BNB non-inflationary.

# Proof of Staked Authority

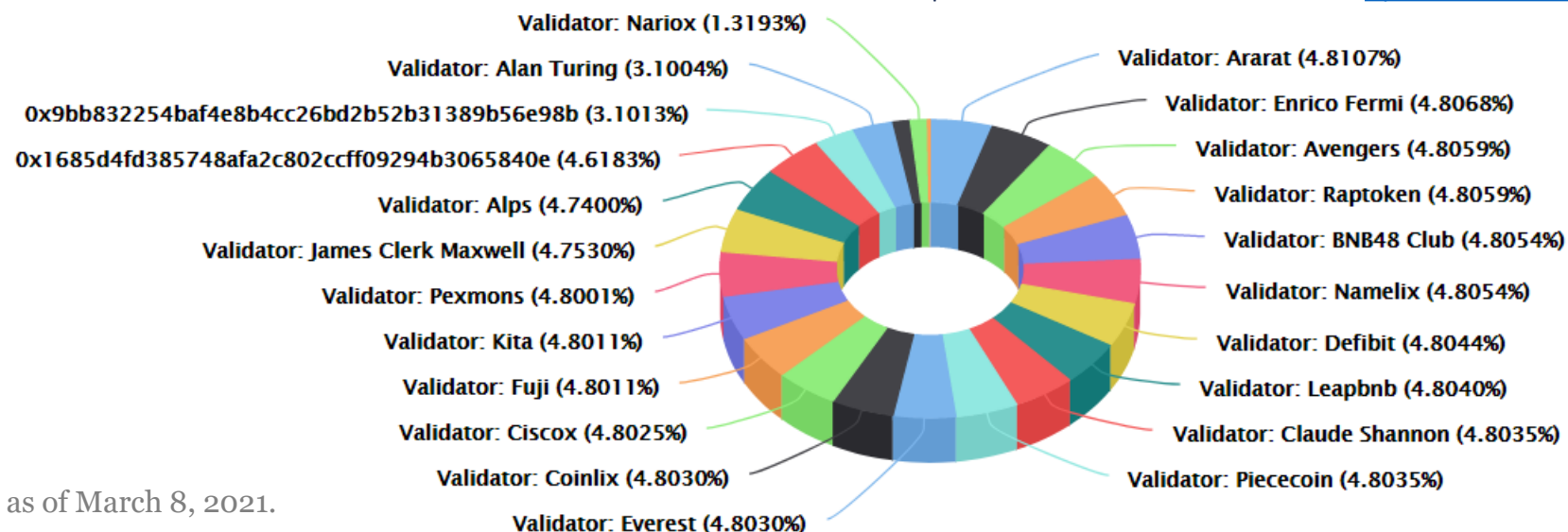
- Blocks are produced by a limited set of [21 validators](#).

These are responsible for validating transactions and generating blocks, ensuring the network's security and the consistency of the ledger. They receive the gas consumption of transactions.

- Validators take turns to produce blocks (vs. Bitcoin or Ethereum1.0 where they compete to “solve the puzzle” and submit a block).

The gas fee varies by block, but in the long run and under normal circumstances, all 21 validators get similar rewards. Validators get severe penalties (such as slashing their BNBs that are put up as stake) for untrustworthy behaviors (i.e., double signing, or going offline)








Top validators first week of March 2021. [Updated chart on BSCscan](#)



# Proof of Staked Authority

- Validators are elected in and out based on a staking based governance.

The top 21 highest BNB stakers become validators. The minimum self-delegated amount of BNB is 100,000 (~\$24MM) but validators can get BNB from delegators, anyone holding BNB, to secure enough BNB to be in the top. Delegators will get a reward proportional to the BNB they have provided, and since all 21 validators get the same rewards, we expect that they'll all have a similar number of delegated BNB (otherwise delegators would stake in validators with fewer stake).

Validator	Voting Power / %	Commission	APR	Status	Action
 pexmons	243,745.08788955 / 5.3%	25%	15.62%	Active	Delegate
 coinlix	218,470.95510195 / 4.75%	25%	20.53%	Active	Delegate
 namelix	214,643.8160605 / 4.67%	25%	18.8%	Active	Delegate
 raptoken	209,456.09720044 / 4.56%	25%	20.16%	Active	Delegate
 fuji	205,903.51579089 / 4.48%	25%	23.06%	Active	Delegate
 piececoin	204,578.4777941 / 4.45%	25%	19.01%	Active	Delegate
 ciscox	203,870.77883515 / 4.43%	25%	21.84%	Active	Delegate

Anyone can [stake](#) to become a delegator by choosing from the list of intended validators



# Wrapped Tokens

Wrapped or Pegged Tokens are tokens that represent a crypto asset on a blockchain that is not the cryptoasset's native one. This started in Ethereum with BTC, which can be converted to wBTC (an ERC-20 token) and vice versa. Wrapped tokens are 100% backed by the native token, which stays in a reserve, to guarantee the wrapped version can be traded back for the native at any moment.

Wrapped tokens allow us to use BTC, ETH, USDC, etc. in BSC dApps. This way, one can participate in DeFi on BSC while maintaining exposure and using whichever assets are preferred.

(i.e. taking a loan with BTC or ETH, staking coins, yield farming, day-trading, etc.)

Some benefits and uses of converting tokens into the BSC:

1. Taking a loan with BTC, ETH, DOT, ADA, etc.
2. Minting stablecoins – almost identical to DAI on MakerDAO - Ethereum
3. Trade BTC, ETH, or else with very low gas fees and increased speed.
4. Earn fees by supplying liquidity to a liquidity pool.
5. Earn interest by putting your tokens in a vault with yield-farming strategies.
6. Leveraging your exposure by longing or shorting a certain coin.

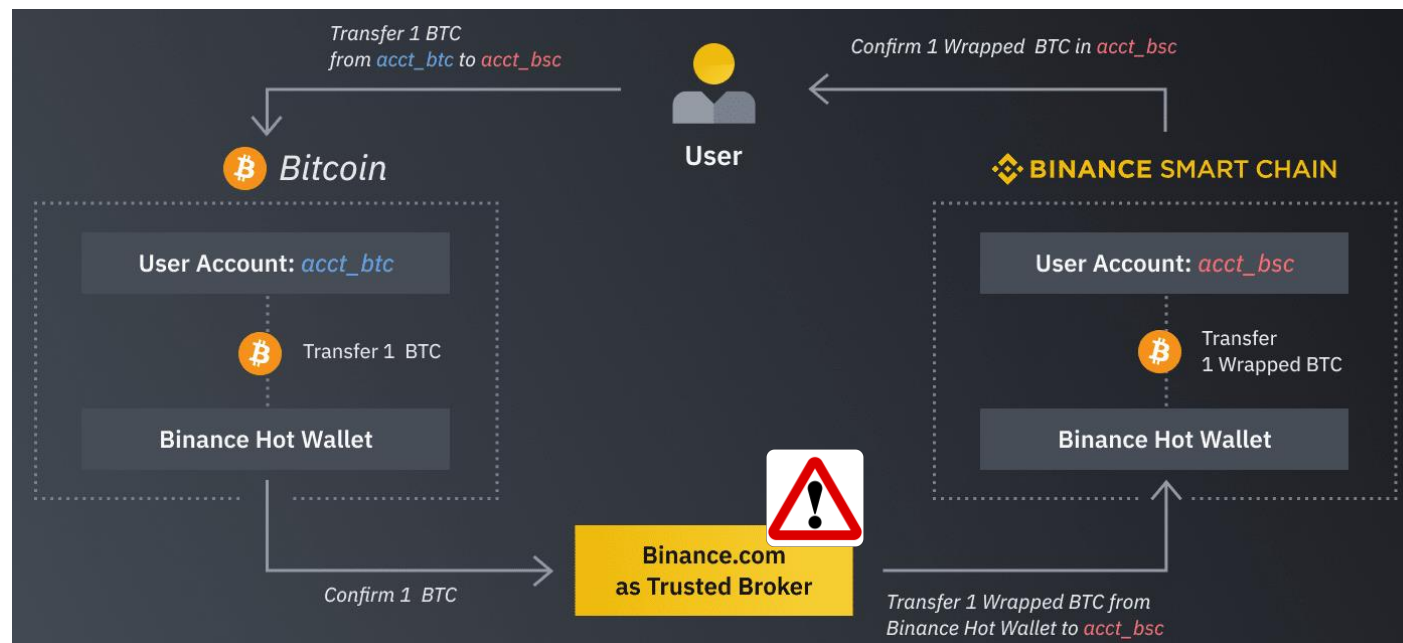


# Wrapped Tokens

- Binance Bridge: a cross-chain service that lets anyone convert selected coins into wrapped tokens to be used on BSC. Binance Bridge charges zero conversion fees, to incentivize the BSC adoption and increase usage, but you do have to pay the gas fees of the blockchains. There are currently 34 non BSC crypto assets that have a BSC pegged version. This number is increasing.
- Proof of Assets: Binance facilitates the different contract addresses so anyone can [audit the original addresses](#) on the different blockchains to verify the assets are actually locked there.



Although it can be audited, we are trusting Binance to secure the assets



# DeFi and Ethereum analogues

## A. Decentralized exchanges and Liquidity



Largest two exchanges in Ethereum and Binance Smart Chain:



	Uniswap (UNI)	Pancakeswap (CAKE)
Tokens listed	1500+	200+
market cap	\$ 17 B	\$ 2 B
Volume (24h)	\$ 920 MM	\$ 376 MM
Swap fee	up to \$100 or +	~ \$1

## B. [Minting] stablecoins

Stablecoins (centralized or decentralized) can coexist in both chains thanks to the wrapping and bridging. The largest decentralized stablecoin is DAI by MakerDAO in Ethereum and VAI by Venus Protocol in Binance Smart Chain.

	 DAI	 VAI
market cap	\$ 2.6 B	\$ 132 MM
price range 1y	\$ 0.97 - 1.11	\$ 0.85 - 1.00

VAI lost its peg to the dollar in the last week of February and has since not yet recovered (currently at \$0.89). However, Venus is quite new and launched on 3Q20

# DeFi and Ethereum analogues

## C. Lending and Borrowing

Although relatively new, lending and borrowing in Ethereum has consolidated and counts with solid projects and proven products. Examples are Compound and AAVE, between others.






In BSC, there are several platforms but the leader is Venus Protocol (same through which one can mint VAI). Venus Protocol could actually be thought of as a combination between MakerDAO and Compound into one platform.





	Compound	Venus		
Total Supply	\$ 10.4 B	\$ 3.7 B		
Total Borrow	\$ 4.8 B	\$ 1.5 B		
APY for most popular coins				
	Compound	Venus		
	Supply	Borrow	Supply	Borrow
BTC	0.25%	4.29%	2.95%	13.77%
ETH	0.19%	2.87%	4.57%	14.54%
BNB	N/A	N/A	9.51%	16.56%
ADA	N/A	N/A	2.20%	12.96%
USDT	7.61%	9.79%	19.62%	20.97%
DOT	N/A	N/A	2.46%	10.11%

# DeFi and Ethereum analogues

## C. Lending and Borrowing:

- You could have been extremely worried if you lent BUSD in Venus Protocol during the first week of March 2021. Lenders couldn't get their money out of the contract due to lack of liquidity.
- The community expressed discomfort through different engagement channels (twitter, telegram, discord, etc.), the price of the governance token, XVS, dropped and VAI was still dangerously below the peg.
- Then suddenly, a big player added liquidity from one moment to the next. The liquidity problem was solved but questions arise as to how decentralized and efficient the protocol is and who is behind the project.

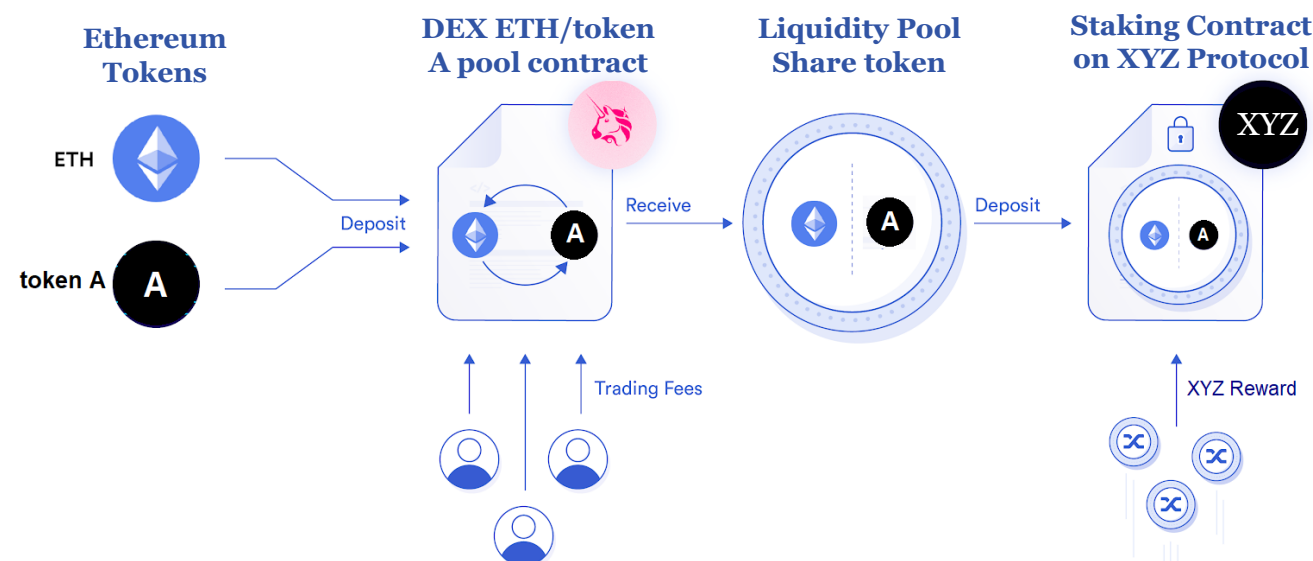
	Total Supply	Supply APY	Total Borrow	Borrow APY	Liquidity
 BNB	\$579.15M 1,957,710 BNB	9.52% 5.06%	\$374.38M 1,265,506 BNB	16.74% 7.93%	\$205.83M
 BTCB	\$1.28B 23,610 BTCB	3.05% 2.25%	\$298.46M 5,490 BTCB	14.46% 10.05%	\$985.33M
 BUSD	\$187.8M 187,743,686 BUSD	17.85% 6.55%	\$187.2M 187,148,837 BUSD	19.24% 6.57%	\$749.6K
 ETH	\$451.72M 246,426 ETH	4.76% 3.21%	\$158.06M 86,227 ETH	15.1% 9.46%	\$293.88M
 USDT	\$144.26M 144,141,898 USDT	19.88% 8.61%	\$143.66M 143,537,921 USDT	21.31% 8.64%	\$749.95K

	Total Supply	Supply APY	Total Borrow	Borrow APY	Liquidity
 BUSD	\$458.63M 458,590,635 BUSD	9.56% 2.56%	\$354.87M 354,842,143 BUSD	13.52% 3.32%	\$103.91M
 BNB	\$543.68M 1,890,726 BNB	9.44% 5.26%	\$338.9M 1,178,567 BNB	17.13% 8.57%	\$205.82M
 BTCB	\$1.35B 23,830 BTCB	2.89% 2.07%	\$318.48M 5,590 BTCB	13.57% 9.15%	\$1.03B
 USDT	\$351.88M 351,799,231 USDT	11% 3.35%	\$285.54M 285,473,790 USDT	14.76% 4.15%	\$66.49M

# DeFi and Ethereum analogues

## D. Yield Farming

- One of DeFi's biggest uses has been earning yield on crypto assets. Without any detail, these are the most common ways of doing so:
  - Providing liquidity** to an exchange and farming. And by doing so earning transaction fees at the risk of impermanent loss and depending on the protocol, receiving governance tokens when you **farm** the LP tokens.
  - Staking** one single asset into a vault and generating governance tokens of the protocol you have invested in. Remember that in proof-of-stake coins, staking is crucial for the ecosystem to function and so staking is rewarded similarly as mining is rewarded in PoW. Even though a regular user won't be processing transactions or securing the blockchain.







# DeFi and Ethereum analogues

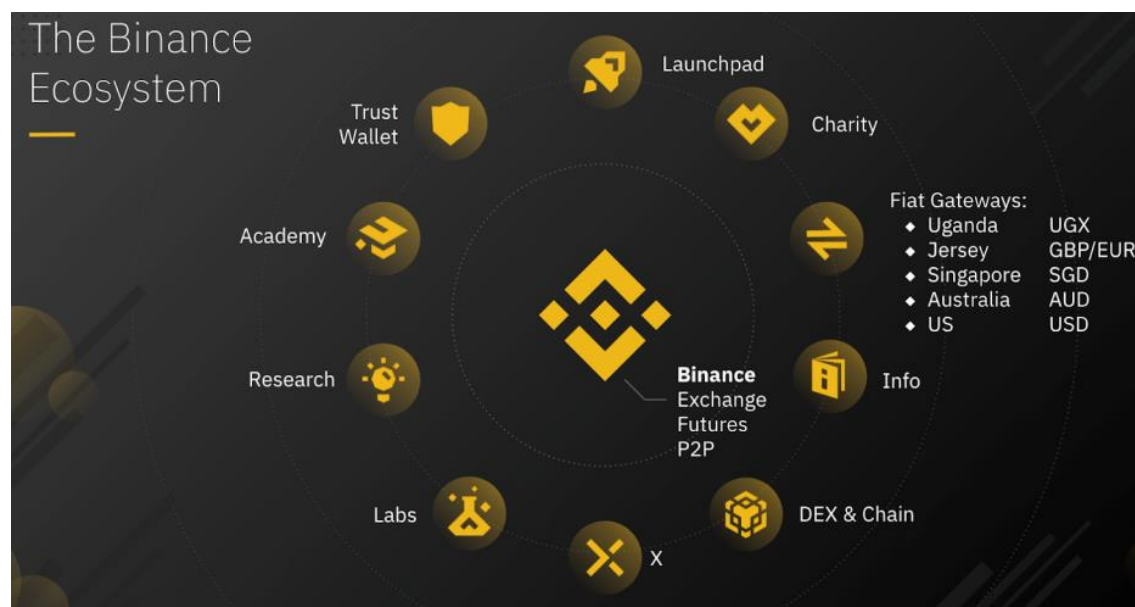
## D. Yield Farming

- Yearn Finance: **On Ethereum**, Yearn automates yields for protocol users. It is a smart savings account. Instead of users hopping protocols to find the best return, Yearn does all the work for you searching and allocating your assets to the highest APY platforms (Compound, Curve, Aave, etc.).
- **In BSC**, several protocols are competing to be the blockchain's Yearn. This means there are several options for users to experiment that currently offer considerably more return than Yearn such as Autofarm, AcryptoS, Beefy, between others.
- Different protocols and blockchains have inherently different risks, which are hard to asses. Risk aside, the end user can experience the same concept of generating the best return for its assets by depositing on a Smart Contract either on Ethereum or BSC. Currently, APY among the most traded coins is higher on BSC while offering lower fees, making it attractive even for small and short-term deposits

			BTC	ETH	BNB	USDT	DOT	USDC	DAI
Ethereum		Yearn	3.59%	13.09%	N/A	13.39%	N/A	21.07%	19.34%
BSC		Autofarm	19.3%	27.6%	43.5%	50.4%	13.7%	49.1%	N/A

# Binance support and funding

- Accelerator Funds: To stimulate innovation and usage of the BSC, Binance set aside \$100 MM to fund projects. Between September and December 2020, Binance's Accelerator Fund funded 15 projects, including the two largest automated market makers.
- BUIDL Reward Program: To incentivize developers to build all sort of dApps, Binance made a \$5 MM pool of BNB (now worth ~\$50 MM) to reward deployers of smart contracts on BSC.
- Binance Launchpad: A token launch platform that offers exposure to the millions of Binance users. Works hand by hand with a Launchpool that allows early "investors" to farm crypto assets held on the CEX and earn tokens of projects that haven't yet launched or been listed.
- Binance Labs: Basically a venture capital firm that invests in blockchain and cryptocurrencies. It provides funds, advice, technical resources, and a network difficult to find elsewhere in the blockchain community.



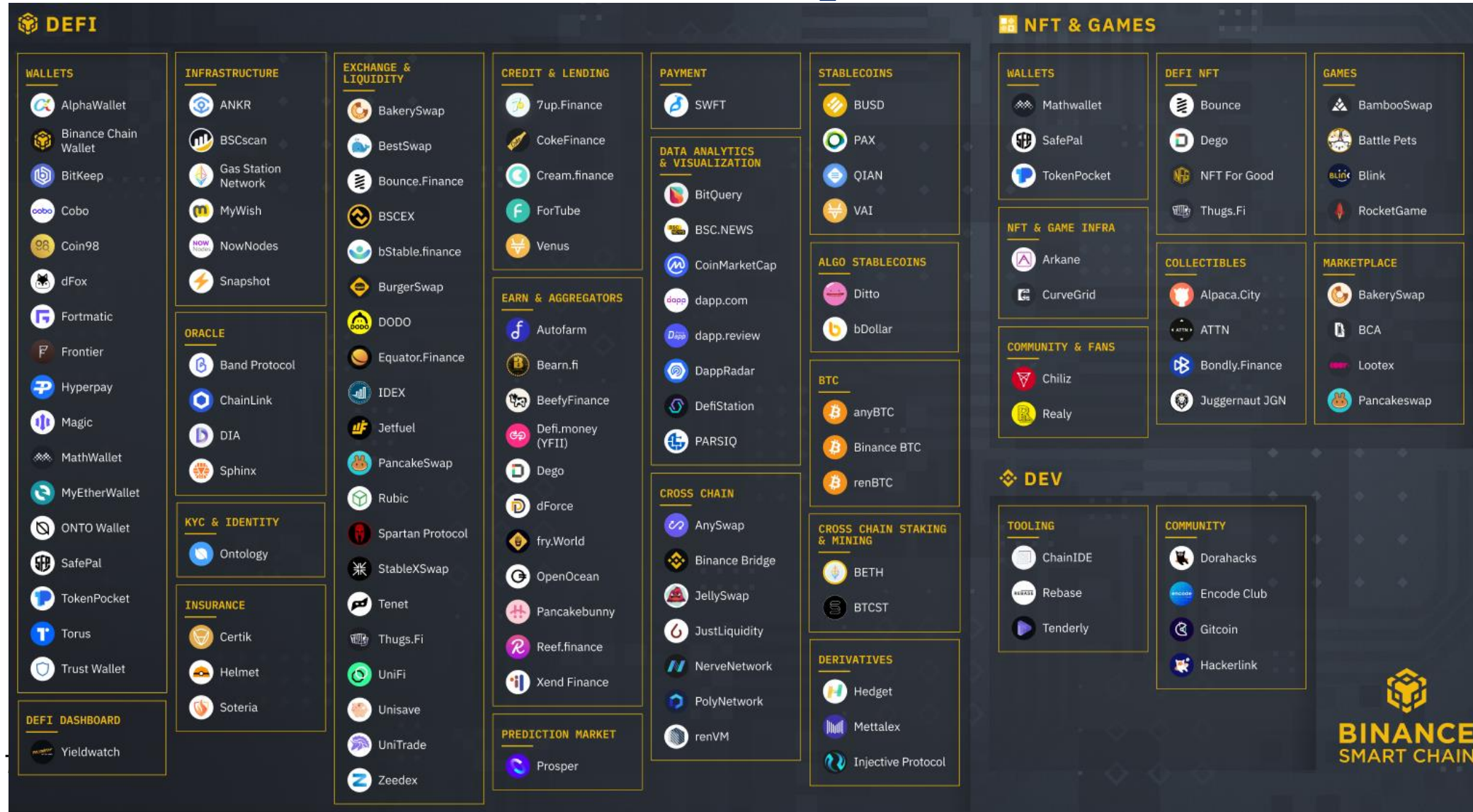
# Food for thought

---

- ♠ Is BSC decentralized? The Binance Chain has 11 validators, all of them preselected by binance. The 21 validators on BSC also need a substantial amount of BNB which probably could have only been possible to get being involved in the Binance team from the early beginnings. Most of the validators are owned by Binance anyway.
- ♠ Binance is one of the biggest players in the blockchain and crypto industry already and is not decentralized (its CEO has described themselves as CeDeFi: centralized decentralized finance). Their support and funding also works as a selection process and filter to new projects. Does it make sense to continue increasing their market share and power?
- ♠ Binance is the world's largest CEX but is not the market leader in the US. Kraken alone has three times more volume. Binance.US is not allowed to operate in Connecticut, Hawaii, Idaho, Louisiana, New York, Texas, Vermont for different reasons (regulations, taxes). Is it a risk to operate and trade coins and tokens minted on the BSC that the SEC prohibits? What can be the future tax implications for law-abiding citizens?
- ♠ The BSC benefits come primarily from low transaction fees, increased speed, and having strong financial and technical support from Binance. Ethereum 2.0 aims to address those issues in the near future, threatening BSC's biggest competitive advantages. Will the network effect be big enough to make projects endure if Ethereum 2.0 succeeds to become equally faster and accessible?
- ♠ Ethereum is home to the largest blockchain projects, dApps, protocols, and platforms. The number of users and amount of money flowing through Ethereum offers a larger market and possibilities for innovations. Most developers are familiarized with Ethereum and are working on it. Can BSC continue to attract users, developers, and investments in a sustainable way?

# Binance Smart Chain landscape:

As of Feb 19, 2021.



# Sources

---

- i. Binance Smart Chain whitepaper: [https://dex-bin.bnbstatic.com/static/Whitepaper %20Binance%20Smart%20Chain.pdf](https://dex-bin.bnbstatic.com/static/Whitepaper%20Binance%20Smart%20Chain.pdf)
- ii. Introducing Bitcoin-pegged token on Binance chain: <https://www.binance.com/en/blog/347360878904684544/Introducing-BitcoinPegged-Token-on-Binance-Chain>
- iii. Forbes article “What’s Binance Chain trying to accomplish”:  
<https://www.forbes.com/sites/darrynpollock/2019/05/09/whats-binance-chain-trying-to-accomplish-and-why-is-it-pulling-projects-from-other-platforms/?sh=6b83ba23666e>
- iv. Blocking time on BSC scan: <https://www.bscscan.com/chart/blocktime>
- v. Binance Academy, on Binance Bridge: <https://academy.binance.com/en/articles/an-introduction-to-binance-bridge>
- vi. Uniswap and Pancakeswap comparison: <https://coinmarketcap.com/alexandria/article/uniswap-vs-pancakeswap>
- vii. Defi, Yield aggregators Ethereum <https://rossbulat.medium.com/defi-exploring-the-ecosystem-around-yield-farming-dc4dfe8a74cc>
- viii. Binance Accelerator Fund: [https://www.binance.com/en/blog/421499824684901149/UPDATE-\\$100M-Accelerator-Fund-Supports-2-More-Projects](https://www.binance.com/en/blog/421499824684901149/UPDATE-$100M-Accelerator-Fund-Supports-2-More-Projects)
- ix. BUIDL Reward Program: [https://www.binance.com/en/blog/421499824684901064/Introducing-the-BUIDL-Reward-Program-for-Binance-Smart-Chain?ref=JLI1VBLA&utm\\_source=BinanceTwitter&utm\\_medium=GlobalSocial&utm\\_campaign=GlobalSocial](https://www.binance.com/en/blog/421499824684901064/Introducing-the-BUIDL-Reward-Program-for-Binance-Smart-Chain?ref=JLI1VBLA&utm_source=BinanceTwitter&utm_medium=GlobalSocial&utm_campaign=GlobalSocial)
- x. Coindesk note on CZ (Binance’s CEO) defining CeDeFi as a compliment to DeFi: <https://www.coindesk.com/binance-smart-chain-cz-defi>