



# DeFi's Ability to Scale

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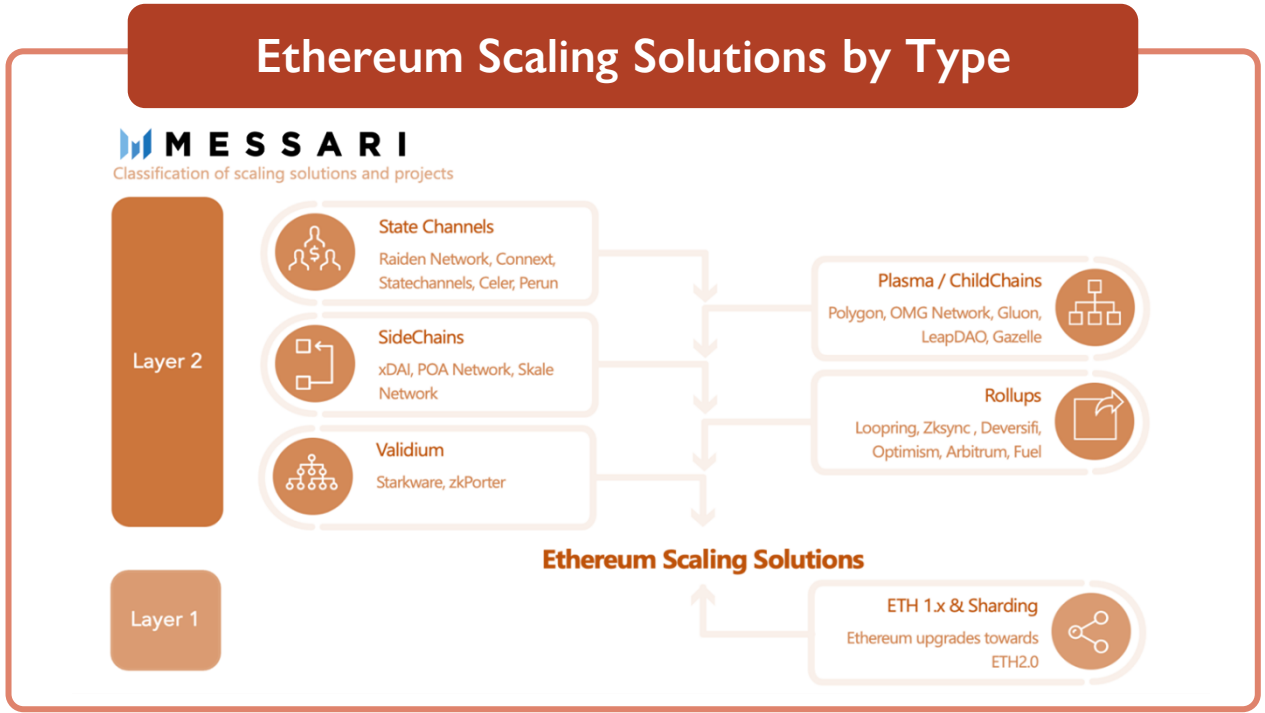
## DeFi's Ability to Scale

The growth of DeFi is largely contingent on the growth of the blockchain network in which it operates. To date the vast bulk of DeFi applications have been built on technology supported by the Ethereum blockchain. Ethereum's ability to facilitate smart contracts has seen its use cases grow dramatically and has ushered in the development of the DeFi ecosystem. With the explosion in the number of Decentralised Applications (Dapps) and growth of collateral in DeFi (Total Value Locked or TVL) the Ethereum network is experiencing some pronounced growing pains. The ability to scale and grow to meet the needs of the application layer has become a question asked by many market participants as network execution costs ("gas") have risen to uneconomical levels.

In this month's report we explore the issues of network scalability, laying out the various issues that a blockchain must overcome in efforts to deal with greater transactional volume. We will also look at a number of scaling solutions and review several of the competitor blockchains that are now offering smart contract functionality and DeFi applications.

When looking to scale a blockchain it is important to understand the components of delivering information on a decentralized computer network. In an effort to increase the speed or TPS (transaction per second) of a blockchain, developers need to take into consideration the size and interval of each block. The ability to increase the TPS directly relates to the consensus mechanism that underpins the blockchain. This involves adjustments to the proof of work algorithm and fault tolerance of the network nodes. These are complex problems that result in a trade-off between speed, security and decentralization of the network. As at today, blockchain scalability is still an open problem without a perfect solution.

Today's blockchain scaling solutions fall into two distinct approaches - scaling the protocol layer (layer 1 scaling) or scaling using solutions on top of the protocol that do not require changes to the core code of the blockchain (layer 2 scaling).



The largest Layer 1 scaling solution that is currently in the development stage is Ethereum 2.0. This ambitious project being rolled out over a 12-18month period will see the migration from a proof of work system to a proof of stake system. This makes it possible to dramatically decrease the complexity of the consensus mechanism leading to massive throughput gains for the whole network. Ethereum 2.0 is also introducing a processing technique known as sharding. This technique allows the blockchain to make use of parallel processing, which could increase overall capacity several times over. Between this added technique and the switch to proof-of-stake, the new Ethereum blockchain should be far faster and more efficient than its predecessor. There are currently 160,000 validators running Ethereum 2.0, a network size 50x larger than any of the competitor networks.

The first of the Ethereum upgrade releases is scheduled for release in July 2021. EIP 1559 upgrade is aimed at reducing the “gas” or transaction costs of the network whilst simultaneously enhancing the throughput of the network.

## Competition is Heating Up

With the commercial success of both Ethereum and the numerous DeFi applications that it supports, competitor blockchains are circling in an effort to take market share. In this section we run through the various competitor blockchains that have emerged and analyse the trade-off between speed, security and decentralisation that each offers.

## Solana (SOL)

- **Development Team** - Anatoly Yakovenko
- **Financial Backers** - Multicoin Capital, Foundation Capital, Distributed Global, Blocktower Capital, NGC Capital, and Rockaway Ventures.
- **Application Layer** - DEX - Serum
- **Consensus Method** - Proof of Stake/Proof of History
- **Security** - Decentralised
- **Validators** - 600
- **Economics** - Variable Transaction Fees

Solana is by far one of the most promising projects with a number of big names in the digital space as backers. Solana is a truly decentralized platform, even while it has backers who also run centralized exchanges (FTX) it meets the trustless criteria. One of the speed constraints on any of these systems is proving the data that has been agreed in previous blocks. All protocols need to spend time and energy ensuring that nothing has been manipulated before approving the next transaction. Solana have solved this through what they call "proof of history," wherein they have developed a synchronized clock that, in essence, assigns a timestamp for each transaction and disables the ability for miners and bots to decide the order of which transactions get posted onto the blockchain.

This dramatically speeds up the processing time and energy required which leaves the blockchain supporting up to 50,000 transactions per second (tps). Serum which is the largest decentralized exchange on the Solana platform with approx \$50 million in daily trading volume, while on the Ethereum-based Uniswap, the 24-hour trading volume is in excess of \$1bn on a regular basis.

## Binance Smart Chain (BNB)

- Development Team - Binance
- Financial Backers - Changpeng Zhao
- Application Layer - DEX - Pancake Swap
- Consensus Method - Proof of Authority
- Security - Centralised
- Validators - 21
- Economics - Variable Transaction Fees

Binance Smart Chain (BSC) is a copy but not an exact replica of the Ethereum blockchain. BSC uses an alternative to Ethereum's Proof-of-Work model that they call a Proof-of-Staked-Authority (PoSA) model. This model optimises the network for low fees and high throughput but sacrifices decentralization and censorship resistance to do so. It's a fascinating project that has blossomed given the reach and marketing power of Binance, the world's largest centralised exchange. A decentralised exchange (DEX) has been built on BSC, PancakeSwap, which has quickly amassed 250,000 individual users.

With anonymous development teams driving the Dapp layer, the jury is out as to whether this new centralised contender will capture enough market share of projects. The protocols that they are supporting are at the more speculative end of the spectrum and not places we are currently invested.

## Polkadot (DOT)

- **Development Team** - Gavin Wood, Robert Habermeier and Peter Czaban.
- **Financial Backers** - Web3 Foundation
- **Application Layer** - DEX - Polkaswap/Sushiswap
- **Consensus Method** - Nominated Proof of Stake
- **Security** - Decentralised
- **Validators** - 300
- **Economics** - Market Cost

The project leader of Polkadot, Gavin Wood, is the ex Ethereum CTO who recognised the importance of a base layer, or Level 0 protocol for blockchains. Creation of a base layer allows for cross chain interoperability with Level 1 networks including Ethereum, Bitcoin and others. It offers a unique approach to solve the scalability and throughout dilemma in the ecosystem without tinkering with the underlying protocols of the existing blockchain networks.

It operates a multichain format, through the use of sidechains, that facilitate the cross chain transfer of any data or asset type and not just tokens. Sharded chains connected to Polkadot are called “parachains” because they run on the network in parallel. This ends the siloed nature of the blockchain space and opens up new possibilities for applications to interoperate and create novel services. Parachains are a bet on open economies and free trade over chain-specific application.

## Avalanche (AVAX)

- **Development Team** - Emin Gün Sirer
- **Financial Backers** - Andreessen Horowitz, Polychain Capital, Galaxy Digital, Bitmain and Initialized Capital
- **Application Layer** - DEX - Pangolin
- **Consensus Method** - Avalanche Proof of Stake
- **Security** - Decentralised
- **Validators** - 975
- **Economics** - Fixed Transaction Fees by Type

Avalanche launched in September 2020 as a so-called Ethereum killer. With claims of 4,500 TPS the project has received backing from industry heavyweight Mike Novogratz at Galaxy Digital. Avalanche operates three separate chains, one that supports Ethereum, so it is often seen as a way to complement and connect, rather than directly compete against Ethereum. Given the speed of the network and its connectivity to Ethereum many DeFi applications have been developed, the most prominent of those is Pangolin (USD\$420mm TVL). Alongside Pangolin, there are many other dapps joining the Avalanche ecosystem across a variety of different use cases, making it a fully-featured network right from launch (bZx, Reef, Jelly Swap).

Source : The Block - Research

Table 1 : Blockchain Comparison Metrics

	Ethereum 1.0	Ethereum 2.0	Polkadot	Cosmos	Avalanche	NEAR	Solana	BSC
<b>Architecture</b>	Single-chain (synchronous)	Multi-chain (shards)	Multi-chain (parachains)	Multi-chain (IBC-compatible)	Multi-chain (subnets)	Multi-chain (shards)	Single-chain (synchronous)	Single-chain (synchronous)
<b>Security</b>	Global	Shared	Shared (if parachain connected)	Blockchain-specific	Shared (validators choose subnets)	Shared	Global	Global
<b>Consensus</b>	Proof-of-Work	Casper Proof-of-Stake	Nominated Proof-of-Stake	Tendermint Proof-of-Stake	Avalanche Proof-of-Stake	Nightshade Proof-of-Stake	Proof-of-History (PoS)	Proof-of-Authority
<b>VM/ Development</b>	EVM (Solidity, Vyper)	EVM (Solidity, Vyper)	WebAssembly, Substrate	WebAssembly/EVM Cosmos SDK	AVM (Go), Athereum (EVM)	WASM, Aurora (EVM)	Sealevel (Rust)	EVM (Solidity, Vyper)
<b>Validators (today)</b>	6,000 (nodes)	160,000	300	125	960	60	600	21
<b>Economics</b>	Variable transaction fees	Variable transaction fees	Market cost for parachain slot	Variable transaction fees	Fixed transaction fees by type	Variable transaction fees	Variable transaction fees	Variable transaction fees
<b>Governance</b>	Off-chain	Off-chain	On-chain	On-chain	On-chain	On-chain	On-chain	On-chain



## PAL vs VHS

At the risk of dating ourselves... way back at the beginning of the home video market there was a pitched battle of which format of video would gain the greatest traction the fastest. While the consensus was that PAL was the better quality product the world went with VHS. Needless to say neither of these platforms exists today and the battle for supremacy is an odd footnote on a Wikipedia page somewhere. Its pretty clear that something similar eventually plays out here in the digital asset space, there will be winners and losers.

The value of the Ethereum network is currently significant and being the most established it has a significant advantage. The DeFi space, which is one of the areas in the digital asset space with the most developer activity has chosen this platform to develop projects. Composability between different Ethereum smart contracts that can call each other and interact is enough for todays market, but will it suit the developments of tomorrow?. As the space evolves we need to stay on top of the opportunities that are likely to present themselves.

The goal of this note was to try and layout that there are many valid and real projects being launched and scaled. Also how the developments are being used in real life and go some way to try and explain the demand for capital that this space has as these projects are developed. DeFi has the unique advantage of generating a return to fund these various projects and see up close the changing landscape and hopefully identify other investment opportunities over time. At FCAM we are truly platform agnostic as all we manage our decisions to is the concept of risk vs return, optimising that parameter is the only variable that concerns us when making financial decisions.