

Aptos and Sui:

The New Kids on the Block

October 2022

Shivam Sharma

Table of Contents

| | |
|--|-----------|
| <u>Key Takeaways</u> | 2 |
| <u>Introduction</u> | 3 |
| <u>Current State of the Market</u> | 4 |
| <u>Where are the developers?</u> | 5 |
| <u>Where do current L1s fall short?</u> | 6 |
| <u>Aptos</u> | 13 |
| <u>Key Points</u> | 16 |
| <u>Team and Fundraising</u> | 19 |
| <u>Sui</u> | 18 |
| <u>Key Points</u> | 21 |
| <u>SUI Tokenomics</u> | 23 |
| <u>Team and Fundraising</u> | 24 |
| <u>What are the similarities between Aptos and Sui?</u> | 23 |
| <u>What are the differences?</u> | 24 |
| <u>Outlook</u> | 26 |

Key Takeaways

- ◆ Aptos and Sui are new Layer-1 projects that seek to solve the scalability and safety issues that are characteristic of the current Layer-1 space
- ◆ Both blockchains utilize the new smart-contract specific programming language, Move. Move comes pre-built with features that hope to deliver an improvement in safety and privacy in the blockchain world. We look forward to monitoring developments in the language and whether it manages to deliver on its promises
- ◆ Aptos and Sui have been developed by some of the top engineers and product developers in the Web2 space, and both feature a range of cutting-edge technical features which we dive into in this report
- ◆ Aptos Labs and Mysten Labs (the team behind Sui) have both raised sizeable amounts of capital from a well-capitalized investor base
- ◆ Given the extensive product experience in the background of these teams, both chains are looking to take crypto adoption to the global stage and target the next billion users
- ◆ In this report, we look at the state of the current L1 market, dig into Aptos and Sui and where they fit in, as well analyzing in detail the similarities and differences between the two projects

Introduction

From the humble beginnings of Bitcoin, through Ethereum and BNB Chain and more recently the likes of Solana and Cosmos, the layer-1 (“L1”) blockchain ecosystem has been of cornerstone importance through the history of the crypto space. Now, we find ourselves in the midst of another [BUIDL](#) market and in anticipation of the newest entrants into the L1 space:

Aptos and Sui.

Born from the extensive work completed by Meta for their Diem (formerly Libra) project, both Aptos and Sui are backed by experienced teams and seek to use their product development expertise to solve the problems current L1s face. These problems include safety and privacy concerns, as well as structural scalability issues. To help solve these issues, both L1 blockchains utilize the **new smart contract programming language: Move**. Move, originally developed for Diem, displays innovative improvements on current alternatives, and promises both an unmatched level of smart contract security, as well as a low migration cost for Solidity or Rust developers.

In this report, we evaluate the current L1 landscape and dive into Aptos, Sui and their swiftly expanding ecosystems.








Note: “Blockchains”, “chains”, and “L1s” will be used interchangeably throughout this report

Current State of the Market

The multi-chain thesis is in full swing in these early years of the crypto industry, with developers undoubtedly having a choice of where to build. While market capitalization (“market cap”) tells one part of the story, usage statistics show us another side:

- ❖ **Ethereum’s market cap v usage...** points to a degree of overvaluation, with the likes of **BNB Chain** and **Solana** very much outperforming in terms of both **Daily Transactions** and **Active Addresses**
- ❖ **Layer-2s (“L2”) sneaking in...** with **Arbitrum** and **Optimism** showing strong usage numbers, despite their low market cap (or no market cap in the case of the token-less Arbitrum)











Figure 1: L1 (and L2!) market cap does not necessarily reflect on-chain activity

| Blockchain | | Market Cap (\$B) | Daily Txns (M) | 30D active addresses (M) |
|---|------------------|------------------|----------------|--------------------------|
|  | <i>Ethereum</i> | 157.9 | 1.2 | 6.8 |
|  | <i>BNB Chain</i> | 43.9 | 3.1 | 8.8 |
|  | <i>Solana</i> | 11.2 | 28.1 | 13.4 |
|  | <i>Polygon</i> | 6.9 | 2.7 | 3.9 |
|  | <i>Avalanche</i> | 4.8 | 0.1 | 0.3 |
|  | <i>Arbitrum</i> | n/a | 0.3 | 0.4 |
|  | <i>Optimism</i> | 0.2 | 0.1 | 0.2 |

Source: Nansen, CoinMarketCap
As of 11 Oct 2022

Where are the developers?

Figure 2: Ethereum leads in volume, but Commits per Active Dev tells a different story

| Project | | Weekly Commits | Weekly Active Devs | Commits per Dev |
|---|------------------|----------------|--------------------|-----------------|
|  | <i>Ethereum</i> | 11,391 | 1,795 | 6.3x |
|  | <i>Polkadot</i> | 7,429 | 747 | 9.9x |
|  | <i>Cosmos</i> | 2,389 | 500 | 4.8x |
|  | <i>Solana</i> | 2,084 | 344 | 6.1x |
|  | <i>Bitcoin</i> | 2,057 | 355 | 5.8x |
|  | <i>NEAR</i> | 1,368 | 141 | 9.7x |
|  | <i>BNB Chain</i> | 853 | 78 | 10.9x |
|  | <i>Cardano</i> | 756 | 136 | 5.6x |
|  | <i>IPFS</i> | 562 | 66 | 8.5x |
|  | <i>Kusama</i> | 521 | 115 | 4.5x |

including projects with >0 sub-ecosystems, as of 11 Oct 2022

Source: Gokustats

- ❖ **Ethereum's lead is notable...** with both weekly commits / active devs nearly 2x those of its nearest competitor, Polkadot. It is also notable that **Cosmos activity has ramped up** (relative to historical levels); likely due to the increased work around their Cosmoverse event and the product announcements they had planned around that
- ❖ **Commits per Active Dev...** highlights the amount of work being put into NEAR Protocol, BNB Chain and Cosmos ecosystems. Given **developer figures are typically a forward-looking metric**, this may be construed as a positive sign for these ecosystems. It should be noted, however, that this metric abstracts from measuring the complexity of each commit, which might be very different between Ethereum and NEAR owing to the relative development of the respective blockchains








Where do current L1s fall short?

One way to look at the issues that are prevalent in the current L1 landscape is to evaluate them from the perspective of the classic [Blockchain Trilemma](#) i.e. the idea that a **blockchain has to optimize for two out of three features between decentralization, security, and scalability**. Let's look at these one-by-one:

Scalability

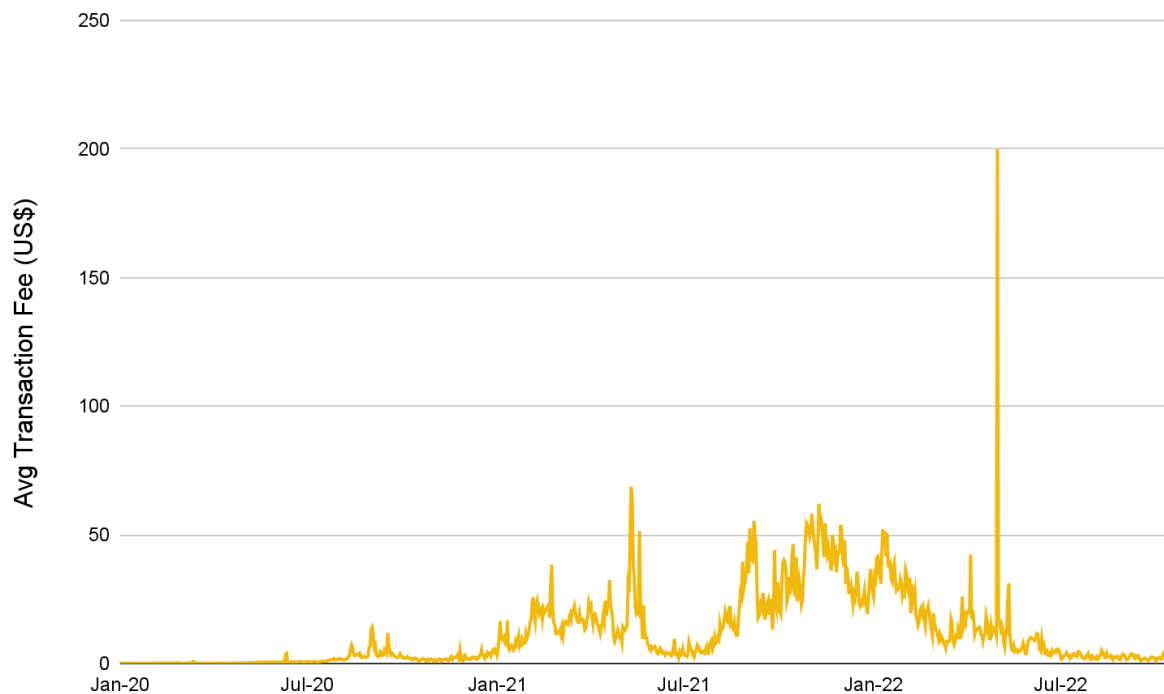
- ❖ What are we talking about? Scalability refers to the ability of a blockchain to maintain performance as the network i.e. users and transactions grow. This is arguably the most important bottleneck that current L1s experience and has been a key focus of builders in the space e.g. the entire Layer-2 sector is primarily focused on improving scalability
- ❖ How are we measuring it? One way to compare scalability is via **throughput**, which refers to the amount of data a chain can handle, typically measured in transactions per second ("TPS"). We can also look at **latency**, which is the amount of time it would take for a chain to perform an action i.e a transaction. The table on the following page shows how current L1s rank against Aptos and Sui, and further contextualizes the current market. As we can see, **Solana has been in a leading position** in terms of these metrics. However, we should also note - **Solana has had outages at least nine times in the last year**. Thus, a key test for Aptos and Sui will be to not only exceed on TPS and latency metrics, but also to prove that they can maintain constant uptime

Figure 3: Aptos and Sui aim to take blockchain scalability to the next level

| Blockchain | | Time to finality | Max TPS |
|--|------------------|----------------------------------|--|
|  | Aptos | <1s | 160,000 |
|  | Sui | 2-3s | 120,000 |
|  | Solana | 2.34s - 46s (different tests) | 120,000 (710,000 on a 1 GB network) |
|  | Avalanche | 0.15s (record) 1.3-3.4s | 4,500 per subnet |
|  | BTC | 60m (6 confirmations) | 7 |
|  | BNB Chain | 1s (1 confirmation) | 160 |
|  | Ethereum | 78s (6 confirmations) | 45 |

Source: Pontem Network, Company Websites

- ❖ We should also make note of the current issue of **transaction fees** (used interchangeably with “gas” throughout this report). Transaction fees, on Ethereum in particular, have been known to spike rapidly in times of higher activity, going up to thousands of dollars per transaction. **Spiking gas fees have been a critical factor in preventing further blockchain adoption, making it a key vector that Sui and Aptos will seek to tackle** with their designs

Figure 4: Average Ethereum gas fees are far from the level needed for mass adoption

Source: Etherscan.io

As of 17 Oct 2022

What are Aptos and Sui doing to improve it?

- ❖ Judging by our research so far, this is really the key factor that both blockchains are focused on and have centered large parts of their marketing around
- ❖ **Sui and Aptos both rely on parallel execution** to promise a higher TPS and lower latency than most competitors
- ❖ For **Aptos**, the key to this lies in their **Block-STM execution engine**, which allows the chain to handle multiple complex transactions concurrently. Aptos also **separates all the different parts of a transaction into individually parallelizable stages** - further improving latency
- ❖ For **Sui**, the parallel execution is possible due to their **dual-execution model**, which allows for independent transactions to bypass consensus and have near-instant finality. On top of this, **Sui also implements a novel transaction fee design which allows for stable gas prices** for every 24 hour period and also introduces localized fee markets, which would mean that any transaction fee effects from a major spike in activity, say due to a hot NFT drop, could be isolated to its own market
- ❖ We will explore these features in more detail later in the report

Security

- ❖ What are we talking about? The crypto ecosystem consists of a series of interoperable protocols, powered by underlying smart contracts. There are various layers in the so-called “stack”, and there are unique vulnerabilities at each stage. Some potential exploits are general i.e. social-engineering attacks gaining access to user private keys, whereas other exploits might be highly technical and blockchain-specific e.g. re-entrancy attacks

Figure 5: Hackers can use a variety of techniques to exploit different levels of the L1 stack

| Vulnerability Stack | Example Techniques |
|-------------------------|--|
| Ecosystem | Flashloan Oracle Attack Flashloan Governance Attack |
| Protocol | Access Control Exploit Deposit Logic Exploit |
| Smart Contract Language | Re-entrancy Attacks Arithmetic Overflow |
| Infrastructure | Compromised Private Keys DNS Spoofing |

Source: The Control

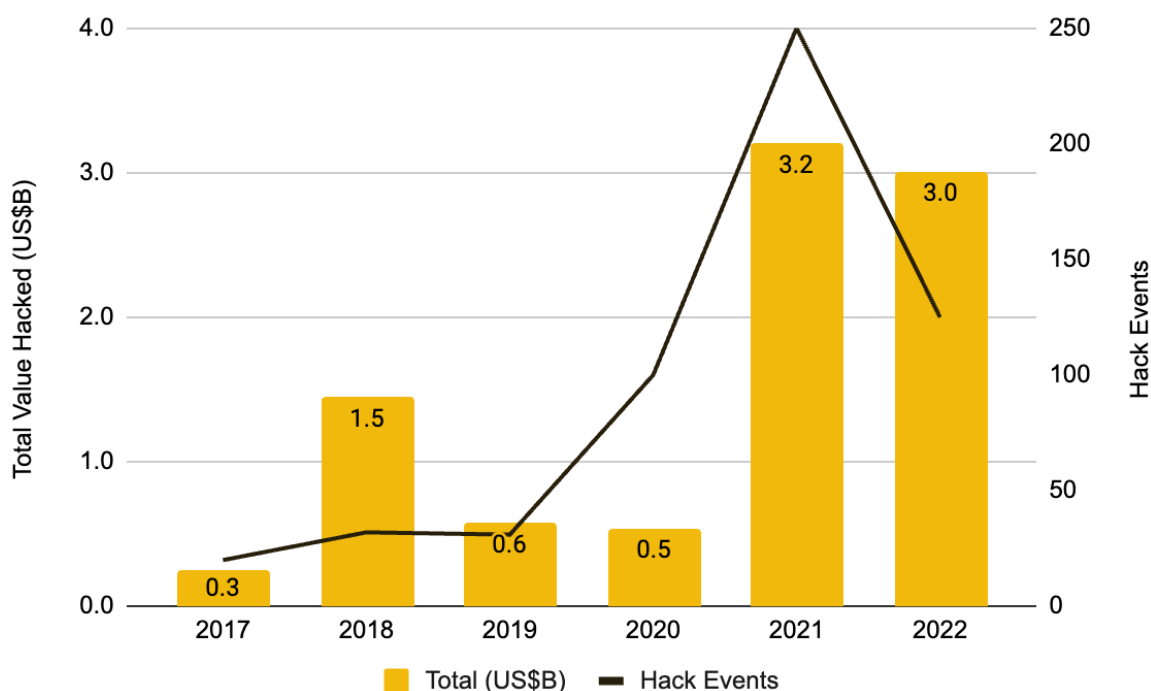
- ❖ How do we measure it? We can look at recent hack and exploit data to get an idea of how things have been progressing from a L1 security perspective. The clear takeaway here is that **hacks and security incidents within blockchains have been growing**. In fact, Chainalysis recently declared October 2022 as the worst month for hacks in crypto history within the first two weeks of the month
- ❖ The **driver for this increase is partly organic** as the market expands and more sophisticated actors enter the market and develop an incentive or find an avenue to exploit. There **might also be a structural flavor to the increase in exploits**, whereby, as the industry grows and less-experienced developers attempt to deploy smart contracts, there is a greater chance for a vulnerability to emerge. There is also the matter of the **programming language used**, i.e. the fact that the majority of smart contracts are written in Solidity (used for Ethereum / EVM-chains) and Rust (Solana), and neither language is particularly accessible to less experienced developers



What are Aptos and Sui doing to improve it?

- ❖ **Implementing the Move programming language**; the new programming language developed for Diem and now being utilized by both Aptos and Sui, **has been designed specifically with security in mind**. The language has various native security features, perhaps because it was originally designed to back a global currency that would serve billions of users. One **key feature is the Move Prover (“MVP”), which is a tool that can help developers formally verify smart contracts** that they have written in Move. We explore this and some of its features below in the next section
- ❖ Additionally, **Aptos has been vocal in stating its focus on upgradeability**, and this means that Aptos is expected to be rapid in the deployment of the latest safety technology
- ❖ It will be interesting to see the effects these changes will have in terms of exploits, and we look forward to monitoring the data as both of these chains go live

Figure 6: Blockchain security incidents have been on the rise, with 2022 numbers on track exceed 2021 well before year-end



Source: Chainalysis
As of 12 Oct 2022

Decentralization










- ❖ What are we talking about? Decentralization refers to the distribution of power and authority in a system or network. There are two key factors to note here:
 - **(1) Decentralization matters on multiple different layers** e.g. decentralization on the infrastructure layer vs decentralization on the blockchain layer. In practice, what this means is that, while a L1 might have thousands of nodes conducting independent validation, the transactions may have to go through a handful of centralized relay providers i.e. an L1 might have different degrees of decentralization across its various layers
 - **(2) Decentralization is a spectrum - it is not binary, nor single-dimensional.** There is no one correct number of validators or mining pools - it is a matter of discussion and crypto projects make different sacrifices to optimize for different goals
- ❖ How are we measuring it? Given Sui is still in testnet, and Aptos has very recently launched,, it is not possible to compare decentralization on an infrastructure level or performance level. However, on a blockchain level, one way we can measure relative decentralization is via hardware requirements to run a validator node. The hardware requirements are a major driver of **the distribution and number of independent node validators** (as a reminder, these are the parties that are processing transactions on the chain) and can be a significant determinant of relative decentralization



What are Aptos and Sui doing to improve it?

- ❖ Both **Aptos and Sui seek to reduce these barriers by lowering hardware requirements** (especially compared to one of their major competitors; Solana)
- ❖ Sui in particular stands out here, and tops our list among the major L1s. Both Aptos and Sui hope that their requirements are able to **attract more independent and unconnected validators to help secure the respective networks.**

Figure 7: Sui ranks top in terms of lowest hardware requirements among major L1s

| Blockchain | | CPU Cores | RAM (GB) | Storage (GB) |
|---|------------------|-----------|----------|--------------|
|  | <i>Sui</i> | 2 | 8 | 50 |
|  | <i>Polkadot</i> | 4 | 16 | 1000 |
|  | <i>Ethereum</i> | 4+ | 16+ | 1000+ |
|  | <i>Cosmos</i> | 4 | 32 | 500 - 2000 |
|  | <i>BNB Chain</i> | 8 | 16 | 1000 |
|  | <i>Avalanche</i> | 8 | 16 | 1000 |
|  | <i>NEAR</i> | 8 | 24 | 1000 |
|  | <i>Aptos</i> | 8 | 32 | 1000 |
|  | <i>Solana</i> | 12 | 128 | 1500 |

Source: Company websites

Aptos

Aptos is a recently launched proof-of-stake (“PoS”) blockchain that aims to solve the scalability and safety issues that are prevalent in the current L1 space. Aptos’ whitepaper communicates that the blockchain has been “designed with scalability, safety, reliability, and upgradeability as key principles”⁽¹⁾, and this is certainly in line with what Binance Research has found. Aptos’ vision is to bring blockchain to the masses and to facilitate this, Aptos Labs wants to build an architecture that supports frequent and fast adoption of the latest technology and moves in line with innovation at the dApp level.

The Aptos blockchain consists of a **modular architecture that is flexible and supportive of frequent upgrades**; a key design feature of the chain made in order to ensure rapid adoption of the latest technology, as well as real-time, high-quality support of emerging blockchain use cases. In terms of the actual processing, the **Aptos chain is made up of a set of validators that jointly process transactions using a byzantine fault-tolerant (“BFT”), PoS consensus mechanism.** As with other PoS blockchains, Aptos token holders can stake their tokens with their selected validator(s), with each validator’s consensus voting weight being proportional to the amount staked with them. It also implements a system of rapid validator rotation, determined by stake-weight, in order to **optimize performance and help push for the organic decentralization of Aptos.** In practice, this means that validators should be in a state of flux, rather than operating in a slow and static manner, as has been characteristic of other chains.

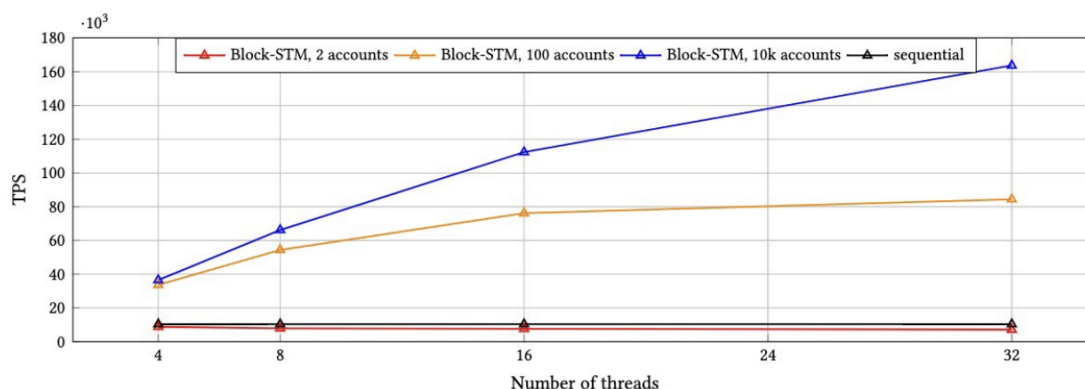
Having gone through four ‘Aptos incentivized testnets’ (“AITs”), where they thoroughly tested the network and got developers up to grips with the chain, Aptos very recently launched their [mainnet](#).

Key Points

- ❖ **Aptos utilizes the Move programming language...** Move is a new Rust-inspired programming language that has been designed specifically for smart contract development. It was built with **safety as a core principle** and Aptos natively integrates the language to allow for fast and secure execution. Move features the **Move Prover (“MVP”), which is a formal verifier** and is able to verify the functional correctness of a Move program against any given specification - helping developers to **write more trusted and secured code.** Furthermore, Move’s design also prevents issues such as reentrancy vulnerabilities; very beneficial given the popularity of this type of attack

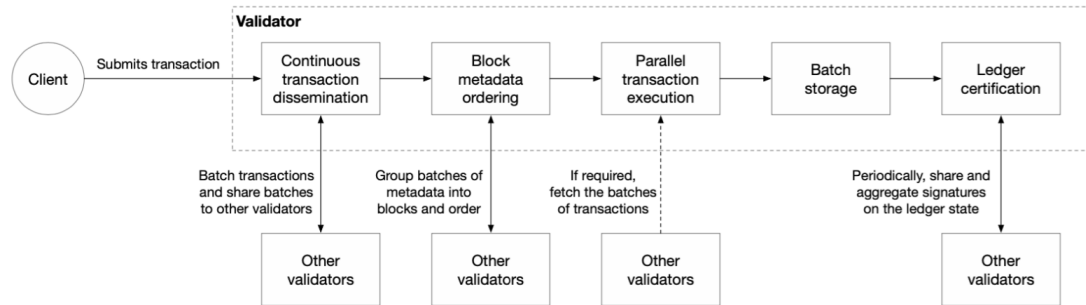
- ❖ **Aptos uses parallel execution...** rather than sequential (i.e. one-at-a-time) transaction execution. It achieves this via both a parallel data model and a parallel execution engine. In terms of data, the Move data model and Aptos concepts, such as *delta writes*⁽⁶⁾, means that significant amounts of transaction processing can be done in parallel. Regarding the engine, Aptos' novel **Block-STM execution engine** allows for optimistic concurrency control and uses a multi-version data structure to avoid conflicts, which, alongside other technical features, allows the engine to support a large number of complex transactions concurrently. Ultimately, these features **allow Aptos to reach previously unseen levels of throughput**, and initial test runs show the chain exceed 160k TPS

Figure 8: Early Block-STM execution runs are promising



Source: Aptos Whitepaper

- ❖ **Independent Transaction Flow improves speed and targets upgradability...** Aptos employs a novel parallel transaction processing flow, separating each component into independent and individually parallelizable stages. This helps maximize throughput and low latency and means that the chain is able to leverage all physical resources in an extremely efficient manner, while also reducing complexity. This structure also **supports quicker development and upgradability, as changes can be targeted to individual modules, rather than the entire system**

Figure 9: Aptos treats all stages of transaction processing as independent

Source: Aptos Whitepaper

- ❖ **Aptos stores its configuration on-chain...** this is somewhat unique among competitors and means that each validator has the ability to automatically synchronize with the most up-to-date and correct configuration of the chain. Practically, this provides a **seamless and extremely quick method for upgrades and is another way that the Aptos team targets quicker development cycles**
- ❖ **Safe User Experience...** Aptos accounts support **private key rotation**, new **hybrid options for custody** and **native key recovery services**. Without going into too much detail, these features are expected to provide previously unseen levels of private key safety and security.
 Aptos also provides **pre-execution services, which are precautionary measures that describe to users the outcomes of the transaction they are about to sign, prior to them signing it** - again providing another safeguard against fraud. The key feature to note is that **these services are provided on-chain**, as opposed to many wallets which support key recovery schemes on an off-chain basis. Having all of this on-chain provides **full transparency of all key-related operations on the Aptos blockchain** and means that each wallet does not have to implement its own novel key management system, but can utilize what Aptos has already built on the base layer
- ❖ **Aptos utilizes timestamps...** Aptos adopts an approximate, agreed-upon, physical timestamp for every proposed block, and thus, all transactions within such block. This enables many use cases e.g. the on-chain timestamp can help correlate data that oracles provide or help in auditing transactions etc.

Team and Fundraising

Aptos was founded in 2021 and is based in Palo Alto, California. Mo Shaikh and Avery Ching co-founded the company behind the project, Aptos Labs, and currently serve as CEO and CTO, respectively. Current LinkedIn⁽²⁾ numbers show a headcount of 74 people at the company, most of whom are based in the US.

In terms of fundraising, **Aptos Labs has raised \$350m across two notable funding rounds this year.** Notable participants include Binance Labs, Multicoin Capital, FTX Ventures, Jump Crypto, as well as TradFi giants, Apollo Global Management and Franklin Templeton.

Ecosystem

Aptos has over 150 projects currently building on it, with estimates of over 200+ by some parties. This includes a complete set of ecosystem projects, all the way from wallets like Petra and Martian, to DeFi protocols such as Econia and Aries Markets. Notable recent announcements include the initial deployment of cross-chain bridge, Wormhole, and the oracle project, Pyth, Aptos, as well as the integration of interoperability protocol, LayerZero.

To incentivize projects, **Aptos also has a grant program⁽³⁾**, which has been open since June, and offers non-dilutive USD funding to project teams working on accelerating the growth of the ecosystem. Thinking about Aptos' focus on user accessibility and security, a collaboration⁽⁴⁾ between Aptos Labs and Aptos Names (an Aptos-based naming and identity service) is worth a mention. This collaboration means that **users will be able to use their “.Aptos” address, instead of a private key, across many of the major dApps on the ecosystem from day one.**

[illegible]

17

Sui

Sui is an upcoming permissionless and highly scalable [PoS](#) L1 blockchain being released by the team at Mysten Labs. Sui uses a novel **object-centric architecture** in order to offer **horizontal scalability**, which it believes is the key to onboarding the next billion users in Web3.

The founders of Mysten Labs looked at the current L1 market and realized that typical blockchains were fundamentally unscalable as they relied on consensus for every transaction, despite most transactions having nothing to do with each other. Sui bypasses this inefficient model, and offers the next level of scalability by allowing causally independent transactions to reach **parallelized agreement** via Byzantine Consistent Broadcast. This eliminates the overhead cost of a global consensus mechanism and provides a path to horizontal scalability without limits. **Simple transactions bypass the Sui consensus protocol and can be executed instantly, without waiting for the entire validator set to reach consensus.** More complex, so-called *complex transactions*, go through the usual [BFT](#) consensus validation. Sui uses a Narwhal⁽⁵⁾ consensus protocol for these transactions, which further has an extremely high-throughput data availability engine and a scaled architecture.

Theoretically, this means that **Sui scales with no upper bound and can accommodate extremely low latency due to many transactions forgoing full consensus and being executed via parallelized agreement.** In practice, this means that to accommodate a spike in blockspace demand, you can add additional resources at the validator level, and essentially meet demand with supply as and when required. Due to the economic nature of Sui (discussed below), validators are incentivized to increase the capacity of the network, while also penalizing those who overcharge on fees. In practice, this **opens up the possibilities for a number of new latency-sensitive use cases** e.g. gaming or retail payments, where operators are currently affected by extremely unpredictable transaction costs and worry about whether the underlying infrastructure will be able to keep up with their growth. Sui seeks to solve this and provide a place for developers to take their dApps to the global stage.

Key Points

- ❖ **Sui uses an object-centric design...** the basic unit of storage on the Sui platform are *objects*, which can be any type of digital asset, including both fungible and non-fungible tokens. This differs significantly from traditional blockchains, which are based on addresses. The object-centric design and the ownership types defined in Move mean that transaction dependencies are explicitly coded into *objects* and this means that

many of the transactions can be processed in parallel. **This is the reason that simple transactions can bypass consensus and have near-instant finality.** This also means that games and other use cases that require transactions be instantly complete can be processed at extremely low latency, and more use cases can be enabled

- ❖ **Sui implements horizontal scalability...** because Sui's object-centric nature enables significant **transaction parallelization**, Sui validators are able to scale horizontally through adding more hardware. This means that the **blockchain can withstand spikes in demand and in theory means that Sui can scale with no upper bound.** This provides significant flexibility for the blockchain and the Sui team hopes that this will allow a change of philosophy, from where blockspace is no longer a scarce commodity, but one that is infinite. The **Sui team does not want developers to worry about blockspace as a commodity and seeks to unlock the creativity of builders** who are looking to build for the mass market
- ❖ **Sui implements a localized fee market system...** this means that if a smart contract e.g. a NFT drop is getting extremely popular, **the price of transactions in a localized market can be increased**, without disrupting the global fee market. The object-centric view of Sui makes it easy to do this, as it enables separate validator markets to develop (as not every transaction has to go through full consensus)
- ❖ **Sui implements a novel gas fee mechanism...** which aims to achieve a triple outcome of preventing attacks on the network, incentivizing validators to optimize their services and also providing users with low and predictable transaction fees. Uniquely, users pay separate fees for execution and storage (more on Storage Fees below). Focusing on execution; **reference prices are agreed upon by validators on a network-wide basis at the start of each Sui epoch (roughly 24 hour period)** and Sui users use this as an anchor when submitting transactions. The price setting mechanism⁽⁶⁾ is designed to reward predictable and fair validator behavior, and align incentives between token holders, users and validators
- ❖ **Sui Move differs from Core Move...** Sui modified the original 'Core Move' into 'Sui Move', in order to fully leverage the flexibility of the language and take advantage of the object-oriented architecture of Sui. While the exact modifications are somewhat technical, as a summary, the **changes help to improve parallel execution and make programming easier for developers.** In addition, Mysten Labs has designed Sui Move to enable features such as **human-readable signing requests.** This is a way to prevent users from blindly signing transactions without understanding its effects, in line with

their goal of promoting mainstream adoption

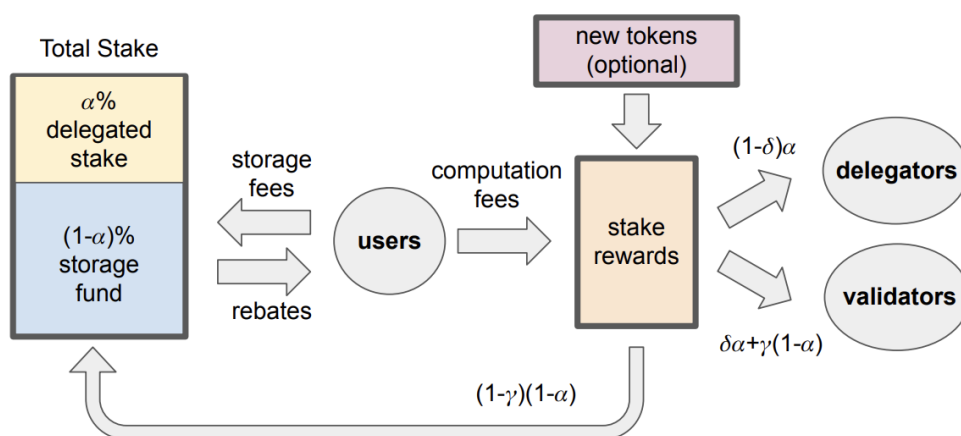
- ❖ **Sui has a Storage Fund ...** as described above, Sui separates Execution and Storage gas fees. Storage fees feed into the Storage Fund which is used **to adjust the share of staking rewards between validators and delegators, depending on on-chain storage requirements and the corresponding higher (or lower) costs**. The fund also includes a “deletion option” which provides users with a rebate for deleting previously stored on-chain data. This introduces incentives for users to delete data whenever storage doesn’t make economic sense. Given Sui’s ability to store large amounts of data on-chain, the storage fee means that future validators and users do not have to subsidize the storage of older transactions and data storage is financed in an efficient and sustainable manner

SUI Tokenomics

SUI is the native asset used to pay for gas for all operations and has a fixed supply of 10 billion tokens. The SUI token serves four key roles in the Sui platform: **Staking/Security, Gas Fees, Governance, and Unit of Account / Medium of Exchange**.

In terms of the economic model, at the start of each *Sui epoch*, Sui holders delegate their tokens to validators and a new validation committee is formed. The reference gas price is then set, and the storage fund’s size is adjusted using the previous epoch’s net inflow. All in all, validators are rewarded for increasing network capacity and being responsive, while unresponsive validators are penalized. The **storage fees also add a potentially deflationary nature to the finite SUI token**, as higher activity and thus higher on-chain data storage requirements will translate into less SUI in circulation.

Figure 11: The SUI Economic Model



Source: Sui Tokenomics Whitepaper

Team and Fundraising

Mysten Labs, the company behind Sui, was founded in 2021 and is based in Palo Alto, California. The company lists five co-founders, including Evan Cheng, Adeniyi Abiodun, and Sam Blackshear, who serve as CEO, CPO and CTO respectively. Current LinkedIn⁽⁷⁾ numbers show a headcount of 76 people at the company, most of whom are based in the US.

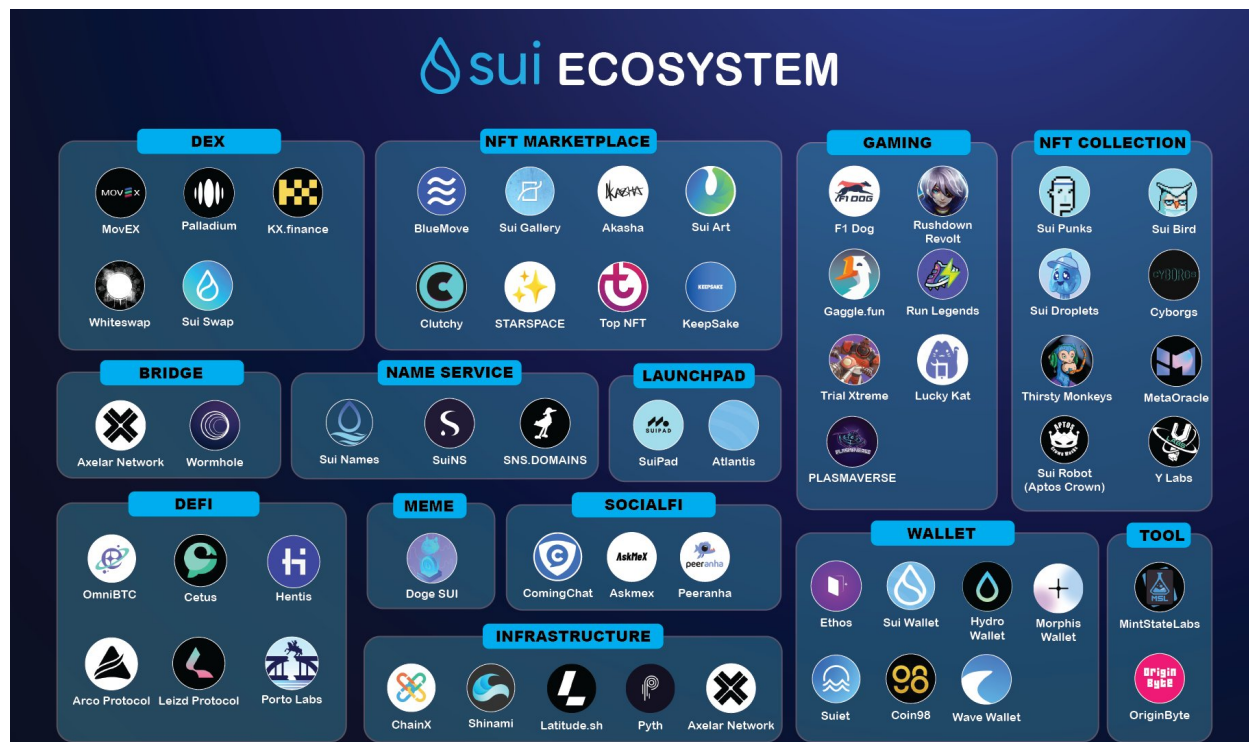
In terms of fundraising, **Mysten Labs has raised \$336m across two funding rounds since December 2021**. Notable participants include Binance Labs, a16z crypto, FTX Ventures, Electric Capital, and similarly to Aptos, the TradFi giants, Apollo Global Management and Franklin Templeton.

Ecosystem

The Sui ecosystem consists of around 60 projects from recent estimations. Notable projects include the in-house Sui Wallet, as well as the Ethos Wallet, and infrastructure provider, Shinami. Mysten Labs' collaboration with Axelar in order to provide cross-chain communication is also worth noting.

While Sui is a general-purpose blockchain; the team has emphasized that they are keen to see the **combination of games, DeFi, and e-commerce dApps on the Sui blockchain** and how its unique L1 technology helps to facilitate true composability between these sectors. They hope to see the next generation of dApps to be built on Sui and see a level of true mass adoption in the next cycle.

Figure 12: Sui's ecosystem is growing rapidly



Source: Sui Insights

What are the similarities between Aptos and Sui?

- ❖ **Both chains use the new Move programming language...** which was developed during the building of the Diem (formerly Libra) blockchain. Given **Move was designed specifically for smart contract development**, as well as its principled focus on safety through integrations such as the **Move Prover** (described in the Aptos section) and **Move-based key management** (a built-in key safety feature), the language could help usher in a new age of blockchain security. While the language **promises a low migration cost for Rust and Solidity programmers**, it will be interesting to see how many developers they can actually attract
- ❖ **Both employ parallel execution and demonstrate high TPS and low latency relative to the current L1 space...** parallel execution, via the **Block-STM engine for Aptos**, or via **Sui's dual-execution object-centric model**, is a key selling point for both blockchains. Testnet / devnet runs for both chains have shown impressive gains on current TPS and latency measures, but the question remains; will these numbers hold up in mainnet when the bull market is in full swing?
- ❖ **Targeting the next billion users...** it is somewhat clear that these teams have emerged out of Meta (formerly Facebook), with how expressive they have both been with regards to reaching the **next billion users**. Both chains have an **intense focus on scalability** and want to generate true user adoption in the next cycle. With the teams' background and focus, we are likely to see this consumer focus manifest in the dApps built on both chains
- ❖ **Top tier VC backing...** over the four major funding rounds across both chains, we have seen some of the **biggest names in the venture capital business participate**. Binance Labs, Jump Capital, FTX Ventures, a16z, and Electric Capital are just some of these names, and the inclusion of Apollo Global Management and Franklin Templeton from the TradFi world is definitely worth noting

What are the differences?

- ❖ **Aptos uses a classic blockchain approach with its address-centric design, while Sui uses an object-centric directed acyclic graph (“DAG”)...** without getting too technical, it should be noted that **Aptos utilizes a traditional blockchain model**, which involves recording transactions by changing data on different addresses. **Sui instead, records transactions by changing the data on its ‘objects’** (previously defined in the Sui section). The data of this ‘object-store’ is then recorded as a DAG. It is this **fundamental difference in how they perceive and process transactions** that has further implications for how the chains work

Figure 13: Alice sending 1 BUSD to Bob will result in two ledger updates on Aptos, but only one on Sui






Source: Binance Research

- ❖ **Transaction ordering & batching...** Aptos uses the classic blockchain method whereby validators order and batch all transactions (whether independent or not) into blocks before recording them onto the single universal ledger. **In Sui, independent transactions do not need to be ordered at all** and can be processed simultaneously (as each object essentially has its own ledger). For ‘shared objects’, those get ordered and go through the Sui Consensus Engine⁽⁸⁾. In practice, this **may provide some improvement in throughput and latency as Sui might avoid ordering 20-40% of transactions**
- ❖ **Sui Move vs Core Move...** Sui uses a modified version of the Move language, dubbed ‘Sui Move’. Sui Move was designed to take advantage of the object-oriented architecture of Sui and improve upon transaction parallelization, as well as improve the developer experience

- ❖ **Aptos ecosystem & community metrics...** at the time of writing, the **Aptos ecosystem is larger** and appears to have more builders on it compared to Sui. In terms of community metrics, Aptos maintains a sizable lead in Twitter / Github stars, whereas Sui beats on Discord numbers. **Perhaps the most important figure, weekly active developers, is roughly similar** between both projects

Figure 14: Current engagement metrics slightly favor Aptos

| Community | | Aptos | Sui |
|---|-------------------|---------|---------|
|  | Twitter Followers | 179,971 | 79,848 |
|  | Discord Members | 109,891 | 130,023 |
| Weekly Active Devs | | 32 | 34 |
|  | Github Stars | 3,923 | 1,738 |

Source: Company profiles / Gokustats
As of 11 Oct 2022

- ❖ **Transaction Storage Fees are handled differently...** Sui uses an economic model where it separates execution and storage fees (allowing for the creation of the previously mentioned Storage Fund). **Sui also incentivizes users to delete objects from the chain through a rebate fee.** Aptos has a more traditional model, whereby transactions are stored on its blockchain forever. However, they **use technical optimizations to reduce storage burdens on nodes, as well as a [Merkle Tree architecture](#)**, further reducing storage requirements. It should be noted that, given these are fresh L1s, **state bloat is unlikely to be an issue for either anytime soon**

- ❖ **Sui has options for localized fee markets, while Aptos uses a global fee market...** this will be an interesting angle to follow, particularly as on-chain activities pick up in volume. While Aptos is to start off with a global fee market, given their focus on upgradeability, we are sure their teams will be keeping a close eye on how localized fee markets develop on their competing project

Outlook

Aptos and Sui are innovative and ambitious L1 projects built by talented teams packed to the brim with expertise from both a technical and product perspective. Some of the best engineers and product professionals in the world have worked on both blockchains and the Move language and it is no surprise that they have been able to raise impressive amounts of capital in the tricky market environment of the last few months.

At this very early stage in both protocols' development, it is difficult and largely pointless to predict who will come out on top. What we can say is that both projects have sky-high goals of billions of users and it will be interesting to monitor whether they have the product to match it. To us, **Sui's unconventional take on blockchains with their object-centric architecture, is a novel way of tackling the issues that we see in the L1 space, and it may very well provide them with a throughput / latency advantage.** It will also be interesting to monitor the functionality of **Sui's localized fee markets** and how this feature may be used in a busier market environment, like large NFT mints for example.

On the **Aptos side, we will keep a close eye on their promise of “upgradeability” and are keen to see how the chain develops and adapts.** The **focus on user safety and auditability (i.e. timestamps)** also piqued our interest and will be something to monitor.

It is important to remember that both **Aptos and Sui are in a very nascent stage** of their development, and any initial advantages may very well erode in a matter of months. What will be absolutely key to the success of either chain is keeping a **strong focus on developer engagement.** This might be anything from organizing dev events and hackathons, to increased development of software development and tooling kits to just having extremely active Discord chat rooms. One other major factor to keep in mind is also **composability.** We are already seeing some existing Web3 projects start to launch on the Aptos and Sui chains and it will be important to see how this progresses, as building ties to the existing blockchain space will undoubtedly be beneficial to both chains.

Whichever way it transpires, one thing is for sure; both Aptos and Sui are highly progressive projects who are pushing the boundaries of L1 technology and we have no doubt that they will help propel the industry forward and towards mass adoption.

References

- 1) <https://github.com/aptos-labs/aptos-core/blob/main/developer-docs-site/static/papers/whitepaper.pdf>
- 2) <https://www.linkedin.com/company/aptoslabs/>
- 3) <https://medium.com/aptoslabs/announcing-the-aptos-grant-program-7654b92e22a1>
- 4) <https://twitter.com/AptosLabs/status/1581075945577803777?s=20&t=RyRAeL4-FUmii5p5v4XC2g>
- 5) <https://arxiv.org/abs/2105.11827>
- 6) <https://github.com/MystenLabs/sui/blob/main/doc/paper/tokenomics.pdf/>
- 7) <https://www.linkedin.com/company/mysten-labs/>
- 8) <https://docs.sui.io/learn/architecture/consensus>

About Binance Research

Binance Research is the research arm of Binance, the world's leading cryptocurrency exchange. The team is committed to delivering objective, independent, and comprehensive analysis and aims to be the thought leader in the crypto space. Our analysts publish insightful thought pieces regularly on topics related but not limited to, the crypto ecosystem, blockchain technologies, and the latest market themes.



Shivam Sharma, Macro Researcher

Shivam is currently working for Binance as Macro Researcher. Prior to joining Binance, he worked as an Investment Banking Associate / Analyst at Bank of America on the Debt Capital Markets desk, specializing in European Financial Institutions. Shivam holds a BSc Economics degree from the London School of Economics & Political Science (“LSE”) and has been involved in the cryptocurrency space since 2017.

Read more<https://research.binance.com/en/analysis>**Share your feedback**<https://tinyurl.com/bnresearchfeedback>

General Disclosure: This material is prepared by Binance Research and is not intended to be relied upon as a forecast or investment advice, and is not a recommendation, offer or solicitation to buy or sell any securities, cryptocurrencies or to adopt any investment strategy. The use of terminology and the views expressed are intended to promote understanding and the responsible development of the sector and should not be interpreted as definitive legal views or those of Binance. The opinions expressed are as of the date shown above and are the opinions of the writer, they may change as subsequent conditions vary. The information and opinions contained in this material are derived from proprietary and non-proprietary sources deemed by Binance Research to be reliable, are not necessarily all-inclusive and are not guaranteed as to accuracy. As such, no warranty of accuracy or reliability is given and no responsibility arising in any other way for errors and omissions (including responsibility to any person by reason of negligence) is accepted by Binance. This material may contain 'forward looking' information that is not purely historical in nature. Such information may include, among other things, projections and forecasts. There is no guarantee that any forecasts made will come to pass. Reliance upon information in this material is at the sole discretion of the reader. This material is intended for information purposes only and does not constitute investment advice or an offer or solicitation to purchase or sell in any securities, cryptocurrencies or any investment strategy nor shall any securities or cryptocurrency be offered or sold to any person in any jurisdiction in which an offer, solicitation, purchase or sale would be unlawful under the laws of such jurisdiction. Investment involves risks.