



Avalanche Q1 Overview

Full Qualitative and Quantitative Overview of Avalanche for the first quarter of 2023

Key Points:

- Continuing to push forward on establishing meaningful partnerships across various sectors, Avalanche is positioning itself for a future that sees Web2 and Web3 come together as one. With its release of the HyperSDK framework, the exciting partnership with TSM, the increased development of Core and a variety of huge wins across the DeFi / Gaming / NFT sectors, Avalanche looks primed to tackle another bull market.
- With strong metrics across everything from DeFi TVL to daily active users, Avalanche usage has stabilized and continues to grow in volume on a month over month basis.
- Expanding developer access to resources and new solutions allows for the creation of more advanced decentralized applications and networks within the unified Avalanche Network.

Introduction to Avalanche:

Brief Avalanche Primer

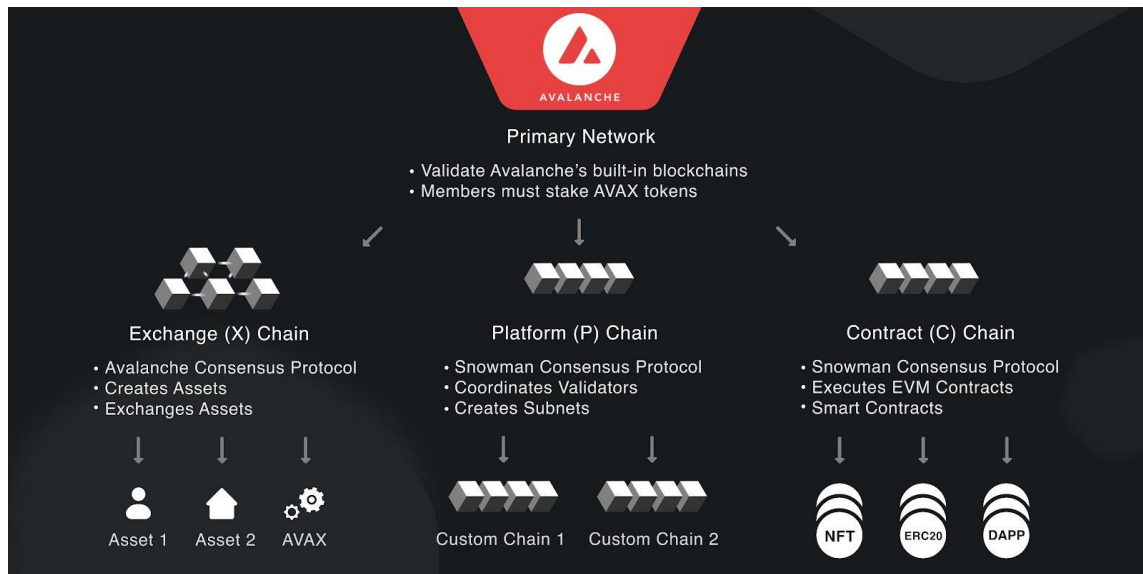
Avalanche is a highly scalable, interoperable alternative layer one blockchain offering users and developers a unique experience through its innovative subsampling consensus model and subnet system designed with scalability in mind.

Using a PoS model and offering EVM compatibility, Avalanche has been able to succeed in becoming one of the most widely used and highly regarded alternative layer one blockchains over recent years. Continuing its efforts through the recent crypto downturn, Avalanche has retained a large number of users and has an exciting developer community building out new products and experiences for users of all backgrounds.

With a current TVL of almost \$1.7 billion and a circulating market capitalization of over \$5.3 billion, Avalanche has become a household name amongst the broader cryptocurrency community. Going forward, Avalanche will continue its efforts in expanding the developer experience and making it easier for new applications to integrate into the Avalanche ecosystem. The purpose of this report will be to cover everything happening within the Avalanche ecosystem, the merits of Avalanche's mechanism design and everything in between related to Avalanche's performance.

Avalanche Consensus Architecture Overview

Beginning with its novel consensus mechanism, Avalanche identifies itself as a heterogeneous blockchain due to its use of a Primary Network and the various subnetworks (referred to as subnets) that make up various other validator groups within the Avalanche unified network. Avalanche's Primary Network consists of three other parts: the Contract Chain (C-Chain), Platform Chain (P-Chain) and Exchange Chain (X-Chain). Because Avalanche is a PoS blockchain, validators must stake their AVAX tokens to participate in validation, in addition to their required validation of the three other chains that manage some of Avalanche's core functionality. Here's an image of this relationship that makes it a little easier to understand:



The C-Chain uses the *Snowman Consensus Protocol*, an implementation of the Avalanche Consensus Protocol. The C-Chain uses an implementation of the EVM and handles the responsibility of executing EVM-based smart contracts and managing Avalanche smart contracts. The P-Chain also uses the Snowman Consensus Protocol, managing the operations of validators within the network and the creation of subnets. The X-Chain's responsibilities include the creation and exchange of Avalanche Native Tokens, these being assets that have specific rules and mechanisms to govern their behavior. With the coming Cortina Update, the X-Chain will soon be able to use Snowman++ which will allow for every blockchain under the primary network to utilize Avalanche Warp Messaging. An example of an Avalanche Native Token is AVAX, this being the primary fee token on the Avalanche Network.

The Avalanche Consensus Protocol is described as scalable, robust, and decentralized - let's examine it and see how it's able to achieve these desirable features, in addition to its low latency and high-throughput. Avalanche is able to run on almost any commercial hardware, stating in its documentation that validators aren't required to own any "special" or highly expensive computer hardware that other blockchains might require. This removes a high barrier to entry for many users, allowing the average blockchain user to boot up their computer, stake some AVAX and immediately become part of a highly distributed system.

Given the support of a “sufficiently large portion” of validators, the main validator takes the majority opinion and agrees to do whatever they agreed upon. This could be the confirmation of the initial transaction or a conflicting one - the honest majority’s view wins out.

One of the Avalanche Consensus Protocol’s core features is its use of sub-sampled voting, a process where validators query other subgroups of validators for their preferences regarding the confirmation of a pending transaction. Due to the fact that most blockchain transactions are harmless and fit within the provided framework of an honest transaction, conflicts are few and far between. This makes finality occur extremely fast, giving credit to the team’s claims of fast finality. In practice, Avalanche transactions are generally finalized in under one second.

While many in the cryptocurrency space debate almost every blockchain’s personal claims regarding actual TPS and state that paper projections rarely work out in reality, there is little any blockchain can do should dishonest transactions arise. Responsibility is placed on the validator set to do good work and ensure honest actors remain protected on the network, the system can only do as well as it’s been created. In instances where conflicts occur over transactions, validators cluster around these controversial transactions and enter into what’s described as a positive feedback loop that continues until an alternate transaction is proposed or the original transaction is accepted.

Exploring Avalanche Subnets and VMs

Avalanche is an EVM-compatible blockchain, but this isn’t the only option for developers. With a variety of options and functionality for custom VMs, Avalanche is extremely composable and allows developers to build out specific VMs for whatever purposes or needs may arise. We’ve already mentioned that Avalanche utilizes three distinct blockchains but Avalanche also consists of three VMs that validators of the primary network *must* validate. The C-Chain uses the Coreth VM, the P-Chain uses the Platform VM and the X-Chain uses the Avalanche VM. This is all fairly self-explanatory, but it’s worth mentioning as the various working parts within Avalanche that come together is what makes the blockchain’s architecture so unique.

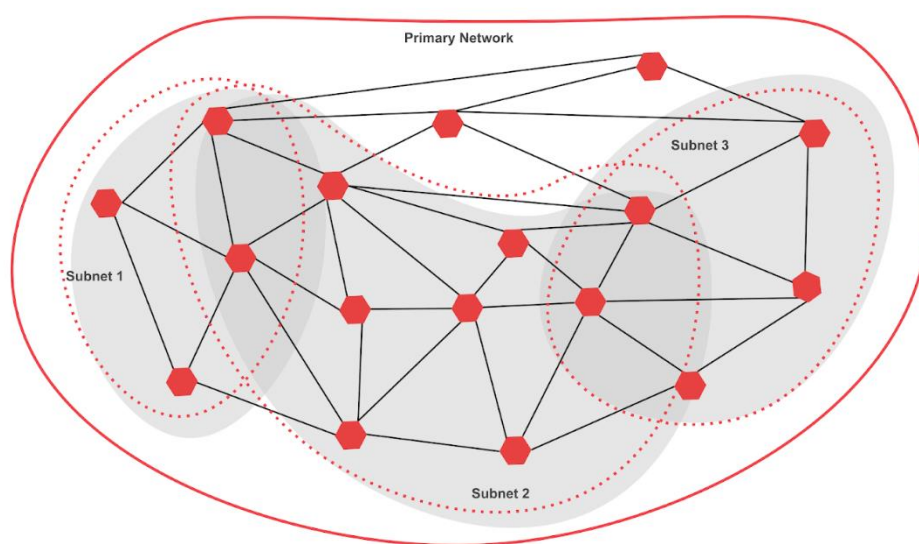
The opportunity to implement and expand upon so many different variations of VMs is a huge value proposition for Avalanche, with [this list](#) (via Avalanche Documentation) showing just how creative developers can be in any situation. Within this documentation, Avalanche lays out a variety of reasons for why one might choose to build a custom VM for their subnet instead of opting for the EVM directly.

In addition to the customizability of VMs, Avalanche subnets are also extremely customizable, with the team stating that custom fee tokens, higher throughput, stricter control and even customization of the EVM all being reasons a team might choose the subnet path over other methods of deploying to Avalanche. Let’s explore the benefits of a subnet and what they provide that sets Avalanche apart from its peers.

An In-Depth Look at Subnets

The basics of subnets have already been covered, but there's more than meets the eye and the benefits of subnets are numerous. Developers can choose to customize their token economics, regulatory compliance and even hardware requirements. For example, a team looking to build an Avalanche subnet might choose to use their very own gas token with tokenomics differing from the native AVAX token, require that validators meet a minimum threshold for RAM or CPU power and even choose to restrict validators by their geographic location.

While some of this isn't always applicable in practice due to the already small number of individuals looking to run a validator, the opportunity and infrastructure has been set in place for whenever the crypto industry might expand. Here's an image of the basic relationship between subnets, keeping in mind each subnet's responsibility to validate the *primary network*:



The most well-known example of a subnet being created occurred in April 2022 when the popular Harmony One protocol DeFi Kingdoms created its very own Avalanche subnet. This move was the culmination of hard work from the Avalanche team in marketing its blockchain as a potential hub for the on-chain games that might come to dominate the space and the huge spike in activity DeFi Kingdoms had brought to Harmony One. DeFi Kingdoms was able to attract enough attention that it made more sense to become an application-specific blockchain, with rules and parameters created based on the requirements of DeFi Kingdoms.

Another example of a successful subnet is the Dexalot Subnet, which has processed over 2.5 million transactions across 1.8 million blocks in the last year. This subnet was created to offer users cheaper transactions, improved liquidity and of course, the increased speed associated with subnets. The Dexalot Subnet is able to interact with multiple blockchains with its subnet architecture, a step up from the past in that Dexalot is able to keep its users' funds on the same chain as they trade. Through the creation of a subnet, Dexalot has been

able to implement more complex operations and features to the subnet, all while improving the user experience. To find out more about Dexalot's coming plans and additional info on their thought process in creating a subnet, [follow the link to this Medium article](#).

While most protocols across DeFi are still generally found on the chain they are deployed on, a large number are considering moves that would cement them as application-specific blockchains. This would effectively put control into their hands, allowing for increased revenues back to the protocol and a better user experience with the previously mentioned customizable parameters. Crypto has already begun to witness a shift in the number of protocols who are building "walled gardens" to accommodate their specific needs. To give a relevant example, applications that utilize orderbook-based models face a significant disadvantage without their own application-specific blockchain or sovereign environment.

Modularity is an important discussion with the looming possibility of mass crypto adoption - subnets are a built-in system designed to help applications scale with familiar software development stacks. Allowing developers to use familiar programming languages and frameworks with the added benefit of EVM compatibility provides a huge incentive to deploy a subnet in the Avalanche network.

Elastic Subnets

The discussion around subnets alone is complex and exciting enough on its own, but the creation of elastic subnets has led to even more interesting capabilities for developers. An elastic subnet is able to enable PoS validation with their own native subnet token. This would allow for any user to validate a subnet of their choice, all while only staking the native subnet token. Despite elastic subnets still being relatively new, their implementation will help further decentralize the network and improve security over time as more are deployed.

Avalanche Warp Messaging

As more subnets are developed and the number of users transacting between subnets increases, it's worth exploring the performance and analysis of Avalanche Warp Messaging (AWM). AWM allows for the communication between two blockchains operating on different subnets, all without the need for a bridge or for the opportunity for multiple chains to compete with each other over finite network resources. AWM is able to achieve this because every subnet is required to validate the primary (or overarching) network, allowing each subnet to view staking weights / BLS public keys. Because each subnet is able to retrieve this information much more efficiently, communication is enabled as it's very simple for each subnet to do so.

Native communication is a huge step in expanding the infrastructure, as this allows for Avalanche to throw its hat into the scalability ring and stand toe-to-toe with alternatives like Cosmos' IBC and Ethereum's L2s / L3s. If a web of subnets possessing native communication can scale infinitely without the trouble of network constraints, this poses itself as an equal solution to the fabled blockchain trilemma.

An Analysis of Avalanche's Performance:

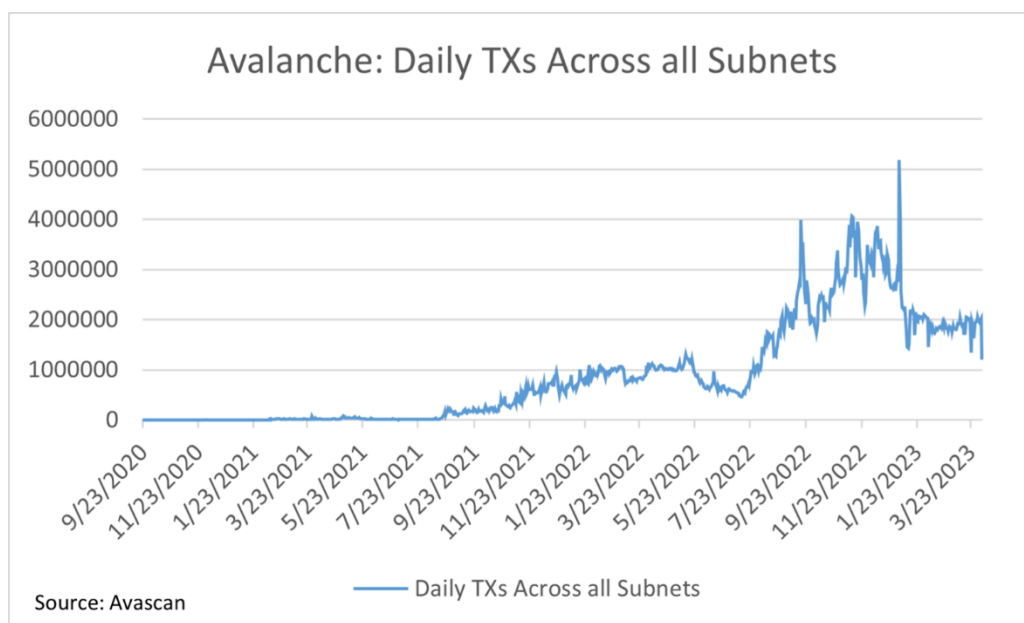
Overview of Key Metrics

Moving beyond the architecture of Avalanche, let's take a quantitative look at the blockchain's performance recently and see how they're doing since inception, taking a look at everything from daily transaction count to average blocktime.

Daily Active Users and Transactions:

Comparing Avalanche to some of its peers, we're able to see that blockchains like Ethereum, Binance Smart Chain and Polygon - while possessing larger total address numbers - have not been attracting *new* addresses at the same rate as Avalanche. Looking at these numbers, we see that on a MoM basis, Avalanche has generally 50% of its user count composed of new addresses, with Ethereum, Binance Smart Chain and Polygon all sitting at a 10-20% rate.

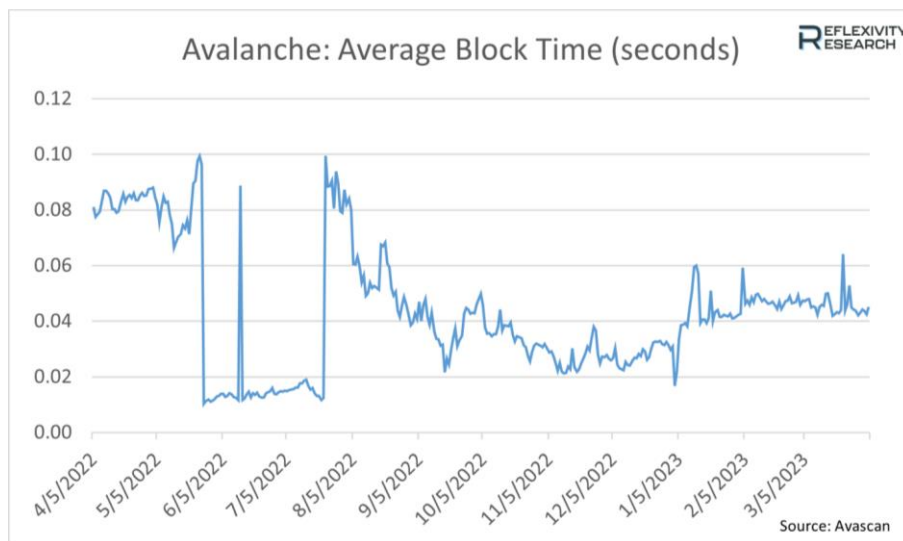
Avalanche has been able to reach a cumulative transaction count of over 223 million transactions, all of this occurring since early 2021 when the usage of Avalanche began to take off. According to Dune Analytics, Avalanche first hit 10,000 cumulative transactions at the end of May 2021 before daily active users, DeFi TVL and bridge users began to grow rapidly.



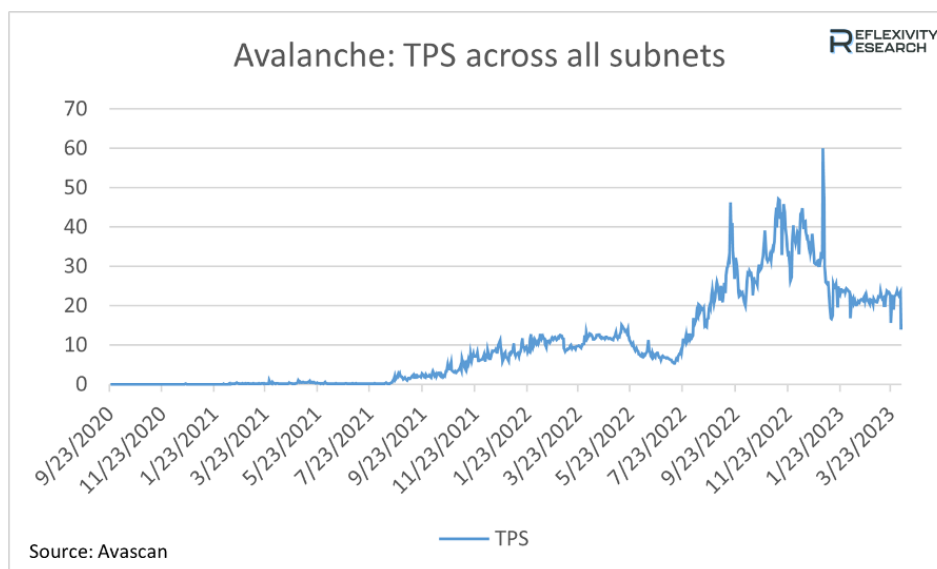
In 2023 alone, Avalanche achieved a cumulative DEX volume of over \$6.25 billion, this number being slightly down from previous highs due to the aforementioned crypto downturn and general decline in on-chain activity across L1s and L2s alike. Despite this downturn, Avalanche's metrics give merit to its diverse ecosystem of applications and the growing popularity of protocols like Trader Joe, Benqi and Platypus Finance.

Blocktime Stats:

Based on recent analysis and the metrics given on AvaScan, Avalanche has an average block time of about 0.05 seconds, give or take. Historically, this number was much higher but managed to stabilize after the network ironed out issues early on. The average blocktime of Ethereum stands at about 12 seconds, though this number has also decreased by about 25% since 2018. The importance of blocktime comes from the fact that when users send a transaction in and it gets added to a block, the outcome of this transaction depends on how fast it can get included. Nothing is instant, and if blockchains wish to compete with legacy systems in everything from centralized order books to high traffic video games, the average blocktime must continue to come down.



It's worth noting that while blocktime is very much a constant point of contention in the crypto community, time to finality is more relevant for Avalanche as blocktimes are variable and dependent on network activity / user demand. Avalanche's time to finality is a more appropriate metric to examine, as these times are more representative of performance. On average, Avalanche offers a time to finality of less than one second through its use of sub-sampled voting as discussed in the previous section.

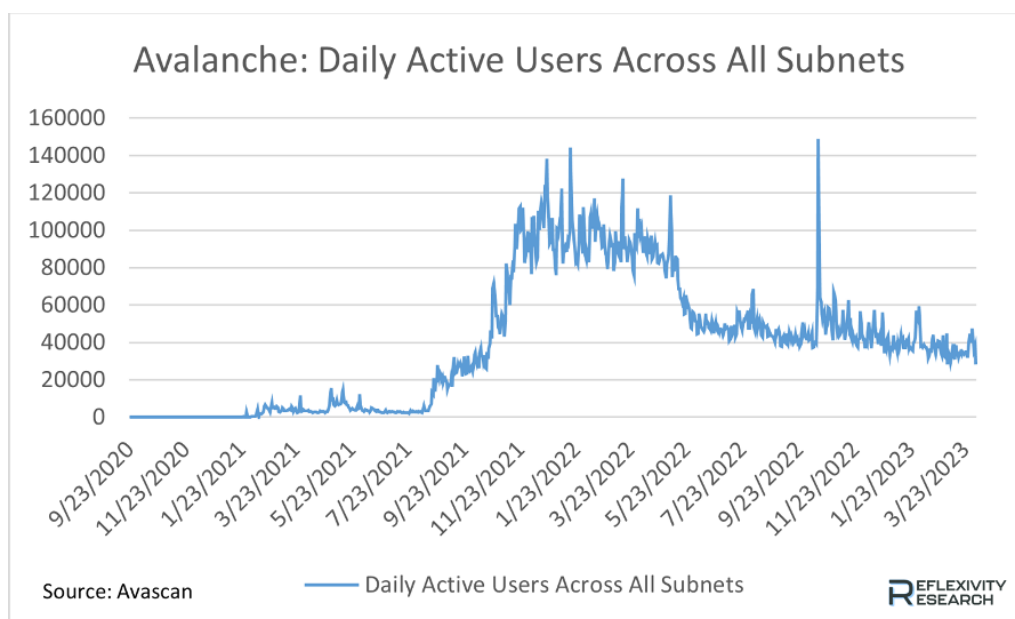


AVAX Stats:

According to AvaScan, almost 63% of all AVAX in circulation is staked and currently earning a yield of 8.49%. While these numbers fluctuate, comparing Avalanche's staked AVAX (sAVAX) count to other blockchains is fairly interesting. Arguably the biggest example of decentralization and one of the blockchains constantly referred to in the staking debate, Ethereum has about 15% of its circulating supply staked, though this represents a much larger number in notional value. Because of the large number of staked AVAX, Avalanche is a fairly decentralized blockchain and offers an attractive yield for those looking to enter the ecosystem in a more formal way.

DeFi Overview:

Looking at Avalanche's current DeFi TVL and user base, they've done a fairly good job at retaining both users and TVL despite the dwindling opportunities available for on-chain market participants. Since the collapse of FTX, Three Arrows Capital and various other large entities, the availability of attractive yields and enticing new protocols has fallen off a cliff, though this hasn't stopped developers from continuing their building on Avalanche and the increased number of integrations present within DeFi.



While this chart displaying daily active users on Avalanche shows a slight drop-off in the user base, the reality is Avalanche has retained a still significant portion of its users and recent developments may bring in more of them. As DeFi has evolved in the face of centralized DeFi's collapse, the growth of a truly multichain crypto system has become more of the norm instead of the pipe dream it once seemed like. One of Avalanche's largest protocols, Trader Joe, recently announced its integration with the popular Ethereum Layer 2, Arbitrum. Trader Joe has been able to accumulate over \$125 million in TVL thanks to its unique "liquidity book" model that stands out as a competitor to the dominance of Uniswap V3's concentrated liquidity.

With Trader Joe's expansion into the Arbitrum ecosystem and a cumulative volume of almost \$82 billion, this DEX has been able to acquire significant mindshare through the bear market and continues to chip away at the market share of Uniswap, Sushi and Curve. While this is currently a longshot considering the dominance of these three protocols, Trader Joe is blazing a new path and offering new protocols an incentive to step into the Avalanche ecosystem.

Potential Futures for Avalanche:

Recent Developments in the Avalanche Ecosystem

Now that we have taken a look at Avalanche's design and its performance over the past year and a half, it's time to analyze some of the more exciting developments within the Avalanche ecosystem. While technical specifications and organic usage are two of the core aspects that determine blockchain success and longevity, partnerships and expansion are arguably just as important. Avalanche has been working hard to integrate new partners, expand the offerings within its various sub-ecosystems and overall build out a better system that's accessible to both old and new users. Let's explore, starting with the highly regarded HyperSDK framework.

HyperSDK:

The HyperSDK framework is one of the more exciting developments coming to Avalanche, offering developers a new way to build their own custom VMs tailored to their needs. HyperSDK enables the creation of HyperChains and HyperVMs, a new twist on Avalanche's ecosystem of unique subnets. After achieving the foundations for a network of interconnected blockchains with its implementation of subnets, HyperChains are the logical next step for Avalanche in order to accommodate an increasingly complex blockchain development community. If you're interested in learning more about HyperSDK and some of the examples that have been created so far, check out [this informative Medium post](#).

Avalanche x Amazon Web Services:

Announced in January of 2023 and arguably Avalanche's biggest partnerships to date, Amazon Web Services announces its upcoming collaboration with Avalanche to help bring blockchain solutions to a broader community of institutions. Amazon Web Services will provide support for the Avalanche infrastructure and make the creation and deployment of nodes simpler and more streamlined. Avalabs also announced its plans to make the creation of Avalanche Subnets more accessible via Amazon Web Services, with future plans to integrate directly with the AWS Marketplace. To learn more about this exciting collaboration, check out [this blog post from Amazon](#) and take a deeper dive into this growing relationship between the Web2 and Web3 giants.

Cortina Update:

Launched April 6th, the Cortina Update is a huge milestone for Avalanche as this will migrate the X-Chain and allow it to run Snowman++ consensus. This process is defined as "linearization," where the Avalanche X-Chain will operate as a totally-ordered blockchain. Cortina is very important as the update helps set the stage for the full integration of Avalanche Warp Messaging, state syncing and will allow exchanges to officially support the X-Chain. This migration to a single consensus engine will allow the network to decrease the

size of “the trusted computing base” and increase capabilities of research and development efforts. By speeding up and simplifying the development process, Avalanche will further improve its already robust development frameworks and create an environment for builders of all backgrounds.

In addition to these major improvements, Cortina will also clean up the distribution of delegation fees that are sent to validators. Prior to Cortina, validators received a large number of UTXOs as the number of network delegators climbed to over 80,000 (as of March 20th 2023). With Cortina, these fee distributions will now be batched together to minimize the hassle of tracking UTXOs across various wallets and blockchain explorers.

After receiving feedback from developers about the 8 million gas per block being too small, Avalanche has made it so Cortina also increases the block gas limit on Avalanche’s C-Chain. This increase allows the network to further accommodate the growing complexities in decentralized applications, letting developers now operate with a 15 million gas block limit. For information on upgrading your node, you can [follow this link](#) or [consult the Avalanche documentation](#).

Avalanche x Arkham:

Offering users the ability to unmask blockchain addresses and deanonymize transaction history and behavior, Arkham Intelligence is one of the leaders in the growing field of blockchain analysis. In announcing its partnership with Avalanche, Arkham is bringing users the ability to explore transaction histories and discover more about the on-chain antics of Avalanche like never before. While still in beta, Arkham has grown in popularity and provides a new way of chaining together addresses, transactions and entities to “paint a picture” of what really goes on within a wallet. For more information on the partnership and a better overview of how Arkham works, check out their website and this announcement [here](#).

Core / Discover:

The Core application is a Web3 hub that’s designed to connect users with all of the necessary information circulating throughout the Avalanche ecosystem. Core’s most recent release - Discover - allows users to explore various levels of information pertaining to Avalanche, with everything from well written blog posts to updates from the team on upcoming events. Within the Core app, users can navigate from the home page to other subsections covering everything from education about current and new projects to an Avalanche-focused events section with links, calendars, and anything else you might need. Through aggregating this info into one place, users and developers are able to keep tabs on everything going on without needing to scour multiple websites and waste precious time. For more information, follow [this link to their website](#).

Glacier API Beta:

Avalanche recently announced its beta launch of the Glacier API, a unified location for blockchain data on Avalanche, Ethereum and the official API service that indexes Avalanche Subnets. Glacier offers information on blockchain explorer and wallet services, token transfers and a variety of other useful metadata for ERC20 tokens as well as NFTs. Glacier is an important milestone for Avalanche as it lets developers create products with both real-

time and historical data, all courtesy of Avalanche's highly performant APIs. For more information on Glacier, you can read [this forum post](#) and get directly in touch with Avalanche developers creating with the API.

Avalanche x TSM:

Widely known across the gaming industry, TSM is a global esports company focused on everything from creators to competition. Avalanche and TSM have come to an agreement to collaborate on making Blitz, TSM's gaming platform, fully operational as an Avalanche Subnet. This is a huge step forward in bridging the gap between Web2 and Web3, with Blitz having over 30 million users and Avalanche possessing the capabilities to scale this experience better for users who might be unaware of crypto's benefits. TSM and Blitz have additionally partnered with Core, allowing their users to buy and sell assets through a digital marketplace. The Blitz Subnet will use the AVAX native token for transactions and plans to transition into an elastic subnet at some point in the future.

This evolution would allow for increased user involvement as Blitz users would be able to participate in validation of the subnet, offering a greater stake of ownership not previously possible in Web2. While this is a major announcement and partnership on its own, this comes in a series of gaming-related moves from Avalanche as it attempts to carve a niche for itself in the promising territory of on-chain gaming.

Intain x Avalanche:

Intain is a leading name in the structured finance sector and has recently announced their new Avalanche Subnet built for the exchange of tokenized asset-backed securities. Known as IntainMARKETS, this subnet will operate as a marketplace with the intent of meeting regulatory standards while also achieving application-specific requirements to facilitate large transactions. Intain chose to collaborate with Avalanche because of the numerous customizability options available with subnets, letting them choose everything from the geographic location of IntainMARKETS validators to the transaction costs on the subnet. The IntainMARKETS subnet will handle everything from loan issuance to the process of collecting payments, all occurring entirely on-chain. Intain is a well respected name in the finance space, with this collaboration marking an exciting time for Avalanche as more businesses learn the capabilities and benefits of subnets. To learn more about Intain, you can read [this Medium post](#) or check out their website [here](#).

Avaissance:

In light of the immense growth within the digital art space, The Avalanche Foundation has recently launched Avaissance, an initiative to help provide assistance and further support digital artists and the Avalanche NFT community. The Avaissance initiative consists of two parts: a residence program for over fifty artists and the Mona Lisa Initiative which will help light the spark for the next generation of Avalanche NFT art. Anyone on the planet can apply to the Artist-in-Residence program, with an announcement of the 50+ chosen residents coming in May of this year. Artists will be able to receive "a 6-month opportunity to pursue a personal creative project while receiving substantial funding, one-on-one mentorship, virtual workshop opportunities, and support from the Avalanche ecosystem" all while chasing their dreams and working in a field they love. The Mona Lisa Initiative will serve as a more formal collaboration between The Avalanche Foundation and teams of curatorial

DAOs to help “cement the next generation of digital art.” As our world becomes increasingly digital, so will our mediums of expression. Avaissance is a step towards the future and displays the Avalanche Foundation’s belief in our digital reality and solidarity with the artists who create meaningful works. To find out more about the application process, you can follow [this link to the team’s Medium post](#).

Avalanche Summit in Barcelona:

Crypto conferences are an excellent way of getting individuals together and sparking interest in new developments relevant to a blockchain. This year, the Avalanche Summit will be taking place in Barcelona, Spain - an exciting, crypto centric meetup designed to pull together everyone in the Avalanche community and introduce everyone to the latest developments across the blockchain’s various subsectors. Running from May 3rd to May 5th, the Avalanche Summit will have over 300 speakers and over 125 panels for attendees to learn more about the advancements occurring in the Avalanche ecosystem. If you’re curious to learn more and wish to secure a spot at the summit this year, [follow this link to the official website](#).

Closing Remarks

As crypto as an industry works to dig its way out of a very deep hole after the chaos of 2022 and early 2023, Avalanche continues to grow its ecosystem, improve the user experience and is actively expanding its list of partnerships across a variety of sectors. With advancements in Avalanche Warp Messaging, Elastic Subnets and the growing number of improvements for developers within the ecosystem, Avalanche is working to improve its scalability and make the process of deploying a subnet much more comfortable for new and old developers.

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