

MONTHLY RESEARCH REPORT

December 2021





CONTENTS

1 INTRODUCTION

Welcome to the December Edition of the Platypus Monthly Report!

The following report will provide insights into all things cryptocurrency for the month of December including macroeconomic insights, sector analysis, and an in depth look at five of the hottest cryptocurrency projects for the month to come.

For each project we analyze, its technology, tokenomics, team, institutional investors, applications, adoption and outlook moving forward. Platypus strives each month to bring you the brightest insights in the industry and we hope you enjoy this edition of the Platypus Monthly Report.

Happy Reading,

Platypus Terminal

2 MACROECONOMIC INSIGHTS

Cryptocurrency Markets set new highs in the month of November with Bitcoin making a new all time above \$68,000 USD. Momentarily the cryptocurrency market cap topped \$3 trillion USD and settled roughly around \$2.5 trillion by the end of the month.

In recent years cryptocurrency has evolved from living in the shadows of society to emerging as the most polarizing industry this decade. This month, cryptocurrency exchange Crypto.com took a major step into the limelight, officially sponsoring what is currently know as the Staples Centre. From the 25th of December the famous arena will be named the 'Crypto.com Arena' at a total cost of \$700 million USD. Though the news was a notable step for the exchange, the move more broadly represents a paradigm shift for cryptocurrencies in general.

UK based multi asset broker, Etoro, recently announced it would de-list popular smart contract platform Caradno from its exchanges. The move came as a surprise to markets after a strong 12 months for Cardano where it solidified itself within the top 10 cryptocurrencies by market cap. The reason provided by Etoro was an, "evolving regulatory environment." The delisting only applies for US users of the platform, indicating it is potentially the Securities and Exchange Commission (SEC) pursuing the project.

Towards the end of November equity markets plunged, dragging cryptocurrencies with them. The emergence of a new COVID variant named Omicron shook global markets and sent Bitcoin down almost 10 per cent. On the 26th of November when markets become aware of the variant and stocks tumbled, Bitcoin and the S&P500 produced one of the highest readings on the 100-day correlation coefficient this year, of 0.33.

The short-, medium- and long-term impact of the variant on financial markets is largely unknown, however is likely to play a role in price action in the coming months.

Moving into December and 2022, Crypto markets are poised to leverage their existing momentum and take advantage of strong financial conditions internationally.



Following the rebranding of Facebook as Meta on the 28th of October 2021, heightened attention has been placed on metaverse focused cryptocurrencies.

The Sandbox (SAND)

The Sandbox is a play-to-earn game that combines blockchain, NFT's and DeFi, allowing users to build an avatar that interacts with a virtual world. Within this virtual world avatars can monetize different environments, games and hubs. The native token of the Sandbox is SAND which is used for making purchases within the digital world, earned for playing games and for governance purposes.

Axie Infinity (AXS)

Axie Infinity is a game where users trade and battle individual avatars known as axis. Users collect, breed and raise axis which they then battled against other users. The platforms native token AXS is an Ethereum based cryptocurrency which can be used to buy and sell different assets within the ecosystem.

Decentraland (MANA)

Like Sandbox Decentraland operates a play-to-earn games where users can exist within a virtual world. Decentraland has two native tokens, LAND AND MANA. LAND is an NFT that allows users to buy and sell digital real estate assets while MANA is a cryptocurrency used for buying and selling digital goods and services within Decentraland.

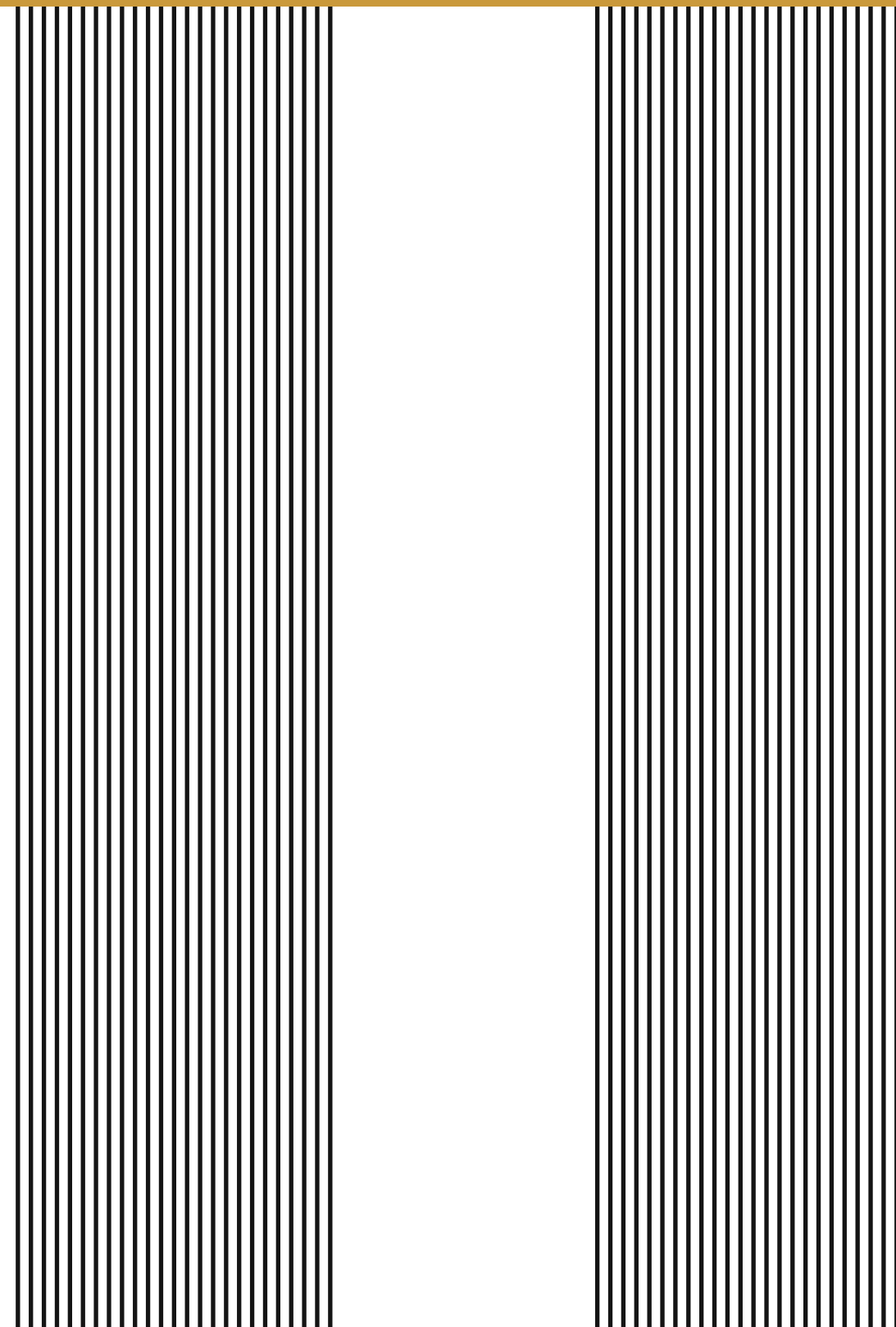
The Metaverse refers to a virtual online world where individuals can interact through 3D avatars using virtual reality technology. Due to the pure infancy of the metaverse, it is difficult to foresee its future direction and development. However various cryptocurrency projects have provided a range of products and services that exist in the metaverse as we know it.

A major component of the metaverse is the integration of Non-Fungible Tokens (NFT's), which will allow individuals to buy and sell virtual items such as clothing, art, property, or other goods.

Due to the surge in value of metaverse projects throughout November, it is difficult to tell what projects will survive an inevitable bear market. To the left are some of the hottest Metaverse focused projects.



Here's a selection of December's top news articles from the Platypus Terminal, Click on the boxes to view the full article.



COIN IN FOCUS:



5. CARDANO (ADA)

Cardano is a third-generation proof-of-stake platform that houses the ADA cryptocurrency. It is the first-ever blockchain platform to be developed through a research-first approach.



PROJECT FUNDAMENTALS



Charles Hoskinson

Charles Hoskinson is a mathematician who pursued an education in analytic number theory. As the founding chairman of the Bitcoin's Foundation education committee, his vast experience witnessed the founding of Invictus Innovations, IOHK and Ethereum. Charles attended the University of Colorado Boulder and Metropolitan State University.



Jeremy Wood

Jeremy Wood was part of Ethereum back in 2013, following which he worked as a Cryptocurrency Consultant. He formed Input Output Hong Kong (IOHK) with Charles Hoskinson in 2015 and graduated from Indiana University- Purdue University Indianapolis. Jeremy was also a pioneering member of the Kansai Bitcoin Meet-up.

TEAM

TECHNOLOGY

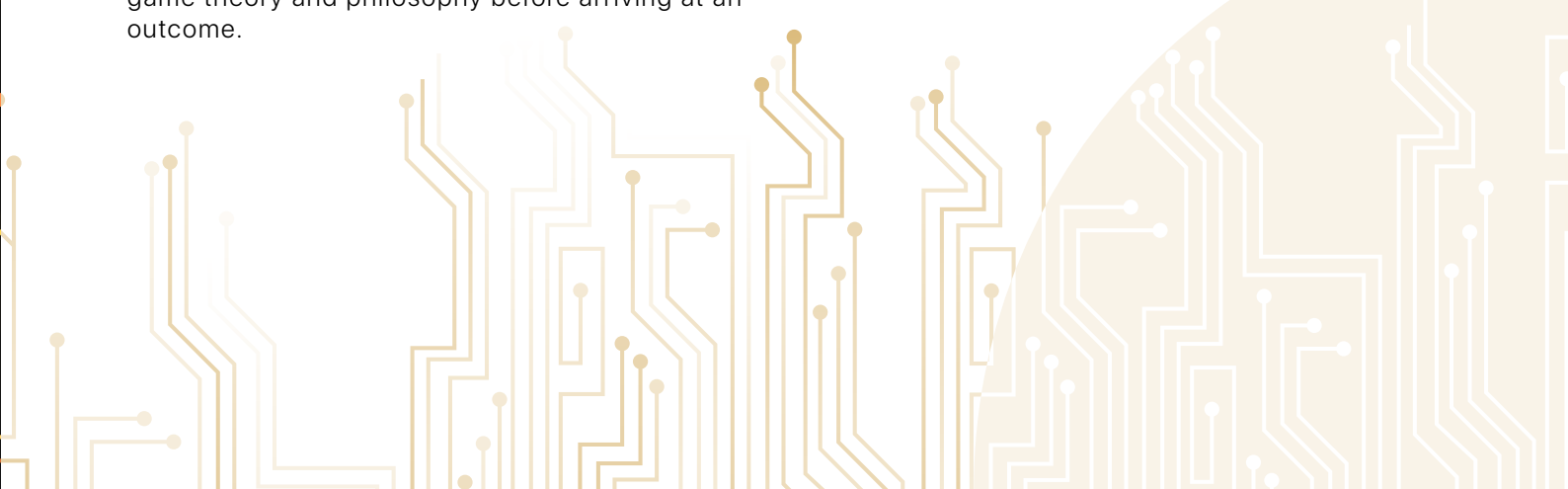
Before the development of any technology Cardano implements on its platform, it is first specified. However, for it to be specified, it must first be researched. Cardano has therefore redefined what it takes to create a software platform through scientific methods. It is this exact process that sets Cardano apart from other blockchains.

The underlying technology that underpins Cardano is its peer-reviewed research conducted by experienced academics. This approach examines a myriad of subject matters including sociology, game theory and philosophy before arriving at an outcome.

One fine example is Ouroboros, Cardano's proof-of-stake protocol, which was deemed safe following a process of formal review. The crux of this approach is the team's belief that fundamental research is the most optimal way of determining what is feasible and how best to accomplish it.

TOKENOMICS

The maximum supply of Cardano is 45 billion. At the time of writing, the total number of coins created sits at 33.12 billion, with a market capitalisation of close to \$77 billion.



IMPLEMENTATION

APPLICATION



Agriculture

Cardano's primary application within the agricultural industry lies in its ability to enable supply chain tracking. In times of pandemic, this sector has proven to be essential considering people's reliance on it as an source of sustenance. Cardano capitalises on its Atala Trace and EMURGO's traceability solution to provide a transparent platform where farmers and retailers can track products' movements till they arrive at the end consumer.



Healthcare

In a study conducted by the World Health Organisation (WHO), more than 50 per cent of medications retailed online are either substandard or counterfeit. As such, when medications are sold beyond the supervision of medical governance, the public is naturally exposed to substantial health risks. Cardano's Atala SCAN works to form product auditability in ensuring that each product sold is authentic. The blockchain solution locates the supply chain of pharmaceutical products and assists in ensuring the safety of patients while preventing the occurrence of fatalities.



Education

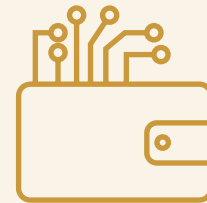
A common issue faced amongst students throughout their education journey is the misplacement of academic certifications. When that happens, students typically undergo a lengthy and possibly costly process of requesting a duplicate copy from their respective institutions. These hard copies certificates also make it harder for sharing purposes, which are typically done online. Cardano's Atala PRISM steps in to lock in academic certifications in an immutable environment, allowing students to have instant access to these documents.



Government

Centralised solutions imply that personal particulars often typically fall under the control of governments and corporate bodies. For users, this means undergoing a lengthy process and relying on third parties to authenticate documents. Meanwhile, centralized identification systems present an expensive proposition for businesses as data leakages potentially result in dire consequences.

Atala PRISM offers a reliable and decentralised infrastructure to verify particulars in a secured manner. Businesses can verify online records instantly and are exposed to less risk through serverless solutions. Importantly, the digital solution instils confidence and trust into users, knowing that third party agencies are now eradicated from the verification process.



Finance

Financial institutions have put in place mandatory identity verification processes when bringing onboard new clients. One fine example is the opening of an online savings account. While the duration of this process varies according to geographical locations, it is often lengthy and daunting. Atala PRISM, IOHK's digital identity solution, eradicates this problem by capitalising on reusable credentials through its blockchain technology. Users can build their digital identities, which they can disseminate at their discretion through their mobile devices.



Retail

Notable retail brands face the teething issue of counterfeit goods, which in 2018 cost the economy a hefty \$300 billion. As these goods are typically sold online, the anonymity of the web means that illegal vendors go undetected. For authentic retailers however, this trend not only incurs considerable financial losses. It further dilutes the brand's reputation and, in turn, depletes consumers' perception of the brand.

With Atala SCAN, the blockchain's tamper-proof environment is capable of solving this issue. Retailers can use a personalised mobile app that enables their customers to authenticate products. The app automatically resolves the above-mentioned problems and further promotes a seamless shopping experience.

INVESTORS

The brightest minds behind Cardano stem from a group of individuals across various occupations, including engineers and scientists with a common purpose. Three stakeholders that play an indispensable role include:

EMURGO: As a pioneering member and enterprise arm of Cardano, the company operates to grow the platform through commercial opportunities. EMURGO seeks to fuel adoption by attracting large corporations to the Cardano platform. The for-profit organisation operates across Japan, India, Indonesia, Singapore, and the USA.

Cardano Foundation: As the owner of the Cardano brand, The Cardano Foundation is a Switzerland-based independent standards body that overlooks the development of Cardano and its ecosystem. The primary responsibility of the foundation is to fuel adoption, drive partnerships and work alongside regulators to mould the blockchain legislation.

Input Output Hong Kong (IOHK): Jointly founded by Charles Hoskinson and Jeremy Wood in 2015, Input Output Hong Kong (IOHK) is one of the world's leading blockchain engineering and infrastructure research institutions. The company was contracted to build and design the Cardano platform and Ouroboros – the proof-of-stake algorithm that operates the Cardano network.

IMPLEMENTATION

ADOPTION

As of 08 September 2021, the blockchain platform boasts 1,509,360 accounts. CEO of Cardano Foundation, Charles Hoskinson, has outlined his plans to achieve 1 billion users of the ADA coin. To drive the adoption of its platform, Cardano has over the years formed several partnerships as listed below:

24 August 2021: European Business University of Luxembourg (EBU)

IOHK has entered a partnership with EBU to provide greater access to education in less developed nations. EBU is a not-for-profit educational provider that currently educates more than 2000 students across 25 countries in Africa. Students enrolled in the EBU Certificate program will be able to sign up for courses in Haskell and Plutus for a €10 commitment fee. EBU and IOHK will work closely to support the rollout of this initiative by providing learning hubs with internet access. In doing so, students in developing countries are given the opportunity to be equipped with new life skills.

11 August 2021: World Mobile

World Mobile Group and IOHK intends to bring wireless internet and digital services to Africa where more than 700 million people lack access to it. World Mobile Chain (WMC), the world's first network to be built on blockchain technology, hopes to bring wireless internet through solar-powered and renewable energy.

This approach is significantly different from typical network providers who, are reluctant to construct mobile masts in inaccessible areas for profitability reasons. WMC further plans to create a financial system for this market which will see IOHK supplying a decentralized ledger while it acts as a bridge, providing linkage to the new market.

30 June 2021: Nexo

IOHK has launched a collaboration with Nexo – a leading digital lending platform engaged in the provision of trading and instant exchange services. The partnership will enable ADA holders to purchase, sell, lend, and borrow crypto on the Nexo Exchange. Importantly, the collaboration is deemed mutually beneficial. On the one hand, ADA holders can earn up to 8 per cent interest on its holdings, allowing Cardano to improve its reach. On the other hand, Cardano's partnership will bring the serviceable assets of Nexo's 'Earn on Crypto & Fiat Suite' and Instant Crypto Credit Lines to twenty.

FUTURE OUTLOOK

ROADMAP

Cardano's roadmap provides a bird-eye view of its development and is outlined across five key stages – Byron, Shelley, Goguen, Basho, Voltaire. Each of the five stages is unique to one another. This means that specific functionalities are emphasised across different stages and are produced over several code releases.

While these stages will unfold chronologically, there is certainly more going on behind the scenes. Concurrent initiatives rolled out across the various development streams include academic research, development, and prototyping. Notably, one unique feature about Cardano is its reliance on technical foundations.

Unlike other blockchains, IOHK collaborates with reputable academics on fundamental research – a key determining factor that stipulates what is feasible and the ideal way to get work done.

Cardano is its reliance on technical foundations. Unlike other blockchains, IOHK collaborates with reputable academics on fundamental research – a key determining factor that stipulates what is feasible and the ideal way to get work done.

1. BYRON: Foundation

Named after Lord Byron, the father of Ada Lovelace, this era was born in September 2017 following two intensive years of studying and 23,430 GitHub code commits. This stage permitted the purchase and sale of the ADA cryptocurrency on a federated network that operates the Ouroboros protocol. Another key milestone recorded in the Byron era is the delivery of the Daedalus and Yoroi wallet.

The former was IOHK's official desktop wallet, while the latter is a lightweight option from IOHK's sister company, Emurgo. In particular, Yoroi was built for facilitating swift, day-to-day transactions. This era wrapped up shortly after ADA was successfully listed on more than 30 exchanges at the tail end of 2020.

2. SHELLY: Decentralisation

Deriving its name from Mary Shelley, the author of Frankenstein, this stage was officially launched on 29 July 2020. This Shelley era is characterised by the transition from a centralised ledger in the Byron era, to a completely decentralised distributed ledger. Importantly, this phase opens the doors to increased network participation. As participants rely more on community-led nodes, they further enjoy enhanced security.

The Shelley era also seeks to implement a reward system aimed at achieving circa 1000 stake pools. Cardano is among one of several proof-of-stake blockchains, where participants can stake their ADA to take part in securing the network. From a broader point of view, the scheme is a win-win for both parties. It encourages users to allocate their holdings to stake pools following which they will receive an incentive for their honest participation. On the other hand, Cardano is anticipated to be 50 to 100 times more decentralised than its competitors. The Shelley era emphasises growth and acts as a platform for a fully.

3. GOGUEN: Smart Contracts

The Goguen era was coined after American computer scientist, Joseph Goguen, and was initially due to be launched in March 2021. Despite experiencing delays, the primary focus of this phase remains to centre around Smart Contracts. The end result allows users from all walks of life, to carry out smart contracts on the Cardano network regardless of background.



FUTURE OUTLOOK

A critical milestone that has been achieved is the creation of Plutus – a customised smart contract platform written in Haskell. Importantly, Plutus contracts comprise both an on-chain and off-chain component. The former includes parts that run on the blockchain, while the latter runs on a user's machine.

Another important task in the Goguen era includes broadening Cardano's reach to cater to a broader audience via Marlowe. Marlowe is a domain-specific language used in financial contracts that comes with the Marlowe Playground – a straightforward application-building platform. Marlowe and the Marlowe Playground collectively seek to attract finance and corporate experts with limited technical knowledge or programming skills to contribute to creating smart contracts.

Goguen further aims to improvise Cardano's core offering through the addition of a multi-currency ledger. The ledger will substantiate the use case of Cardano, facilitating a seamless integration of smart contracts involving multiple cryptocurrencies and allow users to create new fungible and non-fungible tokens.

4. Basho – Scaling

Having established a solid foundation, the Basho era looks at finetuning operations and scaling the network to greater heights. This phase involves identifying areas of improvement to spur adoption for applications capable of handling high transaction volumes.

A highlight of this phase is the rollout of sidechains. In essence, sidechains are new blockchains possessing tremendous potential to be used alongside Cardano (main chain). The sidechains act as a sharding tool by taking off work from the main chain to ramp up the network's capacity.

Aside from sidechains, Basho further seeks to implement parallel accounting styles. The main Cardano blockchain currently utilises a UTXO model. However, the addition of sidechains offers the option to alternate between a UTXO and an account-based model. The end of this era aims to place Cardano at the forefront of competition and evolve to become among the most flexible blockchain platforms.

5. Governance – Voltaire

The Governance era adds the final touches to the construction of a sustainable network. For Cardano to become entirely decentralised, it not only relies on the infrastructure stipulated in the Shelley era. The network further requires ongoing maintenance and improvisations in a decentralised manner.

As such, Governance seeks to implement a voting system that allows users to utilise their stake to have a say in the future of the network. Thereafter, the formation of a separate treasury system will pool together a proportion of transaction costs for development activities following the outcome of the voting process. Once both systems are formed, Cardano will attain complete decentralisation.

“Making The World Work Better For All”

- Cardano

NEWS

In August 2021, Cardano has established a name for itself to emerge as the third-largest cryptocurrency globally. There is increased confidence that the new technological advancements will allow its platform to provide lucrative services such as Decentralised Finance, which Ethereum current holds an edge in.

FUTURE POTENTIAL

Moving forward, blockchain technology is the key that unlocks a myriad of problems beyond that of societal, technological, and financial. It reallocates power to eradicate inefficiencies and aligns closely with the purpose behind Cardano. The blockchain platform was created to build a sustainable future where fairness, transparency and security are upheld.

Unlike its competitors, the underlying technology undergoes constant refinements implemented through evidence-based solutions. Furthermore, its proof-of-stake technology alongside a voting and treasury system will ensure that power is distributed across all its users.

TECHNICAL ANALYSIS

Cardano is currently trading at a major discount to its smart contract and De-Fi peers down 57% from its all-time highs set in August this year. After being one of the top performing coins of 2021 downwards pressure on Cardano has sent it back to its lows for the year. Currently the price action is approaching a crucial level of support at around \$1 USD per coin, used on April, May, June and July this year. This level of support directly aligns with a 161.8% Fibonacci Extension drawn from

the Cardano's sharp correction in September. As the broader cryptocurrency market remains under pressure, this support will become a potential entry point into Cardano. On an hour timeframe, Cardano is finding strong support at approximately \$1.30 USD per coin and is entering a descending triangle. Short term reprieve through this triangle could potentially still be overwhelmed by a stronger selling momentum.



COIN IN FOCUS:



6. CHAINLINK (LINK)

Chainlink is a decentralised Oracle network that houses the native currency LINK. Chainlink was established in 2017 by Sergey Nazarov, Steve Ellis and Dr. Ari Juels and built on the Ethereum Network.

PROJECT FUNDAMENTALS



Sergey Nazarov

Sergey Nazarov is the co-founder of Chainlink. Mr Nazarov was raised by Russian born parents who immigrated to New York. Both parents were engineers and exposed him to computers at an early age. Nazarov has a bachelor's degree in Philosophy and Management and made the decision early in his career to focus on blockchain technology, aligning himself with the philosophical libertarian goals of cryptocurrency itself.



Dr. Ari Juels

Dr. Ari Juels is the Chief Scientist at Chainlink and was instrumental in its development and whitepaper. Juels is a professor of computer science in the Jacobs Institute at Cornell Tech and previously the chief scientist of RSA.

TEAM

TECHNOLOGY

Chainlink Oracles provide a crucial bridge between information stored outside a blockchain ecosystem (off-chain data) and information stored within a blockchain ecosystem (on-chain data).

- Off-Chain Data might consist of currency movements, stock prices, weather information or election results
- On-Chain Data might include a record of transactions of Chainlinks native token LINK.

Off-Chain data faces the consequences of centralisation because a blockchain network has no way to validate or conclude that the data being provided is correct. Oracles offer a solution to validating the off-chain information fed to smart contracts and onto blockchains. An Oracle acts as an intermediary between the real world and smart contracts feeding information to the blockchain. However, an Oracle acting alone is unable to solve the fundamental issue of centralised information, but a network of Oracle nodes acting in unison, can.

Chainlink gathers a network of Oracles providing the same information to its users allowing them to objectively verify the information being provided.

For example, a decentralised application (Dapp) might use a Chainlink Aggregating Contract to source stock market data for the S&P500 from 10 different sources. The aggregator contract reconciles the data from all 10 sources and will be able to identify incorrect or corrupted data being provided to it through clear outliers.

Chainlink's native currency LINK is used to pay Chainlinks node operators for providing information through Oracles. These prices are set by the node operators based on market demand. This payment act's as an incentive for nodes to provide accurate and true information to blockchains.

PROJECT FUNDAMENTALS

Proof of Reserve

Chainlink's Proof of Reserve consensus mechanism uses a network of node operators to acquire and analyse reserve data. This allows institutions, individuals, and entire ecosystems to continuously monitor the reserves of a particular digital currency. Ultimately this prevents systemic failures within De-Fi applications whilst also increasing their level of transparency, security and reliability.

Keepers

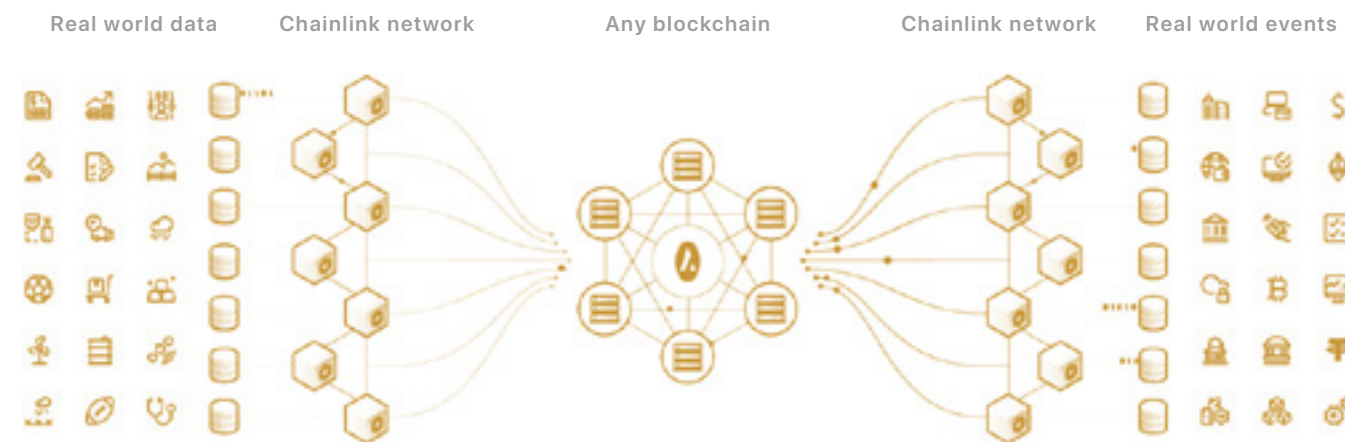
Chainlink's Keepers allow the automatic application of smart contract functions in a cost efficient and decentralised manner. Chainlink Keepers continuously scan and monitor an ecosystem, waiting to observe an event that might trigger a certain condition built into a smart contract. This condition might include a transaction, weather event or length of time having passed. Chainlink Keepers can be used for yield harvesting, rebasing, automated trading systems and triggered asset distribution systems.

VRF

Chainlink's Verifiable Random Function (VRF) provides a source of random number generation for smart contracts. These random numbers are generated and published with a cryptographic proof which is then verified on chain before used by applications. For Blockchain games, NFT's or randomly assigning duties on a network, reliable number generators are required for the effective operation of smart contracts.

Cross Chain Bridging (CCIP)

Chainlink's Cross-Chain Interoperability Protocol (CCIP) allows developers to build Dapps on a secure network. The Dapps built using Chainlink's CCIP are smart contract compatible and blockchain agnostic meaning they can, "interoperate across all public and private blockchain networks." This means the Dapps can complete cross network actions, send messages and other information, transfer tokens and execute smart contracts.



TOKENOMICS

The native token within the Chainlink ecosystem is LINK which has a maximum supply of 1 billion tokens. Developers requiring off chain data to operate smart contracts, purchase data feed's using the native LINK token. Those providing the off-chain data through Oracles are hence incentivised to provide consistent, reliable and accurate data feeds to those demanding it.

On Chainlink, the data provided by Oracles is verified by other Oracles on the network, and each Oracle's reputation for providing accurate information is recorded.

IMPLEMENTATION

INVESTORS

Chainlink conducted an Initial Coin Offering (ICO) in 2017, raising a total of \$32 million USD. At the project's inception there was a total supply of 1 billion LINK tokens. Since then, the project has received investment from notable institutions and individuals including:

Outlier Ventures'

Outlier Ventures is a venture capital firm based in the United Kingdom under founder Jamie Burke. Outlier Ventures aims to "invest in creators building The Open Metaverse," in particular Web 3 projects and services. The company also operates a Web 3 accelerator program assisting developers on Polkadot, Filecoin and Polygon. Outlier Ventures has made notable investments in Aragon, Bitcoin, Cosmos and Secret.

安密經合

Anmi OECD is a Chinese venture capital firm, founded in 2017.

FRAMEWORK

Framework Ventures' partners with token-based networks and is based in Ontario Canada. Other investments of 8Decimal include Aave, Curve, Synthetix and The Graph.

**CONSENSUS
CAPITAL**

Consensus Capital is a Chinese venture capital firm whose investments are focused on internet financial service projects. Notable investment from Consensus' portfolio include Casper Labs, CVVC and Twist.

**8DECIMAL
CAPITAL**

8Decimal invests in blockchain based opportunities having invested in more than 40 company's and managing over \$60 million USD. Other investments of 8Decimal include Polkadot, Solana and Zilliqa.

"We foresee an increasingly expansive role for oracle networks, one in which they complement and enhance existing and new blockchains by providing fast, reliable, and confidentiality-preserving universal connectivity and off-chain computation for smart contracts."

- (Chainlink)

IMPLEMENTATION

APPLICATIONS

Oracle networks such as Chainlink allow decentralised applications and their relevant smart contracts to operate both effectively and efficiently. Real world applications of this technology include:



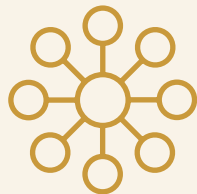
Lending and Borrowing Applications:

Chainlinks Oracles allow decentralised borrowing and lending platforms to provide a number of services including, Issuing and settling Loans, Liquidation of undercollateralized Positions and Trigger Collateral Swap



Mirrored Assets:

Chainlinks Oracles can feed essential financial data such as live asset prices through to decentralised applications that provide mirrored versions of real-world assets. This might include fiat currencies, commodities, or other cryptocurrency assets.



Stablecoins:

Stablecoins require a vast array of live financial data to operate collateralisation ratios, fiat currency pegs and other operations. Stable coins are currently a fast-growing cornerstone of cryptocurrency markets and will continue to require reliable off-chain data.



Asset Management:

Asset management tool's handle pools of capital, which are automatically managed by smart contracts relying on off-chain data. This information is used to rebalanced capital pools



Options and Futures:

The complexity of Options and Futures markets require a wide variety of off chain metrics to operate. This information is required from the centralised and decentralised financial world.

Beyond Traditional Financial Services Chainlinks' Oracle networks can also provide off chain data for a variety of decentralised services.

Parametric Insurance: Parametric Insurance Policy's operate similar to regular insurance policies whereby based on the eventuation of a particular event, a payout is triggered. These policies are often applied to weather events whereby based upon rainfall levels, wind speeds or temperature a payout is provided. This is most often used in the agriculture business to provide insurance against adverse weather events. In particular, developing countries have adopted this technology at an accelerating rate.

Predication Markets: Prediction markets allow individuals to trade or gamble on the outcome of events such as sporting events, weather, politics and more. This is facilitated by smart contracts and pools of liquidity which rely on off-chain data from centralised authorities. Regulation for these markets differ by jurisdiction, however the underlying technology has the potential to revolutionise wagering markets.

Supply Chains: Prediction markets can be used to maximise outcomes for supply chains, by determining optimal inventory levels, reduce supply chain fees and the impact of adverse weather events.

The above applications of Chainlink's technology clearly display the importance of off chain data in operating Dapps and executing smart contracts. The exponential growth of De-Fi projects in recent years has accelerated the demand for the off-chain data feeds provided by Chainlink, leading to growing interest in Oracle networks. It is expected that the potential applications for these data feeds will continue to grow in coming years.

ADOPTION

Due to Chainlink's wide variety of real-world applications, many private institutions have partnered with the project to provide decentralised services. One of Chainlinks' most notable partnerships has been with multinational technology services company, Google. Since 2019 Google and Chainlink have been collaborating to provide fully decentralised weather data directly from the Google cloud. This Integration allows an Oracle node to continuously receive real world weather data from Google which is then distributed to Dapps. The National Oceanic and Atmospheric Administration (NOAA) also operates an Oracle on Chainlink which provides the necessary data to execute parametric insurance applications.

Decentralised farming insurance company Arbol allows small to medium size enterprises, "to create derivatives on the blockchain that pay out based on weather outcomes. This allows weather-exposed entities like farmers to hedge their weather risk." Arbol operates an Ethereum based application that was founded in 2019.

Beyond weather data, Switzerland's largest telecommunications provider, Swisscom, announced in August 2021 a partnership with Chainlink to provide asset price data through an oracle node. Leading decentralised finance protocols use this data to power their financial services including:

- Aave is an open-source liquidity protocol for borrowing and lending services.
- Synthetix is a decentralised liquidity protocol for the creation and trading of synthetic or derivative assets.

In November of 2021, Solana Dapp, Saber announced it would be using Chainlink data feeds to provide automated market making services. Saber uses Chainlinks data feed's to optimise the trading of a variety of asset pairs. The rapid growth of the Solana network has seen many of its applications turn to the blockchain agnostic services provided by Chainlink.

Finally, NFT marketplace UREEQA has also partnered with Chainlink to implement live sports data feeds. Certain NFT's on UREEQA have additional utility that rely on the outcomes of real world sporting events.

FUTURE OUTLOOK

NEWS

In September 2021, Chainlink announced a collaboration with Cardano to act as the networks preferred oracle solution. The move was announced at the Cardano Summit 2021 where Charles Hoskinson described the decision as an “easy choice.” This means Chainlink oracles will be directly fed to Cardano developers.

In November 2021, a video call between Chainlink co-founder Sergey Nazarov and Solana Labs CEO Anatoly Yakovenko discussed the potential for both projects moving forward. Nazarov described how the immense scalability of Solana provides both challenges and opportunities for Chainlink. Solana has been one of the most successful smart contract platforms in 2021, with both project's benefitting from what was described as a seismic shift from Web2 to Web3.

Earlier in the month Chainlink announced that its total value secured has reached \$75 billion as hundreds of protocols and De-Fi applications integrate Chainlink Oracles in their smart contracts.

ROADMAP

In April of 2021 Chainlink released their Chainlink 2.0 Whitepaper which presented along term multiyear outlook for development of the ecosystem. The features presented in the Whitepaper have no distinct timeline or dates associated though have noted that the proposed improvements are either in development or their early testing stages. The Chainlink 2.0 Whitepaper identifies 7 key areas that the network will prioritise including:

- Hybrid Smart Contracts: allowing the augmentation of existing smart contract capabilities.
- Abstracting away complexity: tools for developers and users to understand the protocol more deeply.
- Scaling: greater latencies and throughput to cater higher demand for oracle services.
- Confidentiality: Protecting sensitive data.
- Order Fairness for transactions: Prevention of front running and other attacks.
- Trust minimisation: Boosting trustworthiness through smart contract support
- Incentive based Security: (via www.chain.link/whitepaper, Chainlink.20)

FUTURE POTENTIAL

The demand for Oracle networks is currently growing at an exponential rate and Chainlink will be a direct beneficiary in the transition to blockchain based finance and enterprise business.

Moving forward, there are number of price positive catalysts are set to benefit both the Chainlink ecosystem and the price of the LINK token.

- The ambitious and long-term outlook provided by the Chainlink 2.0 Whitepaper is the most significant outline of the project's future. Though no concrete dates have been placed on the whitepapers proposals a steady stream of updates and upgrade's are poised to boost the price of LINK.
- Chainlink's strong Tokenomics and a limited token supply are designed to be price positive for growing demand for the project's services.
- The rising demand for off-chain data is directly tied to the supply and demand dynamics for the LINK token, benefitting its price. A wide variety of fast-growing projects require the data provided by Chainlink including, AAVE, Synthetix, Curve, Ren and Kava Binance and more.
- A rapidly growing ecosystem of Dapps and De-Fi projects requiring Oracle services. infrastructure research institutions. The company was contracted to build and design the Cardano platform and Ouroboros – the proof-of-stake algorithm that operates the Cardano network.

TECHNICAL ANALYSIS

Chainlink has fallen below its 200-day simple and exponential moving averages in recent weeks, briefly testing its 2021 lows in early December. On that exact candlestick the price action broke a crucial level of support at approximately \$23. Days later the price action attempted to break above this level, though was quickly pushed lower by a

bearish engulfing candle, holding Chainlink within a tight parallel range . Moving forward Chainlink will potentially remain within this range in the short term and begin consolidating before breaking resistance at \$23 and resuming its upward momentum.



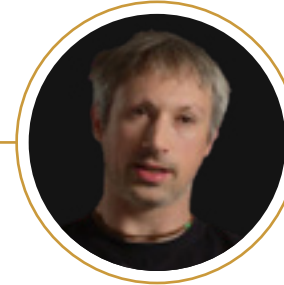


7. POLKADOT (DOT)

Polkadot was launched in 2016 by Ethereum co-founder Gavin Wood, who was the lead creator of Ethereum's code language Solidity. Wood founded Polkadot with the intention of creating the next generation Ethereum, placing a heightened focus on interoperability.

PROJECT FUNDAMENTALS

TEAM



Gavin Wood

Gavin Wood is the creator of Polkadot, hailing from a background in computer science and software engineering. He was also a co-founder of Ethereum, the leading creator of Ethereum's native code language Solidity and the author of its Ethereum's yellow paper. Wood left Ethereum in 2016 for a variety of potential reasons, the most accepted of which being the future direction of the project. At Polkadot, he intends to build a project that unites the often-fragmented world of cryptocurrency and their independent ecosystems.



Robert Habermeir is a cofounder of Polkadot with a background in distributed systems, blockchains, and cryptography.



Peter Czaban is the director of the Web3 Foundation with a Masters from the University of Oxford, working closely with Polkadot.

TECHNOLOGY

Polkadot is a unique smart contract and decentralised application (Dapp) platform that aims to boost the interoperability of blockchain ecosystems using its sharded blockchain protocol. This protocol unites independent networks on what Polkadot describes as a, "robust platform for security, scalability and innovation."

A Sharded blockchain protocol refers to a blockchain network where the responsibility for verifying information is separated across the network to reduce the workload on individual nodes. This means a transaction only needs to be verified by a select number of nodes on a single blockchain shard before being confirmed. This allows a network to achieve far higher transaction speeds and volumes. Polkadot uses Sharding through its Central Relay Chains, Parachains, and Parathreads.

Polkadot operates its sharded blockchain through a central relay chain and Parachains. The central relay chain acts as a central coordinator for the overall ecosystem which is connected to and collects information present on the networks Parachains. The central relay chain was created to have, "deliberately minimal functionality – for instance, smart contracts are not supported," according to Polkadot. The main function of the central relay chain is to coordinate the system and connect to Parachains which run parallel to the central relay chain.

PROJECT FUNDAMENTALS

Each Parachain connected to the Polkadot central relay chain is associated with an external blockchain network that has its own unique characteristics, purposes and use cases. The Parachains feed this information to the central relay chain providing access to the entire network. Parachains provide the following:

Scalability: With this Parachain model Polkadot network is highly scalable and as an unlimited number of Parchains can be connected to the network.

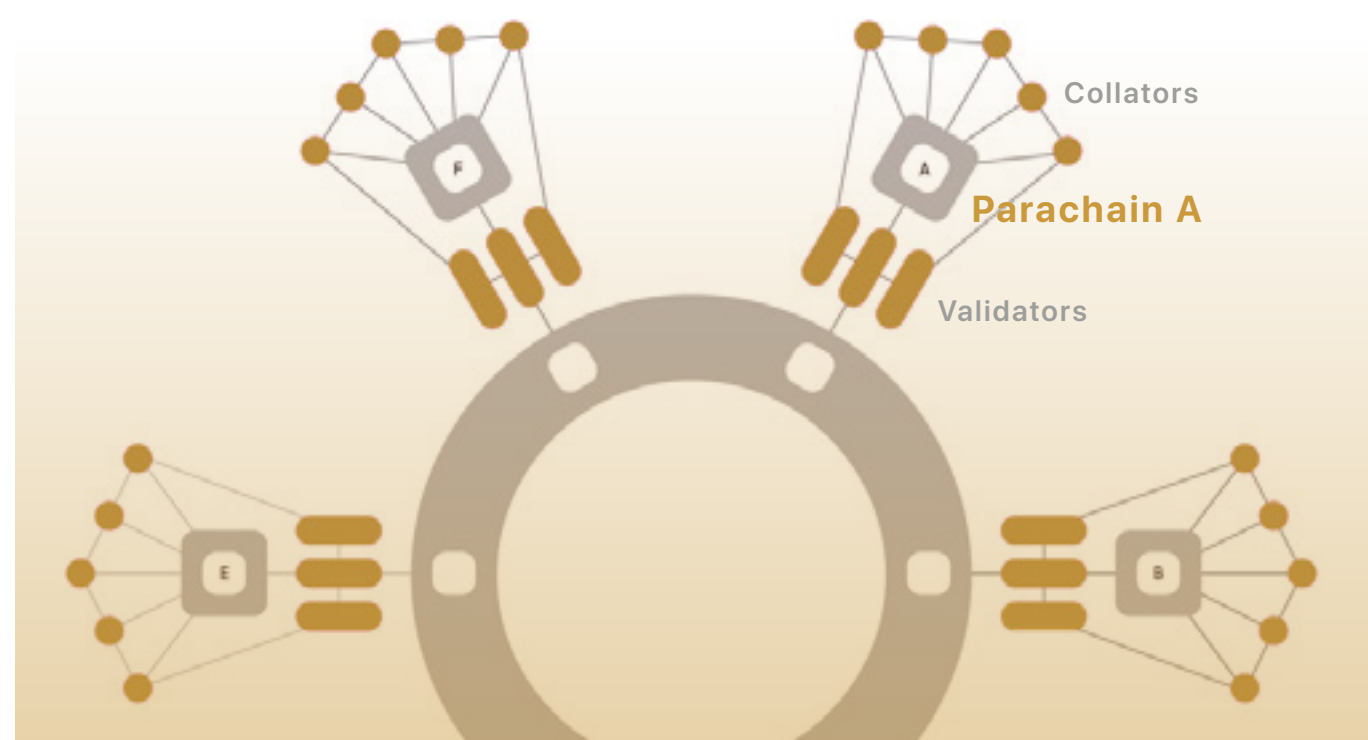
Interoperable: Parachains are free to adopt whatever specific characteristics they desire and are designed around the each individual blockchain. Irrespective of these characteristics they can then be connected to the entire network.

Governance: Each Parachain can implement its own governance model.

Alongside Parachains, Parathreads allows blockchains to temporarily connect to the network, a model which has been described by Polkadot as a "pay-as-you-go model." The fee's paid on Parathread's are also lower than Parachains allowing for more flexible usage. Finally, Polkadot Bridges connect both Parachains and Parathreads to external networks like Ethereum and Bitcoin.

Within the Polkadot a number of parties participate in the transfer of information within the ecosystem:

- **Nominators** are the central nodes of the ecosystem responsible for nominating validators. By nominating a validator, they appoint their stake on the network to validators.
- **Validators** secure Polkadot by staking DOT and adding new blocks to the central relay chain.
- **Collators** collect transactions from the networks shards and provides these proofs to validators.
- **Fishermen** are equal to collators; however, they analyse the information being collected and sent to validators by collators, ensuring that no invalid transactions are being processed.



TOKENOMICS

The native token of the Polkadot network is called DOT. Initially, DOT had a maximum supply of 10 million tokens but was redenominated for the easier calculation to a maximum supply of 1 billion.

DOT serves three Primary functions; governance of the network, staking for the operation of the network, and connecting Parachain to the network. Hence the network uses a Proof of Stake mechanism to validate transactions.



Governance:

Staking Dot gives nodes voting power on improvements on the network. This spans topic including fees, Parachain connections, and technical upgrades, which developers can submit proposals for and have voted by network participants.



Staking:

DOT holders can participate on the network as nominators or validators with block rewards distributed to participants proportional to their stake. Participants can also be punished for acting maliciously or not correctly completing their role on the network by having their staked DOT, slashed.



Parachains:

DOT can also be used to bid for connections to Parachains, where DOT will be locked up to maintain a blockchain connection to Polkadot. This demand is self-reinforcing with more parachains leading to more DOT being locked up.

IMPLEMENTATION

INVESTORS



Nirvana Capital is a venture capital fund focussed on early stage blockchain projects and were early supports of Ethereum. Based in San Francisco the company also has Gole, Chainlink and Raiden network as part of their portfolio.



Hashkey Capital is a Hong Kong based Investment Fund that has taken notable positions in Avalanche, Harmony, Kava and Terra. The company also operates a institutional grade trading Platform called Hashkey.

CoinFund

Coinfund is a New York based research and investment firm which has made investment Messari, NEAR protocol, Serum and the Graph. The company's investments span digital assets, key enabling infrastructure, and decentralisation technologies.



Cryptocurrency investment firm **Digital Financial Group (DFG)** committed 200,000 DOT towards Polkadot's Efinity Crowdloan platform.

At the time this reflects a \$7million investment into a Polkadot Parachain. Other notable investors include: Block0, BlockAsset Ventures, Boost VC, Continue Capital, DU Capital ,Dokia Capital, Fabric Ventures, Fenbushi Capital, GT Blockchain Investments, Genesis Block, HashKey ,KR1, Kenetic Capital, Kosmos Capital, Metachain Capital, NEO Global Capital, Pantera Capital, Polka DAO, Polychain Capital, SNZ ,Sailor Capital ,The Cabin Capital, Three Arrows Capital, Turing Capital, Wolfedge Capital, Zee Prime Capital, Gibraltar, cp0x, zk Capital.

APPLICATIONS

Polkadot can connect any previously existing blockchain as long as it meets two criteria.

- The blockchain must be able to achieve compact and fast finality and validity.
- The network allows a collection of authorities to authorise transactions.

This allows virtually all major blockchains to connect to Polkadot and share information that would otherwise be isolated. The information from blockchains can then be accessed by the entire Polkadot network that did not have access before. This has a number of benefits, including efficiency and interoperability, which could be applied as:

Example 1: A smart contract originating on the Ethereum network triggers a payment of Dash from one wallet to another. This smart contract can connect to the Dash network through a Polkadot Parachain.

Example 2: A particular Chzainlink Oracle that simultaneously feeds data to a number of blockchains to operative De-Fi apps can do so through a Polkadot Parachain.

Both of the above examples demonstrate how Polkadot operates as an interoperable network of blockchains powering each other's operations.

Substrate

Fuelling the application of Polkadot is the Substrate software frame which allows developers to create custom blockchains on the Polkadot network. Substrate was developed by Parity Technology's, a parent company of Polkadot with the intention of simplifying the establishment of purpose built blockchains for developers. It is a web application framework that was used to build Polkadot itself.

The user-friendliness and simplicity of Substrate has accelerated both the adoption of blockchain technologies and the application of new projects on Polkadot.

IMPLEMENTATION

ADOPTION

A number of Blockchains and applications have begun using the information sharing network provided by Polkadot. As the adoption for the broader technology accelerates, the scalability of existing projects will be tested and Polkadot is likely to benefit.

Currently development activity on Polkadot is amongst the highest of the large cap cryptocurrencies and this trend is expected to continue as blockchain projects require interoperability and scalability services.

In November 2021, Gavin Wood commented how "users of applications built on Ethereum are enslaved by it economically," describing the scalability limitations of existing protocols.

Popular platform Bitoin.com saw total wallets grow by 22.9 million between November 2020 and November 2021 exhibiting the growing interest in digital assets and the subsequent pressure on scalability. In order to address this, many platforms are leveraging the scalability and Interoperability of Polkadot such as:



Polkadot's recent integration with Chainlink using substrate, is a powerful connection of two powerhouse cryptocurrency projects. Polkadot developers can now use Oracles from the Chainlink network to operate their smart contracts and it is expected that the partnership with Chainlink will drive user adoption moving forward.



The blockchain is a Parachain that uses the PolkadotEfinity Relay chain to achieve consensus on its network. Efinity is a blockchain developed for Non-Fungible Tokens (NFT's) aiming to escape, "crippling fees, inflexible smart contracts and disjointed interoperability." Polkadots Parachains are used to solve these problems leveraging the networks Relay Chain Validators to unburden Efinity users paying high fee's.

Using Polkadot, Efinity can also process 700-1,000 transactions per second against Ethereum's 15. Efinity continues to collaborate with Polkadot and the Web3 Foundation and as of November 25, 2021, Efinity had raised 1.7 million DOT worth \$68 million USD.



In November of 2018, De-Fi platform Ankr connected to the Polkadot network to provide liquid staking solutions. On the Ankr Parachain, participants can contribute their DOT tokens to crowd loan's and earn Ankr's native token ANKR. Essentially Polkadot sharded Parachain network has allowed Ankr to integrate its De-fi services in the Polkadot ecosystem for DOT holders.

FUTURE OUTLOOK

NEWS

Polkadot's vision is to take the crown as the ultimate internet of blockchains, but in doing so has encountered strong competition from an innovative community of developers. Moving forward, Polkadot will rely on its founder Gavin Wood and parent organisation Parity Technologies to drive innovation to remain ahead of its competitors.

In November 2020, launchpad platform Polkastarter announced they will launch NFT Metaverse Land Sales. Polkastarter allows users to purchase virtual real estate within virtual worlds. In recent months, metaverse focussed cryptocurrency projects have seen extraordinary gains, following Facebook's rebranding under a new parent company called Meta, short for metaverse. The announcement gave equities and cryptocurrency's providing metaverse services heightened attention, encouraging more investment in the sector.

ROADMAP

The future Roadmap of Polkadot primarily concerns the development of Polkadot 2.0 which according to Polkadot is currently in the midst of development. The project has provided relatively limited information though has identified the following areas of development:

- Economics and Networking (Zero-Knowledge): Zero knowledge Proof allows the verification of information in a fast efficient manner.
- Horizontal vs. Vertical scalability
- Nested Relay Chain's

FUTURE POTENTIAL

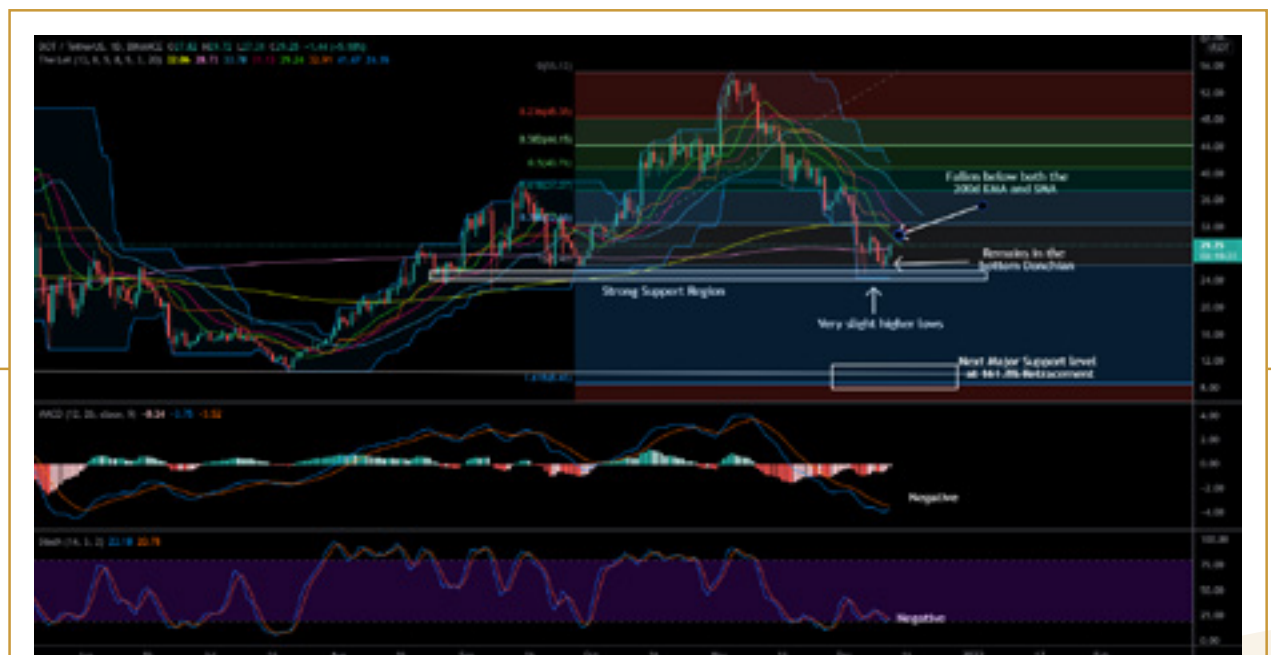
The outlook for the network remains bright as interest in Polkadot's technology extends institutionally. Data provider Messari reported that the most commonly held cryptocurrency asset of major funds in the third quarter of 2021 was Polkadot, ahead of NEAR Protocol and Oasis Network. Moving forward, Polkadot investors and developers await more news concerning Polkadot 2.0 which to date has been limited.

PoA: "Web3 Foundation will launch Polkadot in Proof of Authority mode."
NPoS: "During Nominated Proof of Stake, the network will run with a decentralized set of validators. During this phase, Web3 Foundation will use Sudo to increase the number of validators in the set."
Governance and Removing Sudio: "With Polkadot's governance system enabled, it can elect the first Council and Technical Committee and start accepting public proposals."
Enable Balance Transfers: "Polkadot allows balance transfers."
Future Upgrades: "Polkadot upgrades currently under development include upgrades to XCMP (Cross-Chain Message Passing) and the launch of parathreads."
Current Phase: "Parachain Rollout, Before being enabled by Polkadot's network governance, parachains will be tested and optimized both on parachain testnets and on Kusama."

TECHNICAL ANALYSIS

Polkadot is currently sitting on a crucial level of support established in mid 2021 with consecutive bearish candlesticks in recent weeks forcing prices lower. The price action has also fallen below its 200d day simple and exponential moving averages, though is resistant to falling any further. Three consecutive higher lows have

pushed Polkadot into a short-term wedge which has the potential to be further strengthened support at \$25 USD and act as a springboard for price appreciation. Moving forward, holding this level of support will be crucial with the next level of support and entry point being at the 168% Retracement which is also Polkadot's March low.



COIN IN FOCUS:



8. VECHAIN (VET)

VeChain prides itself as the world's leading blockchain application platform driven by enterprise adoption. The company was founded in 2015 and now has global offices across Europe, China, the US, Japan and Singapore.



PROJECT FUNDAMENTALS



Sunny Lu

Before co-founding the VeChain project in 2015, Sunny spent more than a decade as an IT Executive in Fortune 500 companies. He was previously the CIO of Louis Vuitton Greater China and is proficient in IT management and Strategy. Sunny graduated from Shanghai Jiao Tong University, majoring in Communication and Electronics Engineering.

TEAM



Jay Zhang

Jay is the Chief Financial Officer of VeChain and had previously assumed the role of Senior Manager in Finance and Risk Management for Deloitte UK and PwC China. He oversees VeChain's global corporate structure and is responsible for the company's governance and finances.

TECHNOLOGY

VeChain focuses on blockchain and Internet of Things (IoT) technologies to achieve its vision – developing a reliable ecosystem to allow for the coherent and transparent flow of information and enhanced collaboration that can be applied across a variety of industries. In 2018, VeChain rebranded itself and is now known as the VeChainThor blockchain. VeChain uses two native tokens – VeChain Token (VET) and VeChain Thor (VTHO). The former is the "Smart Money" used to transfer and store value, while the latter is the platform used for transactions and is equipped with proper governance and economic design.

Amongst many other decisions when rolling out a blockchain system is picking and subsequently rolling out a specific consensus protocol. Common protocols include Proof of Work (PoW) and Proof of Stake (PoS). However, VeChain has opted for a Proof of Authority (PoA) protocol – the most centralised approach. This approach allocates specific individuals monopoly power on the system and enables them to validate transactions at their discretion. However, this approach is subject to corruption should authority be abused.

Within VeChain, the platform boasts 101 authorised validators who support the VeChainThor protocol. These masternode operators have interests in line with VeChain's ecosystem corporate governance policies and whose identities have been authorised by the VeChain foundation.

Importantly, PoA unlocks headaches such as upgrade inefficiencies and energy wastage commonly faced by corporations. This is because PoA requires minimal computation power to achieve maximum network security and is controlled through a built-in smart contract.

TOKENOMICS

The maximum supply of VET sits at 86.71 billion. At the time of writing, 74 per cent of the maximum supply are in circulation (64.32 billion). Meanwhile, the total supply of the VeThor token sits at 40.16 billion.

IMPLEMENTATION

INVESTORS

Sharing the same vision as VeChain is six other companies whose industry standing in the market is unquestionable. They include Breyer Capital, DNV, PwC, Draper Dragon, Fenbushi Capital, and Future Cap, we'll explore in greater detail three key partners.

BREYER CAPITAL

Breyer Capital: Spearheaded by Jim Breyer, Breyer Capital is a global venture capital firm with an eye for high-impact ventures across the United States and China. The company has, in January 2018, confirmed its role as an investor in VeChain and will support VeChain as it works to form valuable partnerships. Despite its extensive portfolio, Breyer Capital is not an amateur in the crypto space, having made prior investments in Ethereum and Circle.

DNV-GL

DNV: DNV in May 2018 announced that it will be taking its relationship with VeChain to the next level, having acquired a stake in the VeChain foundation. The quality assurance and risk management company has further confirmed that it will be running 1 of the 101 Authority Masternodes. Prior to this, both DNV and VeChain have been working closely to develop selective dApps that DNV's customers currently adopt.



PwC: The summer of 2018 saw PwC Hong Kong and Singapore announcing a joint business relationship alongside a minority interest in VeChain. Among other reasons, both subsidiaries aim to capitalise on VeChain's Internet of Things (IoT) network to support large-scale corporations. This announcement marks PwC's pioneering decision to utilise blockchain technology to assist in supply chain and counterfeiting issues but, more importantly, falls in line with PwC's goal of resolving critical issues and building trust in society.

APPLICATIONS

An overarching mission of VeChainThor Blockchain is to develop more applications and linking them with business owners. Naturally, the blockchain network will perform the role of an intermediary, whose robust network infrastructure can be applied across the following areas:

1. Digital Carbon Ecosystem

Despite a global race towards zero emission, there exist several barriers that are inhibiting participation rates. The conventional carbon asset certification system is complicated and excludes consumers. Participation rates have been low, with corporations and consumers not seeing a reason to participate in carbon reduction initiatives.

- VeChain capitalises on IoT technology to gain access to various data sources such as garbage collection vehicles, cars and bikes. These data are uploaded and stored on the blockchain network.
- DNV, a Norway-based accredited registrar, verifies the data prior to carrying out the smart contract built by carbon experts. Thereafter, DNV tabulates the carbon reduction equivalent of each act and allocates carbon credits.
- Users can use carbon credits to pay for services and products, while retailers will benefit through increased human traffic.

8. Agriculture

It is uncommon for traditional agriculture businesses to incorporate any form of digitisation in their respective business models. Most small-scale farms in China lack supervision and the quality of products naturally differ.

- Co-developed by VeChain, the Agriculture Big Data Platform monitors all agricultural-related data pertaining to packaging, logistics, production, and planting.

IMPLEMENTATION

2. Consumer Confidence Index

Within the Fast Moving Consumer Goods (FMCG) sector, there exists a perennial issue of information asymmetry between consumers and retailers. Manufacturers can abuse previously established trust and manipulate data at their discretion. Other areas of concern include the reliance on paper documents which comes at the expense of increased costs, reduced efficiency, and food safety issues that occur during the process.

- To alleviate this problem, VeChain's Consumer Confidence Index Platform puts in place quality control measures by monitoring the entire product lifecycle while exercising quality control.
- The platform encourages the transition away from physical documents while providing valuable insights, including big data and consumers' feedback.

3. Automobile

- Car dealers usually maintain data related to vehicle production, sales and possibly maintenance. Therefore, information asymmetry exists as other service providers may not find the data provided entirely convincing. Automobile retailers also fail to capitalise on the benefits of data, leading to an inherent lack of repeat customers.
- VeChain's Automobile Lifecycle Management Solution assigns an exclusive VeChain ID to monitor all vehicle-related details. These are stored on the VeChainThor Blockchain.
- Automobile Manufacturers gain access to a suite of vehicle information, including past conditions and replacement records. Insights can be passed on to the R&D team to improvise the product.

4. Logistics

When goods are transported, data collection is typically undertaken manually. However, this process introduces errors as data can be easily manipulated. Additionally, several upstream and downstream enterprises are not integrated with each other. This means that information cannot be shared, preventing brands from managing the complete logistic process efficiently.

- IoT gadgets that have been embedded with a VeChain ID can monitor every step of the logistics process.
- In ensuring immutability, data collated is stored on the VeChainThor network. Businesses can upload and look for information at their discretion with APIs provided by VeChain.

5. Liquefied Natural Gas Solution

Despite the various ways of measuring gas, an industry-standard has yet to be defined. This, therefore, results in discrepancies among price, quality and subsequently service. Along with limited transparency in the supply chain, limited exposure to digitisation has led to inefficient business management.

- By capitalising on IoT, VeChain's LNG solution can monitor the entire process from transportation to storage tanks. Data collated will be stored on the network to ensure they are reliable and genuine.
- To access any goods-related information or transactions, users can simply input their order numbers through their app allowing for real-time updates and increased transparency.

IMPLEMENTATION

7. Document Management

With hardcopy documents, they are subject to forgery. In addition, the conventional method of storing documents may result in severe consequences should they suffer damages or get misplaced. As each user only stores its own data, this, therefore, prohibits cross-platform sharing, further promoting inefficiencies in the workplace.

- Through VeChain's Electronic Certificate/ Document Deposit Solution, documents can be transferred from physical to digital copies without compromising security.
- Digital certificates are stored on the blockchain. Notably, owners of electronic certificates can grant users the right to access the document as part of the verification process.

6. Digital Content Distribution

It is common to encounter the spread of false online information, and the process of ownership identification is often arduous. In addition, data on distribution platforms are easily manipulated while content is miscategorised.

- Both a time stamp and distributed ledger will allow users to verify copyright issues promptly. Content creators can register on the VeChainThor Blockchain for traceability purposes.
- Content creators are able to look up registration history, and even download its certificate for users' access. With the certificate, this acts as a layer of protection for content creators.

9. Retail

With an uptick in counterfeiting goods among the retail sector, current measures make it hard for consumers to differentiate genuine goods from knock-offs. In addition, manufacturers find it difficult to verify the products' authenticity when clients make a refund or exchange. On a separate note, financial service providers further encounter difficulties to track the usage of mortgage or insurance services.

- Depending on customers' requirements, products are encoded with RFID chips and QR codes during the production process. A VeChain ID is assigned to record data throughout the product lifecycle.
- At every stage, DNV verifies, uploads and holds the blockchain to instil trust between customers and companies and ensure authenticity is upheld.
- VeChain Pro App allows users to scan QR codes to verify products' authenticity, thereby boosting confidence. The app also allows for interaction between users and sellers, further enhancing customer retention.

IMPLEMENTATION

ADOPTION

Since it was established, VeChain has established valuable partnerships with a list of players demonstrating the wide applicability of its blockchain network. A comprehensive outline of these partnerships can be found at vechainsider.com, out of which prominent names include:

1. Walmart

Back in June 2019, Walmart China unveiled a VeChain-powered food safety platform. The platform is equipped with traceability features, and is built to furnish customers with more information surrounding the quality of food they are purchasing.

As seen in the picture below, consumers will be directed to a webpage outlining specific product-related information upon scanning a QR code. They include the route taken before products land in physical stores, ways to use and store products following purchase and supplier information.

2. BYD

Rechains had in September 2018 announced its partnership with BYD, one of China's largest electric vehicles manufacturer and energy storage players. Along with DNV and VeChain, BYD has implemented a caron credit application to be installed in BYD vehicles. Specifically, this initiative monitors drivers' driving habits and provides incentives based on the vehicles' carbon reduction and driving performance.

Footprint captured will be made available to users keen to participate in the program, who can then use the credits to purchase products at a discount.

3. BMW Group

BMW USA has in March 2018, issued a public statement confirming its partnership with VeChain. Specifically, the goal of VeChain's participation in the BMW Startup Garage programme is the roll out and Proof of Concept (POC) on the use of blockchain technology. This technology is poised to be used as a solution for vehicle data storage alongside its controlled provision to third parties.



Via Stormgain.com

FUTURE OUTLOOK

NEWS

VeChain has concluded that the main driving force fueling the mass adoption of non-fungible tokens (NFTs) is going to be enterprises. Naturally, Vechain believes the most optimal way is to establish a close relationship with them to implement a bustling Enterprise NFT (eNFT) ecosystem on the VeChainThor blockchain.

As opposed to individuals, enterprises adopt a clearer vision when developing and designing NFTs. They also bring in new eNFTs into the ecosystem once they are issued and subsequently become tradable on marketplaces. Therefore, VeChain from 2015 has been working towards encouraging corporations to mass adopt blockchain technologies.

The upcoming PoA 2.0 is expected to give VeChainThor a competitive advantage with its block-committee mechanism that raises the upper bound of the maximum throughput of VeChainThor.

OUTLOOK

Moving forward, VeChain will be channelling its focus on three key areas:

1. Migrating PoA 2.0 to the mainnet for improved security and obtain scalability
2. Building and finetuning dApp development tools to ease some weight off developers' shoulders
3. Introducing stablecoins to the arena

Collectively, these upcoming initiatives will work hand in hand to enable VeChain to revolutionise the eNFT arena.

ROADMAP

June 2015: First Generation Technical Proof of Concept (TPOC) was generated
June 2016: VeChain v1.0 was launched in Shanghai
May 2017: VeChain 3.0 was launched, with increased commercial use cases such as automobiles, agriculture, and luxury goods
October 2017: First blockchain solution for digital vehicle passport was rolled out
May 2018: DNV acquired an ownership interest in VeChain
June 2018: VeChainThor's blockchain was made open source and implemented its mainnet
September 2018: DNV and VeChain announced Digital Carbon Ecosystem on VeChainThor
November 2021: The Vechain PoA 2.0 consensus mechanism combines Byzantine Fault Tolerance and Nakamoto Consensus

TECHNICAL ANALYSIS

VeChain is loosely holding onto a key level of support at approximately 80 cents with a negative MACD and negative Stochastic threatening further downside. Currently VeChain is trading 54% lower than its recent highs and almost 70 lower than its all-time highs at 27 cents. The price action has however used the 161.8% Fibonacci Retracement

as support in recent candlesticks with a strong likelihood that the downward trend is being met with some buying pressure. Moving forward, VeChain's price action will potentially remain under pressure in the short term, however presenting potential entry points from 56-80 cents.



COIN IN FOCUS:

9. SOLANA (SOL)

Solana (SOL) is a third-generation platform that provides a foundation for decentralized applications (DApps). Its whitepaper was launched in 2017 and utilises a Proof-of-Stake (PoS) protocol that aims to achieve scalability without compromising security.

PROJECT FUNDAMENTALS

TEAM



Anatoly Yakovenko

Anatoly Yakovenko founded Solana in 2017, having published a whitepaper draft outlining a revolutionary timekeeping method for distributed systems known as Proof of History (PoH). He boasts an extensive career as a Software Engineer, having spent more than a decade with Qualcomm, Dropbox, and Mesosphere.



Greg Fitzgerald

Greg Fitzgerald is the Co-Founder and Chief Technology Officer of Solana. Before assuming these roles, he was the Principal Engineer of the firm, where he worked on building blockchains capable of withstanding more than 50,000 transactions per second.

TECHNOLOGY

Solana's competitive edge lies in its suite of architectural design choices that provide faster transaction settlement times. To date, Solana Labs is the primary contributor to the network, which was officially launched in March 2020 by The Solana Foundation – a not-for-profit organisation that assists in funding ongoing initiatives.

1. Proof of History (Cryptographic clock for the blockchain)

A common hurdle faced by distributed networks is arriving at a consensus on an exact time as to when events unfolded. Unlike its competitors such as Bitcoin which adopts a Proof of Work (PoW) algorithm, each bitcoin miner includes the time and date to the block based on their local clock. This time may be inaccurate or differ as opposed to other nodes.

Solana's Proof of History (PoH) solution resolves this issue by improving the time taken to check on the order of these transactions. Every Solana validator keeps track of its clock by encoding a simple SHA-256, sequential-hashing verifiable delay function (VDF) on transactions. This unique feature naturally outlines a succinct, verifiable sequence of transactions without requiring the need for a timestamp.

Importantly, PoH does not serve as a consensus mechanism. Instead, as its name suggests, PoH is a global clock that acts as a proof that a specific event unfolded at a particular time. This, combined with a PoS protocol, expedites the process taken to select the next validator and is the driving force behind the network's ability to process 50,000 transactions per second.

PROJECT FUNDAMENTALS

2. Tower Byzantine Fault Tolerance (BFT)

Tower BFT is Solana's interpretation of the Practical BFT system and capitalises on its PoH solution prior to the global clock consensus. Another characteristic of Tower BFT is the ability for users to tabulate the timeouts for other users without the use of secondary P2P communications. Therefore, consensus can be reached all while enjoying reduced transaction latency and communication overhead.

3. Gulf Stream

Also labelled as Solana's Mempool-less transaction protocol, Gulfstream is the driving force behind Solana's title as the fastest blockchain network. A mempool operates as a waiting room. It contains transactions that have been submitted but yet to be included in a block. Gulf Stream serves to push for transactional forwarding and caching.

Since Solana' infrastructure allows validators to know beforehand the sequence of upcoming leaders, this means that users and validators can forward transactions to leaders in advance. Importantly, other benefits include shorter confirmation times, less memory pressure on validators and, in turn, swifter leader switching.

4. Sealevel

Blockchain networks are typically single-threaded processors. This means that only one state update is made at any point in time. Naturally, another underlying beauty of Solana is Sealevel – a revolutionary processing engine capable of supporting parallel transaction execution. Solana accomplishes this by having its transactions detail all the states a transaction will read or write. Consequently, this not only prevents duplicate transactions from co-occurring. It further allows for transactions reading the same state to be executed simultaneously.

Of crucial importance is the fact that Sealevel does not carry out transactions. Instead, it allocates transactions to an industry-certified bytecode known as Berkeley Packet Filter, which can handle tens of thousands of contracts in parallel.

5. Turbine

A common issue encountered by blockchain networks is how the network replicates vast amount of data to a broad audience. This witnessed the development of Turbine – Solana's way of enabling block-propagation. Turbine is optimized for streaming. As a block gets streamed, it is divided into small packets before being dispersed across a large group of random audiences. Naturally, Solana resolves the issue of scalability and enjoys the benefit of shorter transaction settlement time.

6. Cloudbreak

Solana's Cloudbreak architecture is developed to curb the issue of insufficient memory space necessary to monitor accounts. Instead of resorting to a conventional database to resolve this issue, Cloudbreak is optimized to withstand multiple reads, writes across a configuration of solid-state drives and leverages on memory-mapped files. On the flipside, Cloudbreak also acts as a garbage collector. As accounts are being updated and as forks approach finalisation, expired accounts are collated, and memory is dissolved.

7. Pipeline

To achieve split-second confirmation times, Solana had to develop a way to verify blocks of transactions while replicating them across nodes in the network. Solana achieves the validation process through Pipelining. Importantly, pipeline works best under two conditions. Firstly, there exists a string of input data that undergoes a series of steps. Secondly, each step falls under the responsibility of a different hardware. The Pipeline mechanism known as Transaction Processing Unit undergoes a four-stage process.

It begins at the Kernel level where Data Fetching occurs, moves through to GPU level where Signature Verification occurs, on to the CPU level where Banking takes place and finally, back to the Kernel level where writing takes place. The multi-step approach promotes efficiency while ensuring that the hardware operates round the clock.

8. Archivers

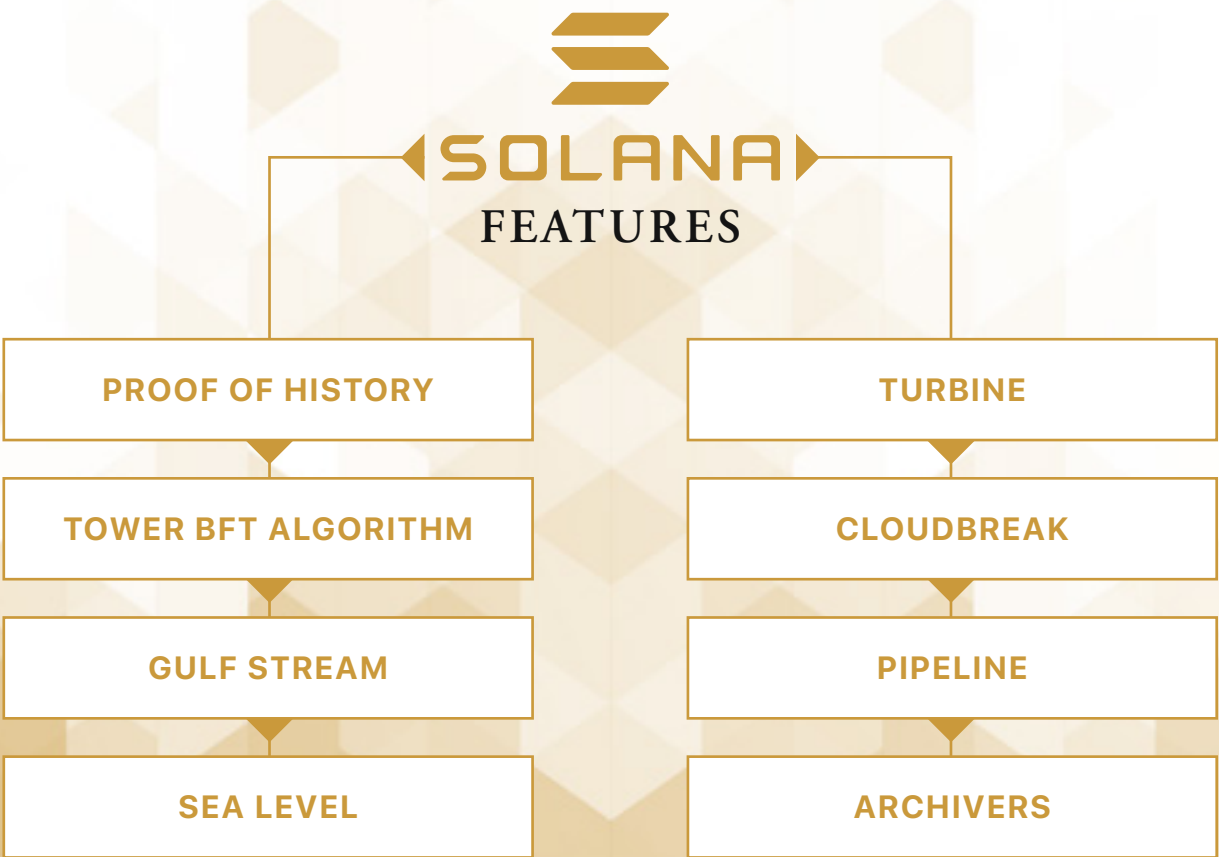
When Solana's network achieves 100 per cent capacity, it will generate 4 petabytes of data annually. Yet should each node be required to contain all these data, that would, in turn, weigh on network membership. Archivers act as Solana's distributed ledger warehouse storing petabytes of blockchain data. It can come in the form of lightweight nodes such as laptops. Occasionally, the network will require Archivers to show that it is storing the data they are required to. Archivers play a crucial role as they guarantee the availability of data, and whose storage volumes surpass that of any global cryptocurrency exchange.

SCARCITY

As of the time of writing, the total supply of coins in circulation sits at 503 million. The maximum supply is unknown as of yet.

“Solana is a decentralized blockchain built to enable scalable, user-friendly apps for the world.”

(Solana)



“Accountability, setting goals and failing is how you grow.”

(Anatoly Yakovenko)

IMPLEMENTATION

INVESTORS

In June 2021, Solana announced the completion of a Private Token Sale where a total of \$314.15 million was raised. Interestingly, this amount was derived from the mathematical constant pi (π) multiplied by \$100 million. The funding round was headed by two reputable Venture Capital players in Silicon Valley – Andreessen Horowitz, and Polychain Capital.

Other participants include Alameda Research, 1kx, Blockchange Ventures, CMS Holdings, Coinfund, CoinShares, Collab Currency, Multicoi Capital, Memetic Capital, ParaFi Capital, Jump Trading, Sino Global Capital as well as individual investors such as Boys Noize.

As opposed to the conventional purchase of equity shares, the sale involved purchasing Solana's digital tokens – SOL.

More importantly, funds raised will be used to roll out an incubation studio to ramp up the development of decentralized applications on Solana.

Solana further intends to build a venture investing division alongside a dedicated trading desk solely for the platform's ecosystem. Earlier in March, the investment division of the exchange OKEx, Block Dream Fund, has kickstarted an investment fund. OKEx has assigned \$100 million to the Block Dream Fund, out of which 20 per cent will be dedicated to ramping up the growth and development projects key to Solana's ecosystem.

APPLICATION

Solana's overarching goal lies in its ability to unlock the perennial blockchain trilemma. The trilemma stipulates that a decentralized network can only satisfy two among three main features – scalability, security, and decentralisation. Solana breaks this norm by combining the PoS protocol alongside its revolutionary Proof of History (PoH) solution.

Scalability

Solana capitalises on PoH and several of its innovative features to support a transaction throughput of 50,000 transactions per second while maintaining 400 milliseconds of block time. This speed is 100 times faster than that of Ethereum's 20 transactions per second. As opposed to other blockchains, Solana scales with Moore's Law, further differentiating itself from distorted Layer 2 systems. This scalability also ensures that transactions for both users and developers remain as low as \$0.01.

Security

Solana's PoH solution significantly brings down the amount of time spent validating the sequence of transactions. Along with PoS, the process of selecting the next validator is shortened and further prevents miners and bots from determining the sequence in which transactions appear on the blockchain. Consequently, both aspects work together to uphold enterprise-level security. Solana is also audited by a Fortune 500-preferred security corporation.

Decentralized

A beauty about Solana is the fact that it is censorship resistant. This means that, unlike fiat currency, there is no centralized control over the network and can remain open for applications to run. Solana's use of the Turbine protocol further supports thousands of nodes without compromising on scale.

IMPLEMENTATION

ADOPTION

Solana prides itself as the fastest blockchain globally. Naturally, at the end of 2020, the platform boasts more than 4.9 million unique SOL wallets. Solana is a firm believer of close partnerships, which it deems paramount to the success of any L1 network.

It has over the years been involved in more than 400 projects spanning across decentralised finance (DeFi), Non-Fungible Tokens (NFTs), and Web3. Key collaborations formed in 2020 include Circle, Audius and Coinbase, among others:



Circle, the founders of USDC, has in October 2020 announced the immediate availability of USDC for Solana, to be known as USDC-SPL. As a point of context, USDC prides itself to be among the fastest-growing US dollar stable coins. The partnership makes Solana the fourth protocol, after Ethereum, Stellar and Algorand to collaborate with Circle and has as of 16 August exceeded \$1 billion USDC in circulation.



Audius has, on 30 October, announced its decision of selecting Solana to scale community-owned music streaming. The prominent streaming app aims to develop a platform that transfers power to content creators. Importantly, as Audius witnessed an influx of users on its platform, it was also faced with increased fees and load times.

Naturally, having examined more than twenty L1 and L2 scaling solutions, Audius has selected Solana as it was the only player who ticked all the boxes – low costs and high speed. The success of this partnership can be witnessed through a recent update in August 2021 where Audius broke 5 million Monthly Active Users (MAUs) – a 400 per cent increase in less than twelve months.



Solana had, in October 2020, entered a partnership with Coinbase Custody – a standalone fiduciary and custodian under New York State Banking Law. Both parties have been working closely to enable the smooth incorporation of Solana into the system. For institutional investors especially, the term "custodian" is usually associated with complexity.

As such, Solana decided on working with one of the most reliable custody providers globally to execute its mission of obtaining security and speed in the space of decentralised finance. Coinbase Custody abides by some of the most stringent protocols, and its reputation is upheld by Coinbase's 8-year track record of zero cyber incidents.

FUTURE OUTLOOK

NEWS

Solana has, in 2020, witnessed exponential gains with recent trading volumes being supported by new institutional backing. CEO of FTX Exchange adopts a similar view and attributes the recent boom partly to NFTs, DeFi and the recent launch of the Pyth Network.

Solana is working actively to widen its global reach. In May 2021, Solana announced a \$100 million investment from five funds to substantiate its presence within the Chinese crypto space. They include Gat Labs, Huobi, NGC Ventures, MATH Global Foundation and Hash Key. Importantly, funds will be allocated to infrastructure initiatives, financial management and recruitment activities.

OUTLOOK

Looking to the future, Solana Labs CEO and Co-Founder believe the next phase is bringing on board a billion users. Both individuals expressed confidence in achieving that target as Solana was developed from the ground up to cater to this capacity. With the additional funding, Solana Labs is in an excellent position to attract the right partners and capital to build the right products. In particular Co Founder Anatoly Yakovenko is known for his commitment to the long term vision of the project.

ROADMAP

As of August 2021, there only exists one item pending completion on Solana's roadmap.

1. Tour de SOL Testnet

Solana's Tour de SOL (TdS) was first launched in February 2020. Right from the start, Solana had planned for its TdS testnet to undergo a series of steps alongside initial iterations of the project's mainnet. This process involves multiple stress tests that are undertaken on a live cluster, with an emphasis on network performance.

2. Mainnet Beta

Solana's Mainnet beta was initially launched in March 2020 having completed a \$1.76 million raising through a public token auction. Beta implies that it is currently in development even though the network boasts smart contract support alongside fundamental transaction capabilities. However, it excludes any staking rewards for validators. The term Beta can be removed to transit to a production-ready version when network inflation is turned on.

3. Full Mainnet

The upgrade from Mainnet Beta to a complete mainnet version remains unknown, even though initial launch dates were set for December 2020. This all-rounded version of mainnet will boast Solana's anticipated inflation schedule. To boost the network before the launch, Solana is extending an invitation to teams to take part in several Hackathons. Doing so will enable teams to test and capitalise on the Solana network, with prizes of up to \$1 million to be won.

TECHNICAL ANALYSIS

Solana, unlike many major coins and tokens has held up well during a period of Bitcoin weakness, though has consistently made higher highs and higher lows in recent weeks. The price action is below all Alligator teeth and recently pushed the bottom Donchian lower. Currently Solana

is approaching two crucial levels of support that align with previous lows and Fibonacci Retracements. On an hourly candlestick chart the price action has recently crossed below the 200-day simple and exponential moving average but is approaching a key region of resistance.



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