













DLT SCIENCE FOUNDATION

TABLE OF CONTENT

From Crypto Valley to Crypto Oasis: A Pioneering Journey Ralf Glabischnig Saqr Ereiqat Faisal Zaidi	6	Chapter 2 Jurisdictions & Regulators	42
Foreword Daniel Rutishauser	8	MICA – EU´s Crypto Regulation Timea Nagy, Senior Legal Counsel, AlpinumLaw	44
Introduction	10	Infographic: Protocols Worldwide	46
Status Quo	12	Chapter 3	
Report Objectives	13	Funding & Valuations	48
Content Overview	13	Introduction to Different Approaches to the	50
Chapter Details	14		50
How to Read this Report	15	Infographic: Marketcap by Country	52
Chapter 1 Evolution of DLT Concepts	16	Global Cryptocurrency Adoption and the Preference for Bitcoin in Emerging Economies Todd Groth CFA, Head of Research, Coindesk Indices	- 54
Bitcoin Evolution	18	Infographic: Protocols as a Percentage of Total MarketCap	56
The Evolution of DLT Protocols - The Inception and Evolution of Blockchain Technology	20	Eunderstanding The GDPX: The Future Metric of The Digital Economy	58
Fundamentels of DLT Protocols: First-Generation Blockchains: Bitcoin and Other Cryptocurrencies (2008 - 2013)	22 23	Forkastlabs Infographic: Increase in Market Cap Year on Year	60
Second-Generation Blockchains: Smart Contracts (2014- 2015)	25	Valuing Crypto Coins and Tokens with Artificial Intelligence and Quant Tools - Two Examples Aisot	62
Third-Generation Blockchains: Applications and Smart Everything for a Digital Society	27	Infographic: Protocol Token Volatility Chart	66
(2016 - 2019)		Infographic: Bitcoin as a Percentage of Total MarketCap	68
Fourth-Generation Blockchains: Adoption (2019 - 2030e)	30	Chapter 4 Accessing Protocol Maturity	70
(Beyond 2030e)	32		
Self-Sovereign Identity: Technical Foundations and	33	Research & Methodology	72
Applications DLT Science Foundation		Neptune – Opinion Piece Dr Alan Szepieniec, Co-Founder, Neptune	/6
Cryptocurrency Inflation: Unveiling the Hidden Costs Edy Haddad, Co-Founder & CTO, PWR Labs	38	Evolving The Blockchain Gregorios Siourounis, Managing Director, Sui Foundation	77
Towards a More Responsible AI How to avoid a real-life Skynet. Mrinal Manohar, CEO & Co-Founder, Casper Labs	40	Layer What? - The Mixed Messaging of Layer-1 Brands German Ramirez Managing Co-Founder & Chief Relevance Officer, The Relevance House	78

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Chapter 5 **Protocol Fact Sheets**

Introduction to One Pagers

Ton Dro	teesle
TOP Pro	Ritegia
	Algerand
	Arbitrum
	Avalanche
	BNB Chain
	Cardano
	Casper
	Chiliz Chain
	Conflux
	Cosmos
	Cronos Chain
	DYDX
	EOS Network
	Ethereum
	Fantom
	Filecoin
	Flow
	Gala
	Hedera
	Immutablex
	Injective Protocol
	Internet Computer
	IOTA
	Kava
	Klaytn
	Mantle
	Mina Protocol
	Monero
	Near Protocol
	Delladet
	Polkduol
	Radiy
	Ripple
	Solana
	Stacks
	Stellar
	Sui
	Tezos
	The Graph
	Theta Network
	Toncoin
	Tron
	Vechain
	XDC Network
	ZCash

84	Additional Protocols
	Aeternity
86	Aleph Zero
	Base
	Concordium
88	E Credits
90	Everscale
91	Gnosis Chain
92	Harmony
93	Haven1
94	Lisk
95	Loopring
96	Neptune
97	Partisia Blockchain
98	Powerledger
99	PWR Chain
100	Qtum
101	RBTC
102	SEI Coin
103	Skale Network
104	Storj
105	Venom
106	Ziliqa
107	
108	Data Partners
109	
110	
111	
112	
113	
114	
115	
116	
117	
118	
119	
120	
121	
122	
123	
124	
125	
126	
127	
128	
129	
130	
131	
152	
155	
154	
155	
150 177	
157	

138 139



140 142

> 143 144

> 145

146

147

148

149

150

151

152

153 154

155

156

157

158

159

160

161

162

163

164



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FROM CRYPTO VALLEY TO CRYPTO OASIS: **A PIONEERING JOURNEY**

Cryptocurrency, a cohesive ecosystem is crucial to comfort, and tax structure it offered. foster collaboration and innovation. As trailblazers in the Blockchain industry, both Crypto Valley and the Crypto Oasis Ecosystems were built to fulfifll the need for safe havens where Crypto entrepreneurs, investors, and stakeholders could thrive.

A fragmented Blockchain world defeats the purpose of the disruption and innovation that Decentralised technologies offer. Creating local and then global Blockchain ecosystems is necessary to help organisations in the Blockchain space collaborate to fuel further disruption and help innovative enterprises flourish.

A clear vision led to the founding of the Crypto Valley Association in Zug, Switzerland, which has now grown into a global hub for Blockchain technology. The logical next step was the promising horizon of Crypto Oasis in the United Arab Emirates and together the two Ecosystems are working closer than ever to further the Blockchain cause globally.

Crypto Valley: From Switzerland to Global Prominence

Crypto Valley, as we fondly refer to the thriving Blockchain ecosystem in Central Europe, has come a long way since its inception. With its rich tradition of financial security, neutrality, and privacy, Switzerland was a natural choice for Blockchain enthusiasts and digital asset holders. Vitalik Buterin, the founder of Ethereum, and Niklas Nikolaisen, the founder of numerous Blockchain organisations establish Bitcoin Suisse, were among the early adopters who made Zug their home in 2013. What set Zug apart

In the ever-evolving world of Blockchain and was the unparalleled trust, openness, regulatory

The Crypto Valley Association has played a pivotal role in the ecosystem's growth. Its co-working space in Zug, the Lakeside Crypto Lab, was the birthplace of many startups. They also organised competitions to stimulate innovation within the Crypto sector. Today, Crypto Valley is home to over 1.250 organisations, specialising in Web3, Blockchain and Crypto technologies.

Crypto Oasis: UAE's Ascent in the Crypto World

The United Arab Emirates (UAE) has been uniquely poised to embrace the needs of digital asset holders, thanks to its history of attracting investment and its reputation for stability. With an ever-evolving culture and laws that favour entrepreneurship, the UAE guickly emerged as an attractive hub for Blockchain technology and its applications in the world of finance, the Internet of Value, Web3, and the Metaverse.

In response to this momentum, and inspired by the Crypto Valley, the Crypto Oasis was introduced as a Blockchain Ecosystem with bigger aspirations because the UAE has better framework to scale fast and grow internationally as a Blockchain destination. Through strategic partnerships and cooperation with economic free zones such as Dubai International Financial Center (DIFC), Crypto Oasis has helped operations in the UAE.

industry and there are over 1,850 organisations within the Crypto Oasis Ecosystem, many of which have been documented in the second edition of the Crypto Oasis Ecosystem Report 2023.

Some of the initiatives to bring value to the ecosystem include the partnership between DIFC and Crypto Oasis Ventures to collaborate on its ongoing and upcoming startup accelerator programmes. The Dubai AI and Web3 Campus is one such initiative by the DIFC Innovation Hub that is aimed at improving Dubai's digital economy and building a tech hub for AI and Web3 Startups. Such enterprising efforts help underline the Crypto Oasis' vision to make the UAE the Blockchain capital of the world and to bring together expertise, innovation, and talent, further propelling the growth of the Blockchain Ecosystem in the UAE.

Celebrating the Synergy between Switzerland and the UAE

Recently, both Crypto Valley and Crypto Oasis celebrated the Swiss Web3FEST, a testament to the alliance between these two pioneering ecosystems. This event showcased the power of collaboration and highlighted the importance of creating global connections in the Blockchain space. The Crypto Oasis Web3 Meta community 'arte' was a major part of the Web3 fest. It stands out with a remarkable record of 60 meetups in the past year, featuring over 120 project presentations, 'arte Talks' at the Theatre of Digital Art, Madinat Jumeirah, have welcomed many influential figures in the Web3 domain.

As of Q2 2023, there has been a massive surge in At the Web3Fest, Crypto Oasis Ventures had the institutional and individual adoption in the Crypto European launch of their groundbreaking initiative in alignment with the UAE's COP28 agenda. 'The Green Block' is a specialised ecosystem for Blockchain and AI entities, dedicated to ESG (Environmental, Social, and Governance) ideals. It strives to foster sustainability by uniting innovators and entrepreneurs to create and implement solutions promoting environmental responsibility and social accountability. The Green Block serves as a pivotal connector for this segment of the industry, harmonising it with the global ESG goals.

Looking ahead, the cornerstones of the success of the Crypto Valley and Crypto Oasis have been the cities of Zug and Dubai. The stable and favourable regulatory environment and the supportive policies in the UAE especially have positioned the country as a modern-day renaissance hub, at the forefront of technological disruption, particularly in AI, the Metaverse, and Web3.

The Crypto Oasis is a flourishing Blockchain ecosystem that is co-authoring the next chapter in Blockchain innovation. The progressive and supportive regulatory environment, a robust pool of industry talent, and unparalleled opportunities for Crypto innovation make Crypto Valley and the Crypto Oasis two of the most promising and dynamic hubs in the world for Blockchain and Crypto development. This is a journey that we have established from grassroots to global dominance, scaling the heights of innovation and disruption in the world of Blockchain.





FOREWORD

Frequently, I overhear people remarking, "Yet another Blockchain," when they encounter a new Layer-1 or Layer-2 Blockchain protocol. It is understandable that some may start to feel overwhelmed by the sheer number of Blockchain protocols. Even for organisations like ours, who are deeply immersed in the world of distributed ledger technologies (DLT) and diligently crafting DLT-based solutions for our clients, it remains a challenge to keep pace with the rapid speed of innovation. In addition to the novel approaches to funding through initial coin offerings (ICOs) and security token offerings (STOs), as well as the rise of non-fungible tokens (NFTs), we have yet to witness the full spectrum of DLT-based solutions materialise. The initial anticipation was that Blockchain technology would emerge as a groundbreaking force, promising to revolutionise industries and redefine how we transact, govern, and interact within the digital landscape.

As we witness the ascendancy of more and more Web3 projects, whether through the introduction of selfsovereign identities (SSI), the tracing of supply chains, novel methods of community engagement, the digitization of assets, or the unfolding realm of Decentralised finance

(DeFi), it becomes increasingly evident that DLT and token economies are steering us into the next phase of digitization. However, the challenge lies in selecting the right Blockchain amidst this burgeoning landscape. Decision-makers new to this technology often struggle with identifying the appropriate assessment criteria and with finding comprehensive information for informed evaluations. In this nascent industry, the establishment of a standardised framework for sharing information and experiences remains a work in progress.

This is precisely why a hub that consolidates all pertinent information becomes a necessity. The report you are about to delve into is dedicated to unraveling the foundational layers of Blockchain networks, with a specific emphasis on Layer-1 and Layer-2 protocols—the very bedrock upon which Blockchain systems are constructed. This marks the first step toward raising awareness of an initiative that has obtained support from leading Blockchain protocol organisations. The information contained herein will be continually updated and enriched with real-world adoption examples and practical experiences, all with the ultimate aim of fostering widespread adoption. Innovation in the Blockchain space is relentless, with new protocols continually introduced to address evolving challenges. Innovation cycles, as history has shown with previous technological revolutions like the advent of the World Wide Web, are inherently brief during the infancy of a new technology. The same holds true now for DLT. As we watch Blockchain technology evolve and mature, we hope that this report will emerge as an indispensable resource for decision-makers, academia, and policymakers seeking to harness the true potential of Layer-1 and Layer-2 protocols. By cultivating a deeper understanding of these foundational elements, we can collectively unlock the boundless possibilities that Blockchain technology offers and usher in a new era of innovation.

Our gratitude extends to the tireless efforts of the experts, researchers, and innovators who have contributed to the development and advancement of Blockchain protocols. Their unwavering dedication has paved the way for the transformative capabilities of Blockchain technology, propelling us closer to a more Decentralised, secure, and efficient digital future. The time has now come to consolidate information and collaboratively chart the course forward.



Daniel Rutishauser

Partner, Head Web3 Solutions Inacta Ventures



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INTRODUCTION

The inception of Distributed Ledger Technology (DLT) can be traced back to a pivotal moment in 2008 when Satoshi Nakamoto published the Bitcoin white paper. Bitcoin, as the world's first Decentralised Cryptocurrency, embarked on a transformative journey that would reshape the landscape of finance. It introduced the revolutionary concept of a peer-to-peer electronic cash system, challenging traditional financial systems and central authorities.

Bitcoin's resounding success and the innovative potential of its underlying Blockchain technology set the stage for a wave of Cryptocurrency developments and the exploration of DLT applications extending far beyond the realm of digital currencies.

Then, in 2015, Vitalik Buterin introduced Ethereum, a groundbreaking Blockchain platform that brought a whole new dimension to the world of Blockchain technology. Ethereum's hallmark feature was its programmable nature, facilitating the creation of Decentralised applications (dApps) through the ingenious use of smart contracts. This innovation greatly expanded the horizons of Blockchain technology, opening the door to an array of diverse applications across various industries.

The launch of Ethereum marked a watershed moment, ushering in a new era of Blockchain-based innovation. This era, often referred to as Web3, has since continued to evolve, giving rise to a range of technologies and applications that hold the potential to redefine the way we interact with digital systems, data, and each other.



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STATUS QUO

The COVID-19 pandemic emphasised the importance of digital certificates and credentials. Mobile certificates became crucial in verifying vaccination records and test results, facilitating safe travel and access to public spaces. Doubts about personal data protection have been omnipresent. Blockchain technology could provide a secure and tamper-resistant platform for storing and verifying these certificates, ensuring their authenticity and privacy. The use of DLT-based mobile certificates highlight the potential of Blockchain in addressing real-world challenges and ensuring the integrity of critical data.

In the last couple of years leading up to this report, the Blockchain space witnessed a frenzy of interest in Non-Fungible Tokens (NFTs). NFTs are unique digital assets representing ownership of digital art, collectibles, virtual real estate, and more. The NFT boom brought unprecedented attention to the potential of Blockchain in the creative and entertainment industries. However, as with any rapidly growing market, the initial hype led to speculative bubbles and inflated prices. Over time, the NFT market experienced a cooling down, leading to a more sustainable and mature approach to tokenisation and digital asset ownership.

One significant development in the Blockchain space has been the increasing clarity in regulations governing Cryptocurrencies and Blockchain-based assets. As governments and regulatory bodies worldwide recognised the importance of the Blockchain technology, they started establishing frameworks to address the challenges posed by this innovative technology. Clearer regulatory guidelines have provided a more favourable environment for Blockchainbased startups and enterprises, fostering

innovation and responsible growth.

Web3 applications represent the next evolution of the internet, built on Decentralised protocols and Blockchain technology. Since 2022, Web3 applications have seen broader adoption, driven by the growing interest of both individuals and enterprises in Decentralised solutions. These applications aim to empower users with greater control over their data, enhanced privacy, and the ability to participate in digital economies without intermediaries.

In the financial sector, there has been a notable adoption of DLT to facilitate digital asset trading, tokenisation of real-world assets, and the creation of financial instruments. Regulated banks have entered the market, leveraging DLT to enhance their services and offerings. Additionally, central banks are exploring Central Bank Digital Currencies (CBDCs) as a means to digitise national currencies and improve payment systems. The implementation and testing of fiat backed stable coins have the potential to revolutionise traditional monetary systems and shape the future of finance.

Beyond the financial sector organisations are increasingly exploring Web3 applications for sustainability DLT-based solutions. protocols provide transparency, traceability, and immutability, making them ideal for tracking supply chains, carbon footprints, and sustainable practices. Several DLT protocols have witnessed a surge in transactions related to sustainability initiatives, indicating a growing trend toward using Blockchain for positive environmental and social impact.



For readers seeking a refresher on basic DLT concepts and the evolution of DLT, the first chapter will provide a recap. The report will then delve into the critical components of successful innovation, including the role of capital, infrastructure, and talent in advancing DLT protocols. By understanding the financial power of DLT protocols and their potential to accelerate adoption, decision makers can make informed choices during the design process of their Web3 applications.



REPORT OBJECTIVES

The primary objective of this report is to offer valuable insights and data points to decision makers and policy makers, enabling them to make informed choices regarding DLT protocols. Additionally, it serves as a platform for protocols to position their solutions effectively. By shedding light on the Blockchain trilemma, the report will explore the emergence of new side chains and second layer protocols, providing a comprehensive overview of the approaches taken.

The report also promises to be an evolving resource, regularly updated to incorporate new trends and developments. This will allow for a time series analysis of data points, showcasing major shifts in the protocol landscape and assessing the maturity of different protocols over time.

CONTENT OVERVIEW





EVOLUTION OF DLT CONCEPTS

This chapter will provide an in-depth exploration of the foundational concepts of Distributed Ledger Technology. The chapter will serve as a refresher for those familiar with DLT concepts while offering newcomers a solid understanding of the underlying principles.

JURISDICTIONS & REGULATORS

In this chapter, readers will explore the different jurisdictions where network organisations are located and understand why certain countries have become favourable destinations for Web3 ecosystems. Factors such as regulatory frameworks, government support, tax incentives, and other infrastructure elements will be analysed.

FUNDING FOR WEB3 INNOVATIONS

For successful innovation, three components are crucial: capital, infrastructure, and talent. This chapter will focus on the valuation and the financial power of DLT Protocols that have propelled the growth of Web3 applications. Readers will gain insights into how these protocols, with the right programs in place, can push and accelerate adoption, leading to a more robust and thriving Web3 Ecosystem as well as different approaches on how one could value these protocols and how different events in the past could have shaped the valuations.

ASSESSING PROTOCOL MATURITY

Assessing the maturity of DLT protocols is crucial for making informed decisions. In this chapter, an introduction to a comprehensive assessment framework will be provided. This framework will allow readers to gauge the strengths and weaknesses of each protocol, facilitating comparison and identification of potential areas for improvement.

PROTOCOL FACT SHEETS

The second part of the report contains fact sheets for each DLT protocol under examination. These fact sheets contains a condensed format of the attributes discussed earlier, facilitating easy comparison and analysis. For each protocol, readers can find essential details such as consensus mechanisms, transaction speeds, Tokenomics as well as a description of their essential strengths, weaknesses and USPs. Additionally, selected protocols have an assessment that summarises, among other things, their adoption, efficiency, security or reliability - based on over 30 individual data points.

HOW TO READ THIS REPORT

Decision Makers

If you are a decision maker involved in the design process of a Web3 application, choosing the most suitable DLT protocol can be a challenging task. To streamline your reading, start with the introduction, which provides a comprehensive recap of the foundational concepts of Distributed Ledger Technology. If you are already familiar with these concepts, you can proceed directly to the Chapters 4 and 5. In Chapter 4 you dive into the comprehensive assessment framework, which will enable you to compare and analyse various protocols based on 60 data points. The fact sheets in Chapter 5 will provide you with concise information about each protocol for quick reference during your decision-making process.

Policy Makers

For policy makers looking to create an environment conducive to innovation and competitive advantages, the report offers valuable information in Chapter 2. It examines the different jurisdictions that have become favourable destinations for Web3 ecosystems, providing insights into regulatory frameworks, government support, and tax incentives. It investigates the dynamics of international innovation hubs and how they contribute to the growth of thriving Blockchain communities. By implementing similar concepts into policies, you can foster innovation, generate more tax substrate, and promote economic prosperity.

Protocol Organisations

If you are part of a DLT protocol organisation, the report's assessment of protocol maturity in Chapters 4 & 5 will be particularly relevant. By understanding the strengths and weaknesses of your protocol through the comprehensive



The Global Blockchain Protocol Report aims to be a valuable resource for different stakeholders, providing tailored insights to meet their specific interests and ambitions.

assessment framework, you can focus on developing new features and setting up sustainable adoption and usage programs. The fact sheets in Chapter 5 will provide you with a consolidated overview of the attributes of your protocol, helping you to position it effectively in the market.

Continued Development and Updates

Web3 applications have the potential to revolutionise industries, offering transparency, security, and decentralisation. However, navigating the complexities of DLT protocols requires a comprehensive understanding of their unique characteristics and features. This report aims to be a valuable resource in that pursuit, fostering the adoption of Web3 technologies and driving transformative changes across various sectors.

This report is not a static document but an evolving resource. It will be updated yearly to incorporate new trends, developments, and technological advancements in the Blockchain space. By providing time series data points, the report will enable readers to identify major shifts in the protocol landscape and gauge the maturity of different protocols over time.

As we continue to explore emerging technologies and future developments, such as account abstraction, in the next coming report, we invite all stakeholders to join us on this journey of discovery and innovation. With the collective effort of the global community, we envision a future where Decentralised technologies enable a more sustainable, efficient, and equitable global economy.





EVOLUTION OF DLT CONCEPTS

This chapter will provide an in-depth exploration of the foundational concepts of Distributed Ledger Technology. The chapter will serve as a refresher for those familiar with DLT concepts while offering newcomers a solid understanding of the underlying principles.





BITCOIN EVOLUTION

Bitcoin is more likely to be held for its original purpose – as a form of hard money – than for non-monetary use cases due to the slow, cautious nature of the Bitcoin network.

Bitcoin's history refers to the various stages of development and growth that the Cryptocurrency has undergone since its creation in 2009. The journey of Bitcoin has been marked by technological advancements, increasing adoption, and a growing ecosystem.

Creation of Bitcoin (2009): Bitcoin was introduced by an unknown person or group using the pseudonym Satoshi Nakamoto in a whitepaper titled "Bitcoin: A Peer-to-Peer Electronic Cash System" published in October 2008. The first block, known as the "genesis block," was mined on January 3, 2009, marking the official launch of the Bitcoin network.

Early Adoption and Mining (2009-2012): Initially Bitcoin attracted a small but dedicated community of enthusiasts, developers, and miners. The first transactions using Bitcoin involved the exchange of the Cryptocurrency for negligible amounts of value. Mining became crucial to secure the network and validate transactions, and it was relatively easy to mine Bitcoin using standard computers at that time.

The Rise of Exchanges (2010-2011): In 2010, Bitcoin witnessed its first exchange rate when a user named "NewLibertyStandard" put a value on Bitcoin based on electricity costs for mining. Later in 2010, the first known commercial transaction using Bitcoin occurred when a programmer named Laszlo Hanyecz bought two pizzas for 10,000 BTC. By 2011, the first Bitcoin exchanges, such as Mt. Gox, began facilitating the trading of Bitcoin against fiat currencies.

Volatility and Media Attention (2012-2013): In 2013, Bitcoin experienced significant price volatility and saw a surge in media attention. As the price of Bitcoin reached several hundred US dollars, it gained more recognition, leading to increased interest from investors and the general public.

Mainstream Recognition (2014-2016): Bitcoin started to gain more recognition in mainstream finance and tech industries. Several prominent companies and organisations began accepting Bitcoin as a form of payment, boosting its legitimacy. On the other hand, Bitcoin stated facing regulatory challenges in various countries.



Scaling Debate (2017): In 2017, Bitcoin experienced a rapid price surge, reaching an all-time high close to \$20,000. The surge in demand led to congestion on the Bitcoin network, highlighting the scaling limitations of the Blockchain. The scaling debate within the Bitcoin community intensified, leading to the emergence of Bitcoin Cash (BCH), as a result of a hard fork in August 2017. Additionally, developers continuously work on second-layer solutions, like the Lightning Network, to enhance transaction throughput and reduce fees.

Institutional Interest (2018-2020): Bitcoin saw growing interest from institutional investors and financial institutions. Various companies and investment funds began allocating funds to Bitcoin as a store of value and hedge against inflation.

Institutional adoption (2023): The Bitcoin ETF approval by the SEC on January 11th, 2024 is a major milestone for the Cryptocurrency industry. It allows investors to access Bitcoin without buying or storing it directly, reducing costs and risks. It also increases the legitimacy and liquidity of Bitcoin, attracting more institutional and retail demand.

Halvings and code upgrades (forks)

Bitcoin Halvings: Bitcoin's block reward is halved approximately every four years through a process known as "halving." The halving events, which occurred in 2012, 2016, and 2020, have historically been associated with significant price movements and increased attention on the Cryptocurrency. The halving characteristic is a primary driver for ensuring controlled Bitcoin volume growth (= inflationary pressure) ensuring value creation and price appreciation, given equal and growing demand. Liquid Network (LBTC): a sidechain allowing faster and more confidential transactions. It is primarily used for interexchange and high-value transactions. It uses a federated model, in which a set of trusted functionaries control the network and validate transactions. This results in faster settlement times compared to the main Bitcoin Blockchain.

2017: SegWit soft fork, which separated Bitcoin's transaction structure into transaction & witness data. This made it easier and cheaper to store information in the witness data of a transaction, allowing Bitcoin's maximum block size to substantially increase.

2021: Taproot soft fork, consisting of three distinct Bitcoin Improvement Proposals (BIPs), bringing increased privacy, scalability, and composability to the Blockchain. This allows advanced scripting in the witness section of a block, as well as removing the data limits between the witness and transaction sections.

2023: Bitcoin Ordinals (= BTC NFT's) and release of the BRC-20 token standard allow minting tokens on the Bitcoin Blockchain. ORD is an open-source software that can run on top of any Bitcoin full node, enabling the tracking of individual satoshis, as well as an "inscription" with arbitrary content (text, images, video, etc.), i.e., a Bitcoin-native digital artifact that could be considered an NFT. Example token: Ordinals (ORDI), Vmpx (VMPX) and Pepecoin (PEPE).

Bitcoin Layer-2 (L2) Examples

Bitcoin's Layer-2 protocols address existing challenges and limitations of the Bitcoin network, such as scalability and transaction speed limitations. L2 protocols sit on top of the main Bitcoin Blockchain and enable faster and more efficient transactions without compromising the security and decentralisation of the underlying network.

Prominent Layer-2 protocols include:

Lightning Network (LIGHT): most well-known and widely adopted Layer-2 protocols. It is a payment channel network allowing users to create off-chain payment channels between each other. These channels enable multiple private transactions without requiring each transaction to be recorded on the main Blockchain. Only the opening and closing of the payment channel are recorded on the Blockchain, which significantly reduces transaction fees and speeds up the transaction process.

Lightning Loop (LOOP): is a service that complements the Lightning Network by allowing users to move funds on and off the Lightning Network more easily. It provides the ability to loop-out (moving funds from the Lightning Network to the main Blockchain) and loop-in (moving funds from the main Blockchain to the Lightning Network) seamlessly, enhancing liquidity and usability of the Lightning Network.

GLOBAL PROTOCOL REPORT 2024



Rootstock (RBTC): Rootstock is a smart contract platform that is merge-mined with Bitcoin. It brings Ethereumcompatible smart contracts to the Bitcoin network, allowing developers to build Decentralised applications (dApps) on top of Bitcoin's Blockchain. It aims to enable more complex and programmable transactions, while still relying on the security of the Bitcoin network.

Statechains: allow the transfer of ownership of Bitcoin without having to move the Bitcoin itself on-chain. It enables users to conduct peer-to-peer transactions off-chain, thus reducing the on-chain transaction load. Statechains use a unique mechanism where ownership of a Bitcoin "state" is transferred, rather than the Bitcoin itself.

Bitcoin Inscription vs. Ethereum smart contract-based NFT's

Fully on-chain: Inscriptions are stored directly on the Bitcoin L1 chain, adding a layer of permanence. Smart contract-based NFTs store metadata off-chain, depending on external factors to function.

Immutable: on-chain storage ensures complete immutability. Smart contract-based can also be modified or deleted by the contract owner.

Ordering: As inscriptions are stamped onto individual sats, each of them is ordered, adding additional value in terms of collectability and rarity.

Scarcity: Through the SegWit and Taproot soft forks, Bitcoin blocks can store considerably more data, which also created an effective upper limit to the size and number of inscriptions that can be minted on Bitcoin overall. Smart contract-based NFT's have no such upper limit.

In Summary

Bitcoin's history has been characterised by a combination of technological advancements, growing adoption, market cycles, regulatory challenges, and increasing recognition as a legitimate financial asset. It has played a pivotal role in catalysing the broader Blockchain and Cryptocurrency industry, inspiring the creation of thousands of other digital assets and driving the global interest in Decentralised finance and Blockchain technology.

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The revolutionary concept of Blockchain was introduced in the early 1990s by researchers Stuart Haber and W. Scott Stornetta, whose ground-breaking and visionary work laid the foundation for contemporary Blockchain architecture. They recognised the need for a computationally practical solution that would ensure the integrity and privacy of digital documents without reliance on third-party timestamping services (Bhutta et al., 21; Sheldon, 21). The pair developed an innovative system infused with Cryptography. This pioneering approach involved storing time-stamped documents in a sequential Chain of Blocks ("History of Blockchain", 23) thus forming the basis of how Blockchain achieves its core properties of security, transparency, and immutability (Shrimali & Patel, 22).

1992: In 1992, the design was updated by Haber and Stornetta with the incorporation of Merkle Trees that provide data structures for verifying individual records. This expanded the capabilities of Blockchain technology by enabling the efficient storage of multiple documents within a single block ("History of Blockchain", 23; Sheldon, 21). This development ushered in an era of enhanced data organisation and integrity assurance. However, this technology went relatively unused and the patent expired in 2004 ("Blockchain Tutorial", 21).

1997: This phase of digital development also saw the emergence of Proof-of-Work (PoW) to verify computational efforts and fortify cybersecurity measures. Adam Back introduced hashcash in 1997, a PoW algorithm that provides denial-of-service countermeasures to limit email spamming (Sheldon, 21).

1998: The above concept was later used by Nick Szabo in 1998 to render the earliest version of a Decentralised currency, Bit Gold. His aim was not only to mitigate spam in online forums and emails but also to underpin the integrity of his nascent digital currency concept However, the concept of Bit Gold failed to materialise due to Szabo's lack of confidence in its implementation. ("The History of Blockchain", 22).

1999: Amid these pioneering efforts, the technology landscape was witnessing other transformative developments. The late 1990s saw the emergence of peer-to-peer (P2P) networks, a concept that gained prominence through platforms like Napster in 1999. While Napster utilised a centralised server, it played a pivotal role in popularising the P2P network model. This shift was crucial, as it set the stage for the distributed system architecture that underpins Blockchain technology.

The ability to harness the computational power and storage capacity of numerous computers marked a significant step towards realising the Decentralised vision of Blockchain (Sheldon, 21). **2000:** Encouraging practical advancements in the field, the year 2000 witnessed the proposal of a Cryptographically secured chain by Stefan Konst. He published a research paper, 2008). History of Blockchain", 23). Nakamoto's innovative concept of a "distributed chain of blocks" revolutionised the existing Merkle Tree model, enhancing security and establishing an immutable record of data exchanges. Operating on a peerto-peer network, Nakamoto's ingenious design verified and integrated time-stamped transactions into the chain, with active participation from the network's members (Nakamoto, 2008).

2000: Encouraging practical advancements in the field, the year 2000 witnessed the proposal of a Cryptographically secured chain by Stefan Konst. He published a research paper, "Secure Log Files Based on Cryptographically Concatenated Entries" whose central theme of tracing back entries in the chain to prove authenticity added a new layer of theoretical understanding to Blockchain technology ("The History of Blockchain", 22).

2009: The true potential of Nakamoto's creation became evident in 2009 with the official birth of Bitcoin, the first Cryptocurrency, built upon Nakamoto's pioneering Blockchain technology (Shrimali & Patel, 22; Tanwar, 22). The first Bitcoin was mined by Nakamoto on Jan 3, 2009 validating the 2004: In 2004, Cryptographic activist Hal Finney introduced Blockchain concept (Sheldon, 21). Moreover, the security of the the concept of "Reusable Proof of Work," a novel system Blockchain was exemplified in a remarkable real-life incident designed for digital cash ("History of Blockchain", 23). His in 2009 when James Howells, a UK-based IT professional, innovative idea introduced a mechanism whereby participants had mined 7500 Bitcoins through Blockchain technology. could receive non-fungible hashcash tokens in exchange for Unfortunately, he discarded the hard drive containing the RSA-signed tokens (Sheldon, 21). This addressed a critical Bitcoins in 2013, only to later discover his unintentional digital challenge known as the "Double Spending Problem," which fortune worth over \$280 million lost (Browne, 21). However, the had been a significant hurdle in the world of digital transactions Decentralised, secure and tamper-proof nature of Blockchain ("History of Blockchain", 23). This approach enhanced the technology revolutionised data integrity, transparency, and practicality and applicability of PoW, setting the stage for its trust and highlights its resilience as an unassailable digital integration into Blockchain technology and, notably, Bitcoin framework. minina.

2008: Blockchain technology gained traction globally in 2008 amid the financial crisis when an individual or a group of persons published a ground-breaking white paper titled "Bitcoin: A Peer-to-Peer Electronic Cash System" under the pseudonym of Satoshi Nakamoto (Xu et al., 19; Sheldon, 21; beyond.





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Blockchain technology significantly progressed with the inception of Bitcoin. Initially, the volatility of Bitcoin and its reserved global reception restricted its development. However, the inherent attributes of Blockchain, decentralisation, transparency, and tamper-resistance, garnered escalating attention, igniting a transformative journey (Xu, Chen & Kou, 2019).

The evolution of Blockchain technology is demarcated into distinct phases known as Blockchain generations. These generations encapsulate both the advancement of the distributed ledger technology and its expanding utilisation across industries (Colomo-Palacios et al., 2002; Sheldon, 21). Every subsequent generation exhibits substantial enhancements in functionality, systematically addressing the limitations of its predecessor.

Blockchain Technology mirrors the growing spectrum of business applications and the

subsequent surge in market acceptance. It has evolved into a multifaceted solution for pivotal domains such as finance, healthcare, and supply chain management (Srivastava et al., 2018).

The evolutionary progression of Blockchain technology unfolds through five distinct generational phases. These encompass Cryptocurrencies, inaugurating the era of Decentralised digital currencies; smart contracts, which ushered in automated, self-executing agreements; Decentralised applications, elevating autonomy, and resilience; industrial applications, infusing traceability, and efficiency across sectors; and finally, Web3 applications, marking a new era of Decentralised internet (Mourtzis et al., 2023).

Each generation encompasses distinct features and serves as a pivotal milestone in the technology's journey.



1. First-Generation Blockchains: Bitcoin and Other Cryptocurrencies (2008 - 2013)

The first generation of Blockchain refers to the original and foundational version of the technology from 2008 to 2013. It was fundamentally rooted in the principle of decentralisation ensuring security, verifiability, and efficiency of digital transactions (Mourtzis et al., 2023). The groundwork was laid in 2008 by Satoshi Nakamoto for a Decentralised and secure ledger system, ultimately giving rise to the renowned Bitcoin Cryptocurrency (Colomo-Palacios et al., 2002).

1.1 Foundation Principles

Blockchain 1.0 is linked to Cryptocurrencies with Bitcoin pioneering as the first digital currency that aimed to provide a trustless, peer-to-peer electronic cash system (Nakamoto, 2008). The core tenets included:

- 1. Decentralisation and Peer-to-Peer Value Transfer: Blockchain's basis was its ability to operate without a central authority. Using a 16bit architecture, this Blockchain allowed basic programmability. Transactions were validated and recorded by a network of nodes, eliminating the need for intermediaries and centralised control.
- 2. Security and Verifiability: Security was upheld through Cryptographic hashing techniques, 2. Distributed Ledger: A distributed network of ensuring data integrity. This approach provided a nodes maintained an immutable and synchronised robust means of verification, enabling participants record of all transactions. This design bolstered to confirm the authenticity of transactions transparency and resilience. (Srivastava, 2018).
- 3. Proof of Work: The PoW consensus mechanism, 3. The Internet of Money: Blockchain enabled the a computational puzzle-solving process, ensured seamless facilitation of financial transactions over that participants invested computational power the Internet, creating a global network of value to validate transactions. This process was not only transfer. secure but also incentivised network participants (miners) (Srivastava et al., 2018).
- 4. Transparency and Immutability: By utilising a Blockchain as a public ledger, the technology ensured transparency and accountability through recording and verifying Cryptocurrency transactions. Once a block was added, its records became unalterable, enhancing security and trust.

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5. Efficiency: The Blockchain's architecture efficient and rapid facilitated transaction processing. Its consensus mechanisms, such as Proof of Work (PoW), enabled secure validation while maintaining efficiency (Mourtzis et al., 2023; Srivastava et al., 2018).

1.2 Key features:

The first-generation Blockchain introduced several key components: Merkle Tree: The Merkle tree, a hierarchical data 1. structure of Cryptographic hashes, was employed to efficiently verify and store transaction data within blocks.





1.5 Protocol Examples

- However, this first-generation Blockchain also ٠ presented certain challenges and limitations:
- 1. High Transaction Fees: The system incurred high transaction fees due to its design and reliance on the Proof of Work mechanism (Kolb et al. 2020).
- 2. Energy Consumption: The mining process, while robust, could lead to potentially high energy consumption, raising environmental concerns (Kolb et al., 2020).
- 3. Low Efficiency (TPS): With a capacity of 4-6 transactions per second (TPS), the first generation Blockchain exhibited lower efficiency compared to subsequent generations ("The Four Generations of Blockchain explained", 2022).
- 4. Hardware Requirements: Miners with substantial hardware rigs and computational power were favoured, potentially limiting participation ("The Four Generations of Blockchain explained", 2022).

1.4 Use Cases

The first application of the first generation of Blockchain technology was seen in financial transactions through Cryptocurrencies.

- 1. Fractional Payments: facilitating costeffective transfers of small amounts.
- 2. Foreign Exchange Transactions: ensuring realtime tracking and reducing the complexities often associated with cross-border payments.
- 3. Remittance Payments: offering an alternative to traditional remittance channels by enabling direct and cost-effective transfers, particularly for underbanked populations.
- 4. Play-to-Earn Video Game Rewards: gamers can receive rewards in the form of Cryptocurrency tokens for their in-game achievements, enhancing engagement and incentivising gameplay.

These diverse applications highlight the adaptability and potential of Blockchain in transforming traditional financial and transactional processes across various sectors

- Bitcoin (BTC): Bitcoin was introduced in 2008 by Satoshi Nakamoto adhering to the principle of decentralisation and ensuring security, verifiability, and efficiency in digital transactions (Mourtzis et al., 2023)
- Litecoin (LTC): Bitcoin's popularity spurred scientific curiosity, giving rise to various Cryptocurrencies like Litecoin in 2011, which mirrors Bitcoin's decentralisation but differs in block generation time and maximum coin supply. Litecoins are produced every 2.5 minutes, four times faster than Bitcoin, facilitating more transactions. Its maximum coin limit is 84 million, in contrast to Bitcoin's 21 million (López-Sorribes et al., 2023).
- Namecoin (NMC): Namecoin was launched in April 2011 as a fork of Bitcoin's codebase. It aims to provide a Decentralised domain name system (DNS) and other internet infrastructure functionalities by integrating Blockchain technology (Gupta et al., 2022).
- Peercoin (PPC): Peercoin (PPC) is a pioneering Proof-of-Stake (PoS) Cryptocurrency launched in 2012, introducing energy-efficient consensus while also supporting Proof-of-Work security. It emphasises sustainability and scalability in Blockchain technology (Zhao et al., 2021).
- Dogecoin (DOGE): Dogecoin (DOGE) is a

light-hearted Cryptocurrency that started as a meme in 2013, featuring the Shiba Inu dog. It gained popularity for its community-driven nature, fast transaction speeds, and low fees. Despite its origins, it has become a widely used digital currency for various online transactions (Nani, 2022).

The above concepts collectively laid the foundation for Blockchain technology and its various applications beyond Cryptocurrency. The firstgeneration Blockchain, as exemplified by Bitcoin, paved the way for the development of subsequent generations of Blockchain technology, each with its own advancements and features.



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Following the first obvious application of distributed ledger technologies, i.e. Cryptocurrencies, there were significant improvements and additional functionalities added to Blockchain technology. In 2013, Vitalik Buterin, a programmer and a co-founder of the Bitcoin Magazine started the development of a new Blockchain-based distributed computing platform, Ethereum, that featured a scripting functionality, called smart contracts. Bitcoin did not have a scripting language for building Decentralised applications. ("History of Blockchain", 23).

2.1 Foundation Principles

Ethereum is an open software platform that runs on Blockchain technology. Ethereum paved the way for Blockchain technology to be used for purposes other than Cryptocurrency and its potential is beyond financial exchange automation (Beniiche). Just as Bitcoin was used to overcome malicious intent that occurs in financial transactions, Decentralised applications and smart contracts built on the Ethereum Blockchain are very powerful and exciting because they give you more freedom, control, and creativity on the internet.

Ethereum also makes the internet more secure, transparent, and fair for everyone as smart contracts are impossible to hack or tamper with. Smart Contracts reduce the cost of verification, execution, arbitration, and fraud prevention and allow transparent contract definition overcoming the moral hazard problem (Unibright.lo, 2019). Smart contracts are immutable and irreversible contracts that are coded and stored on the Blockchain.

Ethereum has its own Cryptocurrency called "Ether". Ether is used to pay for the services and transactions on the Ethereum network. It is also a popular way of sending and receiving money online, just like Bitcoin.

Ethereum has extended the technology from trustless payments to trustless agreements and has made a platform for developers to deliver a scalable experience. Ethereum may be used to codify, decentralise, secure, and trade just about anything thanks to hardware integration, a few examples are below (Beniiche):

- Voting without fraud or corruption.
- Register names or property without paying fees or relying on third parties.
- Exchange money or assets without intermediaries or delays.
- Crowdfund



2. Second-Generation Blockchains: Smart Contracts (2014-2015)

- Company governance
- Protect ideas or creations without lawyers or courts.
- 2.2 Key features
- Smart contract (automation) capabilities. When conditions set by the contract developer are met, the smart contract automates the execution of an agreement without intermediaries, and all parties confirm the conclusion immediately.
- Supporting virtual machines that manage the smart contract functionality.
- Development of more **sophisticated and** flexible Blockchain platforms.
- Enhanced and more scripting language, allowing developers to build more sophisticated applications on the Blockchain.
- Decentralised applications (dApps) creation enablement. As "smart contracts with interfaces" they open up new use cases beyond simple transactions, such as trade between different dApps. Examples are Decentralised finance (DeFi), non-fungible tokens (NFTs) and Decentralised autonomous organisations (DAOs). Ethereum is the leading platform for launching DAOs for charity, venture investments and many more.
- There is increased flexibility for developers. The process of creating applications is easier and more efficient. Developers may create dApps using the built-in language Solidty, which is based on existing languages such as Python and JavaScript (Beniiche, (n.d.).



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Smart contract interactions require more 4. gas and such a Blockchain works at Medium efficiency with 7-14 transactions per second (TPS).

2.3 Use Cases

1. Passive income generation through staking rewards

ETH (Ether) staking provides passive income along with growth potential. Staking means running a computer program to validate data by pledging capital - ETH, and computing resources. In return for this work, honest stakers who validate data according to the predefined rules earn rewards. Staking is data validation, not investing or lending with a third party. It is almost a brand-new asset class and an intelligent addition to your investment portfolio (Bahachuk, 2020).

2. Exchange and liquidity facilitation

Ethereum has better liquidity overall due to its strong base of liquidity providers and because gas fees are relatively less significant for larger trades (Kelin, 2023). ETH is accepted as a payment option by thousands of merchants worldwide. With dApps, Decentralised financial exchanges are built on a Blockchain that allow users to trade their assets in a Decentralised manner.

3. dApps allowing users to record other assets than just Cryptocurrency transactions, such as trademarks and contracts

Users can use dApps to register and verify trademarks, create and enforce contracts,

store and share documents, and more, Some of the examples of dApps that use Ethereum for these purposes are OpenSea, ENS, and DocuSign. These dApps offer users more transparency, efficiency, and trustlessness than traditional systems.

On the basis of the Ethereum platform, many ICOs (Initial Coin Offerings) are held.

This second generation of Blockchain technology witnessed a surge in Initial Coin Offerings (ICOs) and the emergence of various tokens for specific use cases. On the Ethereum Blockchain, developers use a single standard of issued tokens ERC-20. Ethereum is used to tokenise real-world assets (pegged to precious metals, fiat currencies, etc.). Thousands of NFTs (non-fungible tokens) based on the ERC-721 standard are also mined (Dragunov, 2022).

2.4 Protocol Examples

The second generation of Blockchain technology was heralded by Ethereum and it remains the most prominent player in the field of Smart Contracts.

There are other platforms that allow users to create and execute smart contracts but since they built and improved on Ethereum's innovations, they will be covered as part of the third generation of Blockchain technology.



3. Third-Generation Blockchains: Applications and Smart Everything for a Digital Society (2016 - 2018)

Ethereum and Bitcoin opened the floodgates and the second generation showed the limitless possibilities of Decentralised technology. Third-generation Blockchains focus on addressing scalability, security, efficiency, and interoperability challenges faced by previous generations. The third generation fixed the teething problems of the previous two. Despite the exceptional innovation by Ethereum and Bitcoin, if Blockchain was to come to the masses there needed to be some major developments. These improvements were primarily enabled by introducing new consensus mechanisms and protocols, such as state channels and sidechains.

3.1 Foundation Principles of-Work (PoW) for the Decentralised network to come to a consensus. Nakamato's PoW consensus needs Blockchain 3.0 builds upon both the previous incredibly high computational power to perform generations to create the most efficient Blockchainvalidations. On September 15th, 2022, Ethereum based solutions that do not just involve money, had the Merge which was a technical upgrade that shifted Ethereum's existing consensus mechanism to currency, commerce, financial markets, or other economic activity. Such applications include art, a Proof of Stake consensus mechanism that requires significantly less energy and will also allow for future health, science, identity, governance, education, public goods, and various aspects of culture and scalability. This is Ethereum's advent into the thirdcommunication (Efanov. et al., 2018). generational Blockchain.

The third generation had the largest impact on the Post the Merge Ethereum should use considerably world markets and economy, and third-generation less energy with the new consensus mechanism protocols improved on their predecessors by solving where Crypto owners offer their Ether as collateral the following problems that were the biggest obstacles for a chance to validate blocks. This will not be a to adoption: competition-based mechanism like PoW and coin owners with staked coins will be randomly selected to 1. Bottlenecking and transaction processing times become validators.

- increased. Networks become sluggish and transaction fees also increased.
- 2. The inability to process cross-chain transactions and interoperability is crucial for the sustainability of the Blockchain ecosystem.
- 3. Need for high computational power and the proportional environmental impact.

The Blockchain trilemma tells us it is difficult to solve Sharding splits the Blockchain network into the Blockchain scalability issues without compromising smaller units called shards, each with its own transactions and validators. This allows for either the security, decentralisation, or trust of the Blockchain (Sanka et al., 2021). The third generation of parallel processing and higher throughput, as well as reduced storage and bandwidth requirements. Blockchain has found ways to scale without it affecting decentralisation or security and they have blisteringly fast speeds despite secure networks.

3.2 The Ethereum Merge

Before September 22 Ethereum was using the Proof-



3.3 Kev Features

1. Scalability solutions with a focus on transaction throughput and lower latency, by exploring various scaling solutions, such as sharding, and Layer-2 protocols.





Layer-2 refers to any off-chain network, system, or technology built on top of the main Blockchain layer. It extends the capabilities of the underlying network. This reduces congestion and fees on the main chain while preserving its security and decentralisation. It also enhances transaction throughputs.

- 2. Sidechains were introduced in Layer-2 that allow for transfer of assets and data between different Blockchains. This is one of the mechanisms that increased interoperability between Blockchains. The third-generation protocols facilitated communication and data exchange between different Blockchain networks, enabling seamless cross-chain transactions and interactions.
- Advanced consensus mechanisms: Beyond PoW, third-gen Blockchains explore alternatives like Proof of Stake (PoS), Delegated Proof of Stake (DPoS), and Byzantine Fault Tolerance (BFT) to achieve faster and more energyefficient consensus.

Among other major reasons for the Ethereum Merge, one is that while Proof-of-Work favours miners with extensive hardware capacity, **Proof-of-Stake favours miners with high volumes of assets (token) that can be staked.**

4. Privacy and security enhancements that improve privacy features, Cryptographic techniques, and zero-knowledge proofs, are employed to enhance transaction privacy and network security.

Zero-knowledge proof is a Cryptographic method that allows one party to prove to another that a statement is true, without revealing any information beyond the validity of the statement. This enables privacy-preserving transactions, as well as improved scalability and network efficiency.

5. Improving **governance mechanisms** for Decentralised governance allows stakeholders

to participate in decision-making processes. Third-generation Blockchain introduced expressive representation Decentralised governance that allowed stakeholders to vote on high-level decisions. They enable participants to have a say in decision-making processes, fostering community-driven decision-making and transparency (Romdhane, 2023).

- 6. With the third generation, there was a focus on good user interface and user experience and suitability for widespread adoption and realworld applications. UI and UX design are crucial aspects of any digital product. By focusing on functionality, developers can create more user-friendly, user-centric, and user-driven Blockchain applications
 - Third-generation Blockchains have high efficiency up to 10k transactions per second (TPS), while some like EOS bragging up to 100,000 transactions a second (Butler, 2021).
 - With the new consensus mechanisms, there is a drastic reduction in fees & energy consumption, Ethereum's forecast was that it would be reduced by at least by ~99.95% (Carl Beekhuizen, 2021) post the merge.
- The Crypto Carbon Ratings Institute has claimed that Ethereum now uses approximately 99.99% less energy than before the merge was completed. It also suggests the Blockchain's carbon footprint has dropped by just over 99.99% as well (Hayward, 2022).

3.4 Use Cases

Automatised extensions of operating power to prevent bottlenecking. Third-generation Blockchains like Cardano and Polkadot have addressed the issue of bottlenecking that occurs when there is high demand for transactions and smart contracts, through sharding and Layer-2 mechanisms. This allows them to automatically scale on demand and allow more industries to participate in the Decentralised economy. The automatised extensions of operating



power prevent bottlenecking and lower energy consumption.

- Crypto tokens are secondary assets built on top of existing Blockchain networks. They are digital assets and are usually created and sold through an initial coin offering (ICO) process. Crypto tokens are a digital representation of an asset and are often used to raise funds for projects.
 EOS: A high-performance Blockchain platform that offers free transactions and Decentralised applications using delegated Proof-of-Stake consensus (DpoS). This consensus mechanism lets users vote for delegates who are responsible for validating transactions.
- TRON: A Decentralised entertainment ecosystem IoT networks have a massive security and privacy problem that can be solved with Blockchain. that enables content creation, distribution, and Blockchain technology eliminates the central monetisation using its native token TRX. server concept of IoT and allows the data to VeChain (VET): A supply chain management flow through the distributed ledger for each and business process Blockchain platform that transaction with appropriate authentication. uses IoT technologies and a two-token system. Before the third generation had solved the Hedera Hashgraph: A distributed ledger platform scalability issue, IoT and Blockchain were difficult that uses hashgraph consensus, which is faster to integrate but post the third generation and more secure. It uses a BFT-based consensus protocols, Blockchain aims to revolutionise the algorithm. next generation IoT. (Tanwar et al., 2022)
- Polkadot: A multi-chain platform that connects The Artificial Intelligence and Blockchain different Blockchains into a single network using combination has been progressing significantly cross-chain communication. since 2018 and has gained traction in the third generation. The concept of merging Blockchain Cosmos: An Internet of Blockchains that allows and AI technology has been forming and developers to customise and connect their own expanding over the last 6 years. Al, automation, Blockchains. and Blockchains may provide value by decreasing NEO: The first open-source, Decentralised the need for human intervention. AI can read, Blockchain platform in China that offers no analyse, and correlate data with lightning speed transaction fees and distinctive verification and depth, giving Blockchain-based business procedures for smart contracts and digital assets. networks a competitive edge and data security may be improved when a Blockchain distributes IOTA: A Cryptocurrency platform created for and stores AI models (Taherdoost, 2022). the Internet of Things environment that uses

3.5 Protocol example(s)

 Cardano (ADA): A Blockchain platform that uses a Proof-of-Stake (PoS) consensus mechanism called Ouroboros. Cardano also supports smart
 Monero, Zcash, and Dash were created as a way to overcome some of the security and scalability problems.



rgy contracts, Decentralised applications, and interoperability with other Blockchain protocols.

• **IOTA:** A Cryptocurrency platform created for the Internet of Things environment that uses the Tangle, a feeless and scalable consensus algorithm based on a directed acyclic graph. This consensus does not need validation by miners.





4. Fourth-Generation Blockchains: Adoption (2019 - 2030e)

Ethereum and Bitcoin opened the floodgates and the second generation showed the limitless possibilities of Decentralised technology. Third-generation Blockchains focus on addressing scalability, security, efficiency, and interoperability challenges faced by previous generations. The third generation fixed the teething problems of the previous two. Despite the exceptional innovation by Ethereum and Bitcoin, if Blockchain was to come to the masses there needed to be some major developments. These improvements were primarily enabled by introducing new consensus mechanisms and protocols, such as state channels and sidechains.

4.1 Foundation Principles

- Usability & Integration: Building on the foundations laid by the previous generations, Blockchain 4.0 refines Blockchain technology to make it usable in Industry 4.0 including automation, enterprise resource planning, and integration of different execution systems (Unibright.lo, 2019).).
- Interoperability: Cross-System and Cross-Blockchain business integration demand increased trust and privacy protection which is where Blockchain technology comes into play when integrated with IT Systems (Unibright.lo, 2019).
- Business-Centric Solutions: This generation focuses on Blockchain solutions tailored to meet specific business needs by developing smart factories, solutions and supply chain systems in the context of Industry 4.0 in academic, governmental, and commercial domains (Takyar, 2022)
- Scalability and Performance: With data integration cross-platforms security and privacy are a major concern for smart applications in the industries like farming,

healthcare, supply chain, energy management, etc. Blockchain 4.0 addresses the scalability challenges and provides optimised solutions (Bodhke et al., 2020).

4.2 Key Features

- Industrial applications are enabled through increased integration of Blockchain in as finance, traditional industries, such data healthcare. logistics, protection, automotive, information and security, digital purchasing, data storage, and real estate (Javaid et al., 2021).
- Industry infrastructure-based Blockchain ecosystems have reduced costs of transactions, more transparency and efficient data sharing.
- IoT applications can deploy Blockchain to offset the high storage and operating costs of integrated cloud providers. Implementing a structured peer-to-peer connectivity model would reduce the expense of planting and retaining massive consolidated data centres. (Javaid et al., 2021)
- Collaboration between Blockchain projects

established companies for joint and

development and implementation

Privacy and security solutions meet enterprise requirements using Blockchain as it preserves knowledge more securely using Cryptographic approaches, rather than conventional methods that can easily be hacked.

4.3 Use Cases

- Decentralised Identity Solutions: Blockchain-A Blockchain-based trust mechanism for digital based identity platforms offer self-sovereign twin-empowered IoT. The proposed Proof of identity management, empowering users to Authority (PoA) trust mechanism will enhance manage their digital identities independently. data protection and system security. PoA-based Supply Chain and Product Traceability: Blockchainauthority master nodes can reduce energy based applications utilised to track and verify consumption as well (Sasikumar, 2023). the origin and journey of products across supply Energy-efficient Blockchain-integrated and chains, enhancing transparency and reducing software-defined networks (SDN) to create counterfeiting risks.
- a secure system and to ensure safe network connectivity. 4.4 Protocol Examples
- applications provide financial services, such as lending, borrowing, trading, and yield farming, without the need for traditional banks or intermediaries.
- Non-Fungible Token (NFT) Marketplaces: NFT platforms allow users to create, buy, and sell unique digital assets, such as digital art, virtual real estate, and collectibles.

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Decentralised Social Networks: Blockchain-based social platforms prioritise user privacy, content ownership, and censorship resistance, allowing users to control their data and interactions.

Decentralised Exchanges (DEXs): DEXs facilitate the peer-to-peer trading of Cryptocurrencies, allowing users to maintain control of their funds and avoid centralised exchange risks.

Decentralised Finance (DeFi) Platforms: DeFi Top network

4th generation Public Blockchain platform with dApps and Decentralised communication services.

Hydrus 7 by JD Coin

Blockchain with a multilayered hybrid consensus algorithm that incorporates AI, machine learning, sharding, and interoperability.



INACTA.A.



5. Fifth Generation Blockchains: Web3 (Beyond 2030e)

Web3 applications based on distributed ledger technology, often referred to as "Web3 dApps" (Decentralised applications), are a new generation of applications that leverage Blockchain technology to offer Decentralised and usercentric experiences. Web3 applications aim to move away from traditional client-server models.

5.1 Foundation Principles

With the fifth generation of Blockchain, we will see the technology connect with the third generation of the internet, i.e., Web3.0. Blockchain will empower the Web3 landscape with its inherent decentralisation, immutability, and transparency.

Future applications of the technology should include fundamental tools like internet search engines and accessibility on multiple devices and software. With decentralisation in Web3, we can prevent the leakage of personal information, and Web3 dApps can remove the authority of one particular organisation exercising sole authority over its users (Weston, 2022). The fifth-generation Blockchain protocols have high performance, usability, and scalability.

5.2 Key features

Metaverse enablement

Many metaverse brands use Blockchain dApps to store the ownership and metadata of the game assets and even spaces, which are also NFTs.

Newest block architecture

Building on the fourth generation, the fifth has the best block architecture to offer Web3.

Own communication technology

Fifth gen dApps include messaging applications like Secretum, social media applications and even browsers which means that they have communication technology that is on the Blockchain and provides all the benefits of Blockchain technology.

Proof of Tsar (PoT)

An organisation mechanism for consensus that regenerates and reconnects all nodes, it is led • by a single primary node, Tsar.

Own consensus mechanisms

Giving users more control over their digital

identities, assets, and personal information, reducing the risk of data breaches and unauthorised access.

- Tokenisation Enabling Web3 applications token to represent digital assets
- Open-source development practices,

Fostering transparency, collaboration, and community contributions.

5.3 Use Cases

•

Smart energy grids

These use IoT and Blockchain technology to exchange information and buy/sell energy between energy providers and private citizens. (Pieroni et al., 2018)

- Personnel big data management systems and cloud storage
- A novel data storage model of on-chain and

out-of-chain that can effectively solve the problem of data redundancy and insufficient storage space. (Chen et al., 2019)

dApps that leverage a distributed file system include Sia and Storj.

Social Media

To avoid giving traditional social media platforms control over users at. Decentralised social media networks have been created on dApps like Steemit.

5.4 Protocol Examples

Everscale

PoS Blockchain network that prioritises scalability. It uses sharding for computation.

Relictum pro

A fifth Blockchain generation advanced public and private Blockchain platform, where every device is a node able to conduct instant and cheap transactions.

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SELF-SOVEREIGN IDENTITY **TECHNICAL FOUNDATIONS AND APPLICATIONS**

1. Introduction of their personal data, allowing them to determine when and how it is shared with others. Unlike traditional According to World Bank estimates, nearly 850 million identity systems, SSI eliminates the need for a central people lack an official identity [JC23], and the proliferation of authority to hold and disseminate data upon request. digital devices has made it increasingly essential to possess Instead, individuals can independently present identity a verifiable digital identity. This has led to a rise in digital claims. These claims and credentials can be verified with transactions and the need for a secure and reliable identity Cryptographic certainty. This shift in identity management management system. SSI is emerging as a Decentralised is facilitated by Cryptographic techniques, distributed alternative to traditional centralised identity management ledger technology, and standardised protocols [CT21]. systems, in which identities are Cryptographically verifiable. Within this model, the identity holder retains ownership It allows individuals to control their digital identities and of their identity information and credentials, while issuers share them with trusted parties. Each entity in the SSI system are responsible for issuing Verifiable Credentials (VCs) is identified by a unique DID (Decentralised Identifier) as [SLC22], tamper-proof digital credentials, to holders. shown below, which can be resolved to reveal information Verifiers, in turn, rely on these VCs to authenticate and such as the entity's public key and other metadata. validate the presented identity as shown in Figure ??. This model enables individuals to securely exchange credentials with verifiers, establishing trust and facilitating 2. Building Blocks of SSI a wide range of digital interactions without the need for centralised intermediaries.

SSI is a new paradigm that puts individuals in full control





(C) Crypto Valley

2.1 Decentralised Identifier

Various identifier schemes exist, such as the International Standard Book Number (ISBN), the Global Trade Item Number, and the Uniform Resource Identifier (URI). All of these examples require a central registry to issue and maintain the identifiers. SSI systems utilise the emerging scheme called Decentralised Identifiers (DIDs) [SLS+22]. These DIDs are standardised by the World Wide Web Consortium (W3C) and offer a novel approach **2.3 Verifiable Data Registry** to identification in a Decentralised way within the SSI framework.

2.2 DID Document

DIDs are resolvable to DID documents which contain additional information associated with a particular DID such

as Cryptographic public keys and authentication suites. Additionally, the document may include service endpoints that describe how to reach the DID subject and establish trusted communication channels. Organizations seeking public visibility can create public DIDs. The corresponding DID documents can be stored directly in a Verifiable Data Registry (VDR), such as a Blockchain.

A VDR is a system designed to store DIDs and provide the necessary data to generate DID documents. VDRs can take various forms, including Blockchain, Decentralised file systems, databases, peer-to-peer networks, and other trusted data storage solutions [PR21]. To establish technical trust and facilitate interactions between entities.



public DIDs and their corresponding DID documents must be stored in a VDR. For instance, the Ethereum Blockchain network can be used to resolve DIDs using the did:ethr method. Blockchain technology offers desirable properties such as verifiability, availability, and immutability, which align with the requirements of public DIDs and DID documents, thereby contributing to the establishment of

technical trust. However, Blockchain are not the only option for serving as DID anchors. Alternative approaches exist, including the Key Event Receipt Infrastructure (KERI), web servers, the Interplanetary File System (IPFS), and even Public Key Infrastructures (PKIs). However, in this article, we delve into the current academic landscape surrounding Blockchain-based SSI systems and summarize the open

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Nitty Gritty of SSI

- SSI solutions are designed to be Blockchain-agnostic and adhere to W3C's specifications.
- The identity wallets (e.g., uPort, Trinsic, Connect.Me) are different from the digital wallets (e.g., Coinbase, Ledger, Trezor) that store Cryptocurrencies in the sense that they store and manage DIDs and VCs instead of Cryptocurrencies.
- To protect privacy, SSI solutions (e.g. Hyperledger Indy and Aries) are increasingly using Zero Knowledge Proofs (ZKPs) to prove the authenticity of credentials without revealing the actual data.
- To facilitate secure communication between different SSI components (issuer-holder-verifier), DIDComm and CHAPI protocols have been developed and are heavily used.

Note: Some of the most commonly used DID methods: Recent studies have demonstrated the feasibility of DID:INDY using zero-knowledge proofs to disclose information DID:UPORT selectively, such as proof of vaccination status, without DID:SOV revealing users' identities. These studies have employed interoperable open-source tools to implement these While centralised identities and federated identities offer systems globally at a minimal cost. Schlatt et al. [SSFU22] convenience, control remains with the identity provider illustrates how a customer can leverage a Zero knowledge [LB15]. User-centric identities such as OpenID [RR06] Proof concept called 'blinded link secret' to disclose and OAuth [FKS16] improve portability but do not give information selectively. Similarly, Barros et al. [dVBSFC22] complete control to the users. SSI is designed to give implemented a prototype of an application for presenting users full control over their digital identities, and involves proof of vaccination without revealing users' identities. guiding principles around security, controllability, and Furthermore, it uses interoperable open-source tools across portability. In addition to providing total control, Bernabe countries to implement this system globally at a minimal et al. [BCHR+19] presented a classification of techniques cost for each country's government. The NHS Digital Staff for maintaining privacy in SSI, which included Secure Passport solution [LC22] employs the Sovrin Network Multiparty Computation and Zero-Knowledge Proofs, as a public key infrastructure (PKI) to manage verifiable among others. credentials for staff onboarding. Hospitals register on the network and use their private keys to sign credentials, while The three main parties involved in SSI systems are the issuer, staff members utilise Evernym's Connect.Me SSI digital holder, and verifier. The issuer issues a Cryptographically wallet app to store and share credentials.

signed credential to the holder, and the verifier is the

GLOBAL PROTOCOL REPORT 2024



entity that confirms the credential's authenticity using a Decentralised data registry such as a Blockchain. Holders store their credentials in secure digital wallets and can share them with other parties as needed. The holder can also create a presentation and share it with the verifier on request.

Applications for SSI

Self-Sovereign Identity (SSI) represents a transformative approach to managing personal identities in the digital realm, emphasising user control and decentralisation. Its foundational principles and technical underpinnings are now being applied across diverse sectors, driving innovation and enhancing security. In the following sections, we explore various applications where SSI is making a significant impact and reshaping traditional systems.

SSI in Healthcare



SSI in Land Registration

Shuaib et al. [SHU+22] suggest that a Blockchain-based land registry system can be combined with a self-sovereign identity (SSI) solution to provide a secure and efficient identity management system for landowners. Three existing SSI solutions, Everest, Evernym, and uPort [Ame22], were evaluated based on SSI principles [All16] to determine their compliance and effectiveness in addressing identity problems in land registry systems. The Everest platform was found to be the most compliant with the SSI principles. whereas Evernym and uPort had some limitations in terms of interoperability and user control.

SSI in E-Voting

Estonia is one of the few countries in the world that have managed to make evoting a reality [SS22]. Sertkaya et al. [SRR22] proposed an EIV-AC scheme that integrates the Estonian Internet voting (EIV) scheme with anonymous credentials (AC) based on self-sovereign identity (SSI). The use of SSI-based anonymous credentials enables voters to prove their eligibility to vote without revealing their identity. The zero-knowledge proof of identity is used to prove that the voter has the right to vote without revealing any additional information. The EIV-AC scheme enhances the security and privacy of the EIV scheme, making it more compliant with privacy-enhancing and data minimisation regulations.

SSI in Finance and Identity Management

Innovative proposals surrounding digital identity management systems, such as Kiva's architecture, suggest the development of an insurance marketplace for consequential damages related to identity claims. This marketplace could offer a market mechanism for evaluating the accuracy, trustworthiness, and usefulness of various identity claims, subsequently allowing lenders to confidently underwrite loans, even to individuals lacking formal credit history. Furthermore, by leveraging Blockchain technology in a semi-Decentralised identity 4. [*CT21] *Spela *Cu*cko and Muhamed Turkanovi*c.

management system, banks and microfinance lenders could underwrite the risk associated with issuing identity credentials, facilitating derisking for subsequent lenders.

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Ferdous et al. [FIP23] introduce a SSI4Web framework and demonstrate how an SSI-based framework can be designed for web services and offer a secure and passwordless user authentication mechanism, which eliminates the need for users to remember passwords and reduces the risk of password breaches.

Can SSI Work Without Blockchain?

Blockchain is one of many options when implementing a Self-sovereign Identity system. Alternatives like IPFS, Public-key Cryptography and even traditional Certificate Authorities can be used to implement SSI. However, the main advantage of using Blockchain is that it provides a Decentralised and immutable ledger that can be used to store and verify credentials.

Conclusion

Self-sovereign identity can potentially revolutionise various industries, including healthcare, voting systems and many more. However, as research and development in SSI progress, it will be crucial to address interoperability, scalability, and usability challenges to fully realise SSI's potential in a global context.

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Cryptocurrency Inflation: Unveiling the Hidden Costs

Cryptocurrencies, once hailed as the epitome of **Transaction Fees and Fake Transactions** decentralized value and financial sovereignty, have not been without their complexities and Some blockchains do not openly maintain a challenges. One of the overlooked issues within this digital ecosystem is the concept of inflation - the same financial ghost that haunts traditional economies. Inflation is often associated with the hidden costs of running validator nodes in blockchain networks, and understanding these costs is crucial for the long-term viability of the fake transactions are solely intended to reward blockchain ecosystem.

Staking and Newly Minted Coins

Most modern blockchains, based on POS, DPOS, DPOSA, and similar consensus algorithms that allow staking or delegating, reward their users through transaction fees and a fixed base yield. This fixed base yield consists of newly minted or This deceptive practice further underscores the unlocked coins, resulting in an increased total supply of the coin and a stable devaluation due to the growing selling power of rewards. If the rate at which new coins are minted and distributed as rewards exceeds the rate of adoption or use of the currency, it could lead to an oversupply, thus devaluing the coin and acting as a form of inflation.

This scenario highlights the hidden costs associated with maintaining validator nodes in blockchain networks. As more coins are minted to reward validator nodes, the overall supply of the cryptocurrency increases, potentially eroding its value over time. Users and investors must consider this hidden cost when participating in staking or delegating activities on blockchain networks.

stable yield to avoid claims of inflation. However, they still experience real inflation in the form of fake transactions. These Blockchains attempt to increase the rewards for staking and delegating by creating a stable volume of fake transactions that pay validators transaction fees. When these with transaction fees, they can artificially inflate the perceived value or activity level of the network. Over time, this causes inflation, erodes trust, and devalues the cryptocurrency, similar to how printing excessive fiat money without a corresponding increase in economic activity or value can lead to inflation.

hidden costs associated with blockchain networks. Users may not be aware that the transaction fees they pay are used to reward validators for processing fake transactions, ultimately contributing to the inflationary pressure on the cryptocurrency.

Validator Contracts

Some new blockchains have introduced what we call Validator Contracts, where a blockchain agrees to pay a validator a fixed amount of coins per month for running a validator node. While this method might not cause inflation as significantly as the others, it still results in constant inflation and the risk of validator nodes leaving when the blockchain fails to deliver the agreed payment. Validator contracts represent a contractual obligation that blockchain networks must fulfill,

adding to the overall costs of maintaining the from fully embracing them. network. If these obligations are not met, validators may exit the network, potentially compromising its Looking Ahead: The Future of Cryptocurrency security and stability. Inflation

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The Role of Governance As the cryptocurrency landscape continues to evolve, understanding and addressing these hidden One crucial aspect worth exploring further is the costs of inflation will remain essential for its longrole of governance in addressing cryptocurrency term viability and success. The crypto community inflation. Many blockchain projects employ must remain vigilant, advocating for transparency, decentralized autonomous organizations (DAOs) governance, and technological responsible or other governance structures to make decisions innovation to navigate the challenges posed by about inflation rates, token distribution, and network inflation while harnessing the vast potential of upgrades. Examining how governance mechanisms blockchain technology. can strike a balance between community input and In conclusion, the hidden costs of inflation in blockchain networks, particularly those associated with rewarding validator nodes, have far-reaching

economic stability is essential for a comprehensive understanding of Cryptocurrency inflation's impact. implications for the cryptocurrency ecosystem. Governance decisions can have a significant impact These costs can erode the value and trust in on inflation rates within blockchain networks. A cryptocurrencies, impact network sustainability, transparent and accountable governance system and necessitate responsible governance is vital for ensuring that inflationary pressures are mechanisms to address inflationary pressures. As managed effectively and that the interests of all the blockchain industry matures, it is imperative stakeholders are considered. to shine a spotlight on these hidden costs to ensure the continued growth and adoption of The Impact Beyond Inflation cryptocurrencies in a sustainable manner.

Beyond these direct forms of cryptocurrency inflation, there are indirect consequences that ripple through the crypto ecosystem. For instance, continuous inflation can discourage long-term holders and investors who seek to preserve the value of their assets. It can also undermine the trust and credibility of blockchain projects, especially when exaggerated transaction volumes and artificial activities are used to mask true network health.

Moreover, the inflationary aspect raises important questions about the sustainability of blockchain networks. As cryptocurrencies aim to become a mainstream means of exchange, these hidden costs of inflation may deter businesses and individuals



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Artificial intelligence (AI) is experiencing an unprecedented wave of interest and adoption. This has been driven in no small part by ChatGPT's release, along with a subsequent tide of similar, AI-powered applications. Businesses and consumers are using (and talking about) Al on an unprecedented scale. Formerly the domain of futurists and sci-fi writers, AI has firmly planted itself in the mainstream consciousness.

Al has long raised fears of a "Skynet" scenario, the "automated defense network" dreamed up by James Cameron for the Terminator franchise. Initially hailed as a new order of intelligence, Skynet's AI-powered algorithm quickly went rogue, determined that all humans were a threat, launched a nuclear war that eliminated most of the population and subsequently enslaved the rest. Were it not for a series of ex-machina-inspired heroics from a small-but-fierce band of rebels (and Arnold, of course) that would've been it for the fate of humanity.

While this remains an unlikely reality, it's far more plausible today than when the film was released nearly 40 years ago - and it's a topic we can no longer afford to ignore. Over the past decade, generative AI systems have made remarkable progress around image recognition, training) itself. It does so in a black box: we can't see what reading comprehension and language understanding, to the point where they can credibly mimic, and eventually surpass, human capabilities. While most AI development to date has focused on training large language models to generate text, the rapid pace of innovation with no real oversight poses a viable concern.

Al's potential applications, from realising elusive medical breakthroughs to plugging acute labor shortages to more effectively combating climate change, is incredibly exciting. Reaching it, though, is contingent on providing the appropriate guardrails for a largely untested and powerful technology – a role that Blockchain technology is uniquely suited to play.

Debunking a common myth around AI and Blockchain

While AI currently consumes our collective hive mind, it's worth remembering that this was the conversation happening around Blockchain just several years ago. Like any breakthrough technology, this marked Blockchain's

"peak of inflated expectations," as outlined in Gartner's Hype Cycle model. While the ensuing period has seen a cooling of public enthusiasm, the technological principles that guided the initial wave of hype remain - and Blockchain is realising historically high adoption rates among businesses. The foundation for collaborative opportunities between Blockchain and AI are myriad, with exciting and transformational potential.

As early and promising applications in fields including human resources, robotics and customer service take hold, it's worth remembering that we're still wrapping our heads around what AI's ultimate potential can look like. Already, there are important lessons for its future adoption curve. Blockchain and AI are not orthogonal technologies; they're actually complementary. Together, they can drive massive new efficiencies for organisations in a transparent and ethical manner that would make even the stoic John Connor crack a smile.

Breaking through Al's black box

Let's first define what AI ultimately is: a data model that receives continual inputs and keeps training (and redata it's ingesting, nor how it's adapting. Sometimes it will start doing completely unexpected things, often termed as "hallucinations," that baffle even its creators. New York Times columnist Kevin Roose provided a compelling example of this when a seemingly innocuous feature on Bing's new search engine devolved into a creepy exchange with a bot that was seemingly trying to sabotage his marriage.

There are many other examples of this playing out at increasingly frequent cadence.

"

Blockchain and AI are not orthogonal technologies; they're actually complementary " In March, many of the world's leading AI researchers an emerging and still largely unknown technology - and published a letter encouraging companies to at least one which the Skynet creators surely wished they had in temporarily pause their work on AI, citing the need to better James Cameron's fictional universe. Why rely on a single understand the ramifications of empowering models that party and its oft-opaque motives and biases, when you can will soon exceed our own collective intelligence. The letter instead distribute (and subsequently audit and verify) that called out the need to "...[step] back from the dangerous risk across a large number of independent and disparate race to ever-larger unpredictable black-box models with parties in a transparent and trustless manner? emergent capabilities."

Due to the massive and complex data sets that feed AI It's a vitally important consideration at this stage of AI's systems, they tend to produce terabytes worth of metadata adoption cycle - and an area in which Blockchain technology that's less germane to the issue at hand - and thus more is uniquely suited to play a key role. A Blockchain's inherent efficient to share in an off-chain, private environment. This strength lies in its ability to provide a transparent system approach considerably reduces transaction costs, while for storing data and executing contracts, underpinned by a also minimising the signal to noise ratio in data sets. Put distributed network of computers that has no single point simply, it makes more economic sense for businesses of failure. seeking to realize a competitive advantage with an emerging technology. If this equation sounds familiar, it's because it's the same playbook that saw cloud computing This is a critically-needed feature set as it relates to developing a more ethical and transparent brand of AI. evolve from niche curiosity to mainstream best practice for Among other key functions, Blockchain can record every almost every organisation around the world.

time a parameter that governs AI behavior is adjusted, whether that's by a human researcher or the AI itself. This will provide an important breakthrough in making AI more transparent: it unlocks a tamper-proof view of an Al's "weight system" history, or how it logs training set data and its outcomes.

While this is theoretically possible with non-Blockchain databases, it quickly becomes a far more complex and prohibitively expensive proposition in practice. Timestamps will need to be entered manually (an incredibly timeand labor-intensive process), data sets require constant monitoring to ensure their continued integrity and the entire, centralised system relies on a single (likely opaque) point of failure that makes it far vulnerable to manipulation and difficult to rein in. With a Blockchain, that entire process can be automated via a single smart contract, and secured by a Decentralised network that consists of hundreds or even thousands of independent servers.

Taking a hybrid approach

Hybrid Blockchain are one potential Al governance model. Hybrid chains allow an organisation to utilise private infrastructure that they control while simultaneously accessing public infrastructure that is fully Decentralised. It's up to them which data lives where.

Organizations will understandably want to store the most relevant and important data on the most secure option: the public Blockchain. This ensures that the system will behave as intended if or when any shutdown mechanism is triggered by an AI, and it represents a critical boundary for



It's become clear that AI, like Blockchain, is here to stay. And in the case of both technologies, we've barely scratched the surface when it comes to realising its ultimate potential. We're at a crossroads, and the decisions that we collectively make in the coming months and years will have significant and long-term implications. The individuals and organisations that will make an exponential impact on our future would be remiss to overlook the incredible potential that AI and Blockchain offer for ushering in a more equitable and promising future.

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JURISDICTIONS & REGULATORS

In this chapter, readers will explore the different jurisdictions where network organisations are located and understand why certain countries have become favourable destinations for Web3 ecosystems. Factors such as regulatory frameworks, government support, tax incentives, and other infrastructure elements will be analysed.



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Looking at the Cryptocurrency landscape, it's challenging how regulations can vary so greatly depending on where you are in the world, involving different regions, legal jurisdictions, and governing bodies. In an effort to create a more cohesive framework, the European Union (EU) has taken a significant step by introducing the Markets in Crypto-Assets Regulation (MiCA). This initiative could potentially serve as a blueprint for other jurisdictions around the globe. As of now, MiCA stands as a beacon of possibility for harmonizing Crypto regulations on an international scale.

MiCA isn't just a standalone regulation; it's a crucial piece of the comprehensive digital finance strategy devised by the European Commission. This broader strategy encompasses various aspects, including the forthcoming Regulation on digital operational resilience (DORA), which has provisions extending to Cryptoasset service providers. Another noteworthy inclusion is the new Regulation centered around a distributed ledger technology (DLT) pilot regime, focusing on enhancing the functioning of financial market infrastructures built upon DLT principles.

The regulation itself casts a wide net, covering a range of subjects. From those issuing Crypto-assets without backing to stablecoins, and from the platforms where Scope. In general, MiCA applies to three categories of

Crypto-assets are traded to the wallets where they're stored, it seeks to provide a cohesive regulatory framework. This regulation defines Crypto-assets as digital representations of value or rights, transferable and storable electronically. It categorises them into utility tokens, asset referenced tokens, and electronic money tokens - effectively enveloping Crypto-assets that aren't presently regulated by existing financial services laws.

The new regulation emphasises transparency, disclosure, authorisation, and supervision, all of which hold significant sway. Notably, Crypto-asset service providers (CASP) are required to obtain authorisation from a national competent authority, allowing them to offer their services across the entire EU. This authorisation essentially acts as a passport for their operations within the union. But what does this mean for Switzerland or other non-EU countries?

Switzerland, as well as any other non-EU country are affected by MiCA as long as they provide Crypto related businesses in EU countries. Meaning, Swiss companies will need to analyse whether they fall under the MiCA provisions; if so - whether they have the necessary license or not.

Cryptoasset services means:

- 1. Custody and administration of Cryptoassets on behalf of third parties;
- 2. The operation of a trading platform for Cryptoassets;
- 3. The exchange of Cryptoassets for funds;
- 4. Exchanges (Crypto to Crypto and Crypto to fiat)
- 5. Execution of orders for Cryptoassets on behalf of third parties;
- 6. Placement of Cryptoassets;
- 7. Providing transfer services for Cryptoassets on behalf of third parties;
- 8. Reception and transmission of Crypto assets on behalf of third parties;
- 9. Advisory services; and
- 10. Portfolio management

persons, (i) issuers of Cryptoassets, (ii) CASPs and (iii) enact measures that either prohibit or restrict the provision any person, in respect of acts that concern trading in of Cryptoasset services by CASPs, particularly when Cryptoassets that are admitted to trading on a trading there are perceived threats to market integrity, investor platform for Cryptoassets operated by an authorised protection, or financial stability. Cryptoasset service provider, or for which a request for For stablecoins, the oversight landscape involves admission to trading on such a trading platform has been made. Furthermore, MiCA distinguishes between three the European Banking Authority (EBA) stepping in. types of Cryptoassets: Specifically, stablecoins with user counts surpassing 10

- Asset references token, means a type of Crypto-asset that is not an electronic money token and that purports to maintain a stable value by referencing another value or right or a combination thereof, including one or more official currencies.
- Electronic money token is a type of Crypto-asset that purports to maintain a stable value by referencing the value of one official currency.
- Utility token refers to Crypto-assets that are only intended to provide access to a good or a service supplied by its issuer.

NOTE! Outside the scope of MiCA are: DeFI protocols, pure NFTs, CBDCs, security tokens or other Cryptoassets that gualify as financial instruments according to MiFID II.

Licensing. MiCA introduces licensing requirements for Cryptoasset service providers, issuers of asset-referenced tokens and issuers of electronic money tokens. In general, CASP will trigger the licensing requirements, unless they are already a licensed credit institution under MiFID. As mentioned, before, even with an existing license, the company would still need to notify the competent authorities about its intention to offer Cryptoasset services.

Supervision. At the member state level, competent authorities will hold the responsibility for overseeing CASPs and ensuring adherence to the stipulations outlined in MiCA.

CASPs with an active user base exceeding 10 million will fall under the category of "Significant CASPs". While these Significant CASPs will continue to be monitored by the relevant competent authorities, the European Securities and Markets Authority (ESMA) will be vested with an "intervention power." This authority empowers ESMA to



million or possessing an asset reserve exceeding 5Bn will fall under EBA's supervision. Additionally, the European Central Bank will possess the authority to exercise veto rights concerning any stablecoin it deems concerning, thereby influencing its operations.

Market abuse restrictions. Cryptoassets that do not qualify as financial instruments under MiFID II will fall outside the scope of the EU Market Abuse Regulation. However, MiCA sets outs its own market abuse rules for Cryptoasset markets in an attempt to guarantee market integrity. These rules will be applicable to Cryptoassets that are admitted to trading on a trading platform for Cryptoassets operated by an authorised Cryptoasset service provider. .

Conclusion. It is without any doubt that the influence of MiCA on CASPs is bound to be substantial. This means that we might be looking at extended and potentially demanding phases for implementing the necessary changes. Despite the potential hurdles that lie ahead, we're maintaining an optimistic outlook as we're prepared to tackle the challenges not only from a practical perspective but also from a legal standpoint.

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PROTOCOLS WORLDWIDE





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47







FUNDING & VALUATIONS

For successful innovation, three components are crucial: capital, infrastructure, and talent. This chapter will focus on the valuation and the financial power of DLT Protocols, discussing the various funding mechanisms and investment trends that have propelled the growth of Web3 applications. Readers will gain insights into how these protocols, with the right programs in place, can push and accelerate adoption, leading to a more robust and thriving Web3 Ecosystem as well as different approaches on how one could value these protocols and how different events in the past could have shaped the valuations.





INTRODUCTION TO DIFFERENT APPROACHES TO THE VALUATION OF DLT PROTOCOLS

Navigating the valuation of Blockchain drawn to its store of value in unstable and digital ledger technologies (DLT) requires a nuanced approach, given their complexity and evolving nature. This section brings together insights from leading experts in the field, each contributing their unique perspective and methodology. These thought leaders, hailing from influential organisations in the Blockchain sphere. provide a multifaceted view of how to assess the value and potential of various DLTs. Their collective expertise offers a comprehensive exploration Forkast Labs introduces the GDPx. into innovative and emerging valuation methods, essential for understanding these transformative technologies.

"Global Cryptocurrency Adoption and the Preference for Bitcoin in innovation Emerging Economies"

Todd Groth of CoinDesk Indices global Cryptocurrency examines adoption trends, highlighting Bitcoin's growing popularity in emerging economies. The article explores how these regions, characterised economic growth and lower bv banking infrastructure, levels of are increasingly embracing Bitcoin,

economic environments. The analysis, supported by data on Google search trends and the Chainanalysis report, provides a nuanced perspective on regional differences in Cryptocurrency adoption, offering valuable insights for understanding global digital asset markets.

"Understanding the GDPx: The Future Metric of the Digital Economy"

a novel metric designed to evaluate the economic output of Blockchain networks. This concept parallels the traditional GDP measurement for countries, representing a significant in quantifying the economic health of digital economies. By considering activities like mining rewards, transaction fees, and NFT sales, the GDPx offers a more comprehensive view of the Blockchain's economic activity, marking a pivotal step in understanding the broader economic impact of Blockchain technology.



"Valuing Crypto Coins and Tokens with Artificial Intelligence and Quant Tools"

Aisot Technologies delves into the application of artificial intelligence and quantitative tools for the valuation of Cryptocurrencies. This innovative approach is showcased through the analysis of two distinct types of Crypto assets: large-cap and small-cap. The article illustrates how AI can provide a nuanced and sophisticated perspective on Crypto valuations, revealing intricate patterns and insights that might not be apparent through traditional methods. This exploration highlights the evolving role of AI in the realm of digital asset valuation, emphasising its potential to revolutionise our understanding of Cryptocurrency markets.











According to Location of Foundations, in Percentage (%)

DLT SCIENCE FOUNDATION





CoinDesk Indices

GLOBAL CRYPTOCURRENCY ADOPTION AND THE PREFERENCE FOR BITCOIN IN EMERGING ECONOMIES

Introduction:

Amidst the ongoing regulatory developments surrounding the introduction of a Bitcoin Spot ETF in the United States, it's crucial to remember that Cryptocurrencies and digital assets constitute a global market. The traditional financial system has often been centered around New York, the US Dollar, and the Swift Payment System, which might contribute to a certain myopia regarding global Crypto adoption. However, insights from the upcoming 2023 Geography of Cryptocurrency report by Chainanalysis (link here) help provide a broader perspective on the world of Blockchain and digital assets.

Emerging Economies Lead in Crypto Adoption:

In the Chainanalysis report, they rank countries by global Crypto adoption, revealing an interesting trend: nearly 75% of the countries within the Top 20 are emerging market economies. These leaders in Crypto adoption are not only experiencing economic and demographic growth but also represent a significant portion of the world's population. Furthermore, these emerging economies tend to have lower levels of banking infrastructure compared to their developed counterparts. They also possess greater demographic growth rates than the more advanced economies, further

supporting the long term growth of Cryptocurrencies and the digital asset market.

Google Search Insights:

To gain additional insights into global adoption trends, we analysed Google search results over the past five years for Bitcoin and Ethereum in various countries and normalised the data for comparison. The results paint an intriguing picture.

The scatter chart divides countries into four quadrants, with Bitcoin and Ethereum search interest on the X and Y axes, respectively. Western Europe and the Philippines show a preference for Ethereum searches, while emerging economies exhibit greater interest in Bitcoin. Switzerland, an outlier, displays average Bitcoin interest and significant Ethereum interest, likely due to its unique status as the country headquarters of the Ethereum Foundation.

Explaining the Preference for Bitcoin in Emerging Economies:

To understand the preference for Bitcoin over Ethereum in emerging economies, we must consider the context of these economies compared to their developed counterparts.

Google Search, Past 5 Years: Bitcoin vs Ethereum



Bitcoin Interest

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CoinDesk Indices

Crypto Benchmarks. Reference Rates. Systematic Strategies. Signals.

The leading global index provider for digital assets.

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Emerging economies often grapple with weaker and more Conclusion: volatile currencies, less established property rights, lower rates of financial inclusion, and less developed financial While Bitcoin remains the preferred Cryptocurrency in infrastructure. In these conditions of economic instability, emerging economies due to its store of value properties, it's Bitcoin's primary use case as a store of value becomes essential to acknowledge that individuals and businesses in highly attractive. People in these countries primarily seek to these regions also utilise other Cryptocurrencies, including safeguard their wealth from rapid depreciation, and Bitcoin's Ethereum, for purposes such as DeFi and accessing global limited supply and deflationary nature offer a hedge against markets. The choice between Bitcoin and Ethereum often depends on the context of the existing financial infrastructure, inflation. specific financial use cases and the level of understanding Bitcoin's widespread recognition and acceptance compared and acceptance of these technologies within a given region.

to Ethereum and other Cryptocurrencies, make it a more accessible form of payment and investment. It enjoys listing In the ever-evolving landscape of Cryptocurrencies, it is vital on numerous Cryptocurrency exchanges, facilitating ease of to recognise that different regions have unique needs and access for individuals in emerging economies. preferences, contributing to the diverse and dynamic Crypto market we see today.

The simplicity of Bitcoin as digital cash and a store of value makes it more comprehensible to those who may lack technical expertise or familiarity with smart contracts and complex Blockchain applications. This stands in contrast to Ethereum, which is a more sophisticated platform used for software development and enhancing existing financial infrastructure.

Furthermore, Bitcoin's utility in international transactions and remittances is valuable in countries lacking robust financial infrastructure. These nations also typically offer fewer investment options than developed economies, making Bitcoin an attractive choice due to its history of price appreciation.

Source: Google Trends, CoinDesk Indices











As of 31st Dec 2023 - 1.67 Trillion US Dollars

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57





forkastlabs

UNDERSTANDING THE GDPX: THE FUTURE METRIC OF THE DIGITAL ECONOMY

In today's fast-paced digital age, the global economy is undergoing unprecedented shifts, powered largely by innovations in the Blockchain sector. Traditionally, the health of a country's economy is measured using its gross domestic product (GDP). But how do we measure the output and health of our rapidly emerging digital economies? Enter the GDPx.

Developed by Forkast Labs, the GDPx, or Gross Digital Product, is a revolutionary metric that views each Blockchain as its own distinct economy. Just as the traditional GDP assesses the value of goods and services produced within a country in a given timeframe, the GDPx evaluates the value of goods and services within a Blockchain.

How is GDPx measured?

Imagine you're trying to understand the productivity of a bustling city. You'd look at businesses, services offered, how much is sold, and the income generated. Similarly, GDPx evaluates a Blockchain's productivity by examining:

- Mining rewards unique to each Blockchain, which includes new entries of the network's native Cryptocurrency
- Block fees related to transactions and block validations
- The primary value of non-fungible tokens (NFT)
 produced on the network

- NFT services, fees generated from their sales and royalties
- Revenue from Decentralised finance (DeFi) services, such as fees related to fungible tokens

Using GDPx, investors can go beyond the volatile Cryptocurrency prices. They can now dive deeper, studying the actual economic activities happening within these digital economies. For instance, while Bitcoin is the most valuable and recognisable Blockchain, it doesn't have a mature DeFi ecosystem, so the value produced on the network is highly reliant on mining activities and block fees. With the GDPx, nuances like these become clearer.

How investors can use the GDPx

Unlike Cryptocurrency and NFT prices, which can be swayed by major holders – particularly in the case of assets with smaller market caps – Blockchain data is transparent and genuine. This means that GDPx offers a more truthful reflection of a Blockchain's health and productivity.

In essence, GDPx is a magnifying glass, revealing intricate details of the digital world that traditional economic metrics may overlook. It's a tool not just for investors, but for anyone keen on understanding the true pulse of our evolving digital economies. In a world that's swiftly moving towards digital realms, understanding the nuances and the genuine state of these new-age economies becomes paramount. GDPx, with its innovative approach, bridges the gap between traditional and digital economic assessment, offering a more comprehensive view. As Blockchain technology continues to influence our









During period of 2022 to 2023

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Polkadot





\$4.4Bn

Source: Inacta, CoinDesk Indices



In today's rapidly evolving landscape, investment professionals face the daunting challenge of sifting through vast and increasingly diverse data sets. This data, which continues to grow in both size and complexity, requires astute analysis to make informed decisions. Traditional approaches often fall short in keeping up with the market's ever-changing dynamics and providing forward-looking insights. This is particularly evident in the Crypto market, where fundamental valuation methods are a field which is still under development, having access to better data and better tools to analyse this data can make a big difference in terms of investment returns that can be created.

On the following pages, we delve into the intricate details of two portfolios generated by a state-of-the-art AI and guant engine. The models take into account more than 500 different features, from market factors, time series and technical indicators. While the possibilities for data sources in Al-driven portfolios are virtually endless, this demonstration primarily focuses on utilising market data and derived indicators. The model conducts rebalancing on a monthly basis, showcasing the effectiveness of these strategies based on consistent, data-driven decisions.

More in detail, the rebalancings are based on a selection and adjustment of the portfolio components using Aisot Technologies' proprietary AI engine in accordance with the following elements:

- Portfolio risk estimation, taking into account the volatility of the individual assets and their mutual dependence, factoring in different risk methods that are composed of state-of-the-art covariance estimators.
- orecast engine, based on a one-month return horizon forecast with an uncertainty component by an ensemble of cutting-edge machine learning models.
- Dynamic cash allocation from 0% to 45%, depending on the current estimated portfolio risk and target annualised volatility.

Risk and alpha components are combined in a minimum-

variance optimisation framework, considering additional constraints like transaction fees.

This article compares a portfolio of seven large cap Cryptos (>1B USD market cap) and a portfolio of four small caps (<300M USD market cap) and their statistical properties when fully rebalanced by some of the most advanced Machine Learning and quant tools. The backtesting time frame is July 1, 2022 to Jun 30, 2023. Target volatility has been set to a minimum to try to make the resulting portfolio as stable as possible. The portfolio is long only with a risk-free component, so there is a dynamic AI based cash allocation. In simpler terms, this means that the engine projects a risk for the next rebalancing period and selects an adequate level of cash for the portfolio.

There is no exposure to short selling or leverage through credit raising or derivatives.

Large cap portfolio (LC)

Constituents:	BTC, ETH, XRP, SC	DL, ADA, MATIC, AVAX
Weights:		all 0-40%
Risk free comp	onent (cash):	0-50% max
Trading fee (de	educted):	10 BP per trade

LC underlying performance

There were substantial differences within the large cap portfolio when it comes to profits and losses in the period selected. The best performing asset (Ether) returned a profit of +83%, the worst performing (Solana) lost -43%. Thus, it seems an exceptionally challenging and interesting task to see if the AI engine is able to choose the right titles at the right time.

An equally weighted portfolio (meaning all seven titles get the same weight) would have returned +17% during this one year horizon.

LC performance record

	Al Portfolio	BTC Baseline
Return	0.27	0.58
Volatility	0.43	0.53
	0.43	0.55
Sharpe Ratio	0.63	1.1
Max Drawdown	-0.25	-0.35

All metrics are annualised, except for Max Drawdown.

The AI optimised large cap portfolio reached a return of 27% over the period from July 1, 2022 to June 30, 2023. This A look at the composition of the portfolio gives further is substantially better than the equally weighted portfolio, insights. The AI engine consistently assessed the risk as which returned +17%. Interesting is the comparison to exceptionally high throughout the latter half of 2022 Bitcoin, which was the second best performing asset in the



Legend: BTC (red) vs AI optimised large cap portfolio (green)

and the initial two months of 2023. During this period. This is a clear sign that the AI engine quickly grasped the cash levels were maintained between 33% and 50% of outperformance potential of the two as compared to the the portfolio. Starting from March 2023, the cash level other Cryptocurrencies in the basket in 2023. SOL, which has been lowered, ranging between 0% and 22%. On the was the clear underperformer over the full period, initially having a weight of 8% in the portfolio (Nov 2022) was level of the individual title, it becomes apparent that the subsequently brought down to 0% in December 2022 larger two, BTC and ETH, have been overweight by the AI engine. There was no prior obligation for the AI engine to (with a quick comeback in May 2023 at 7.5%). do this. However, notably, after reducing the cash portion from March 2023, BTC and ETC experienced a significant Small cap portfolio (SC) surge in portfolio share, with BTC rising from 14% to the maximum level of 40%, and ETH escalating from 10% to Constituents: ZIL, ZEC, KSM, LSK 40%. Weights: all 0-60% Risk free component (cash): 0-50% max

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portfolio with +58%. In terms of return, the portfolio was leading against BTC during most of 2022, but then in 2023 BTC was clearly one of the strongest performers among all Cryptos. So without being able to allocate 100% to BTC, it was not possible to beat it. Throughout the entire period, the statistics clearly demonstrate the successful reduction in portfolio volatility which was set as a target. The Aloptimised portfolio achieved an annualised volatility of 43%, outperforming BTC's 53%. Also in terms of maximum drawdown (how much one could have lost when buying at the top and selling at the lowest point in this period), the portfolio showed to be more defensive than BTC, with a maximum drawdown of 25% and 35% respectively.

LC portfolio composition







Legend: Evolvement of the AI large cap portfolio over time

Trading fee (deducted):

10 BP per trade

SC underlyings performance

The small cap portfolio moved much more homogeneously during the time frame under observation. While the best performing, Lisk (LSK), lost -26%, the worst performing lost -47% (Kusama, KSM). So here it is expected that there is potentially less impact the Machine Learning engine can have on the outcome, as optimising within this set is difficult.

An equally weighted portfolio would have returned -39% on this one year horizon. This is in a stark contrast to the +17% of an equally weighted portfolio of large caps.



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Legend: BTC (red) vs AI optimised small cap portfolio (green)

	BTC Baseline
Volatility	0.40
Max Drawdown	-0.40

All metrics are annualised, except for Max Drawdown.

The AI engine optimised small cap portfolio reached a loss of -22% over the period from July 1, 2022 to June 30, 2023. This is substantially better than the equally weighted portfolio, which lost -39%. Interesting is the fact that the portfolio even did better than its best performing constituent (LSK at -26%). This was possible because of the dynamic risk free component (dynamic cash attribution). As sharpe is difficult to interpret in a negative scenario, it is not displayed here. The comparison to the performance of BTC shows clearly how the trajectories were drifting apart since the start of 2023. On January

1, 2023, BTC stood at -14%, while the SC portfolio was at
-24%. By April 30, 2023, BTC had surged to +51%, whereas
the SC portfolio stood at -13%. Despite the SC portfolio
making modest progress from -24% to -22% in the first
half of 2023, BTC's performance skyrocketed from -14% to
+58%

engine perceived the risk as very high throughout the whole period under review, just slightly reducing the cash part from the maximum (50%) throughout most of 2022 to 35% in June 2023. On the level of individual assets, there was little optimisation potential that could be exploited. The highest weight was given to ZEC in March 2023 at +58%. 18.3%, the lowest to ZIL with 8.4% in July 2022. So in this **SC Portfolio Composition** portfolio, the engine focused on risk reduction by keeping high cash levels. As a secondary priority, it made slight A look at the composition of the portfolio confirms some optimisations to token weights within an otherwise fairly of the observations that have been made above. The AI uniform group of movers.



Summarv automatically optimised with the latest AI tools. Aisot Technologies' interactive AI Insights Platform allows users Al optimisation for Crypto portfolios is a nascent field with to run backtests on their individual universe, goals and great potential to achieve better risk adjusted returns. restrictions and to find an ideal AI optimised portfolio While today most Crypto portfolios are either market setup for themselves and their customers. Existing cap weighted or equally weighted portfolios that are portfolios can be rebalanced and investment products managed in a discretionary manner, fully systematic, AI launched. And with the right combination of universe, driven versions are starting to take on the Cryptocurrency settings and AI boost, it is even possible to beat BTC in 2023 so far, as e.g. in one of our own portfolios. To learn market. The advantages are obvious: less manual work for market monitoring, research and calculations, higher more, contact Aisot Technologies directly. data processing availability, no emotional and biased investing traps, etc. While this report is showcasing two model portfolios of a large and small cap universe, there are innumerable potential combinations that can be









PROTOCOL TOKEN MAXIMA AND MINIMA COMPARED TO AVERAGE During period of 1st Jan 2023 to 31st Dec 2023 400+ 300 200 100 -100 BNB APTOS MONERO TRON QTUM ZILIQA TEZOS NEO HEDERA KAVA RADIX AVALANCHE LISK LOOPRING SUI EVERSCALE MMUTABLEX COSMOS THETA NETWORK VECHAIN ALEPH ZERC POWER LEDGE MINA PROTOCOL CONFLUX SKALE NETWORK STOR. INTERNET COMPUTER CASPEF CHILIZ CHAIN FILECOIN POLYGON HARMONY FLOW **GNOSIS CHAIN** XDC NETWORK ONCOIN OPTIMISN STELLAF CRONOS CHAIN POLKADO⁻ ZCASH FANTON NEAR PROTOCOI **CARDAN** CONCORDIUN ARBITRUM ON ROOTSTOC OS NETWOR ALGORAN 101 % Maximum decrease from average % Maximum increase from average Source: Inacta, CoinDesk Indices





67







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ASSESSING PROTOCOL MATURITY

Assessing the maturity of DLT protocols is crucial for making informed decisions. In this chapter, an introduction to a comprehensive assessment framework will be provided. This framework will allow readers to gauge the strengths and weaknesses of each protocol, facilitating comparison and identification of potential areas for improvement.




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RESEARCH & METHODOLOGY

1. Goal

This section aims to dissect and understand the complexities of the top DLT-protocols in the world, offering a detailed view of their technological infrastructure, market dynamics, and overall impact in the Blockchain ecosystem. Targeted towards industry analysts, regulators and decision makers, this analysis seeks to illuminate the diverse functionalities and innovations each protocol brings to the forefront of digital ledger technology. The research is designed to provide a comprehensive and nuanced understanding of these protocols, contributing to a more informed and insightful discussion about the current and future landscape of Blockchain technology.

2. Scope

This section comprises a so-called "One Pager" for each protocol; each protocol has its own page with various information, graphics and data. For more information on the One Pagers, see the "Introduction to One Pagers" section. The section includes 50 "Top Protocols" and 22 "Additional Protocols", which were selected according to criteria from Inacta Ventures Research.

3. Selection Criteria for Protocols

Top Protocols

All Layer-1 and Layer-2 DLT platforms, with Forks such as Bitcoin Cash or Ravencoin being excluded, that were in the top 100 of CoinMarketCap and CoinGecko by market capitalisation on 30.06.2023 are considered "Top Protocol". In our case, this is 50 protocols.

Additional Protocols

The Additional Protocols are Layer-1 and Layer-2 DLT platforms, which were not in the top 100 according to CoinMarketCap and CoinGecko with their market

capitalisation on 30.06.2023, but which bring innovation to the field of DLT platforms through their specific technology and use cases and therefore, in the opinion of Inacta Ventures Research, can bring new insights into the world of DLT for the readership.

Layer 1

Inacta Ventures Research defines a Layer 1 DLT (Distributed Ledger Technology) platform as the foundational network that forms the core of a DLT/Blockchain ecosystem. It is responsible for validating and recording transactions, maintaining consensus, and ensuring security and decentralisation. These platforms are the bedrock upon which all transactions occur and on which other technologies, like Layer 2 solutions or Decentralised applications (dApps), are built. Key examples include Bitcoin and Ethereum. Layer 1 platforms are characterised by their own native consensus mechanisms (like Proof of Work or Proof of Stake) and have their own inherent scalability, security, and governance features. They form the essential infrastructure for a Decentralised digital economy.

Layer 2

Inacta Ventures defines a Layer 2 DLT (Distributed Ledger Technology) platform as a network or protocol that operates on top of an underlying Layer 1 DLT platform to extend its capabilities. While often associated with improving scalability and transaction speeds, Layer 2 solutions can offer a variety of functionalities, including enhanced privacy features, improved user experience, and lower transaction fees. These solutions, which may include state channels, sidechains, or rollups, work in conjunction with the base layer to expand the use cases and efficiency of the Blockchain without compromising its inherent security and decentralisation. This layered approach allows for innovative developments within the Blockchain ecosystem, addressing specific challenges or needs while

maintaining the integrity of the Layer 1 network.

4. Data Collection Process, Analysis and Sources

The data collection process for each protocol presented in our report was meticulously conducted, leveraging a combination of sources and methodologies. As detailed in the "Introduction to One Pagers" and "Data Partners'

sections, a portion of our data was sourced from our In addition to our rigorous internal research and analysis esteemed data partners. These external contributions were process, we reached out to the specific foundations and complemented by our own research efforts. The sources entities behind each protocol for verification of our data for openly presented data on each One Pager are also and texts. This step was crucial to ensure the accuracy listed in the "Introduction to One Pagers" section. and reliability of the information presented in our report. For the distinctive Protocol Characteristics Graph featured While not all contacted entities responded, those who did on each One Pager, which showcases the strengths of provided valuable feedback. In cases where inaccuracies protocols across seven different aspects, Inacta Ventures were identified, we diligently made the necessary Research developed a unique framework. This framework corrections. The methodologies employed ensure that the involves around 30 individual data points, divided into evaluations are both objective and reflective of the current qualitative and quantitative categories. state of the Blockchain ecosystem, with some limitations of course discussed in "Limitations and Disclaimer".

Qualitative Data

Our team of DLT experts delved into the detailed documentation and whitepapers of each protocol. Using our framework, which assigns scores on a scale ranging In our evaluation of the protocols, we developed a from zero to three (whole numbers only: 0, 1, 2, 3), for comprehensive framework that assesses each protocol each point, they evaluated these data points. The scoring across seven key aspects. These aspects are underpinned scale was carefully designed in alignment with the ISO by approximately 30 individual data points, divided into Standard of Software Assessment, tailored specifically for qualitative and quantitative categories. The scores for each DLT protocols by Inacta Ventures Research. This rigorous data point range from 0 to 3, with the scales tailored to reflect the unique characteristics of DLT protocols. process ensures a thorough and standardised assessment of each protocol's qualitative features.

Quantitative Data

For data not provided by our partners, our DLT experts Governance turned to official sources such as block explorers. Following the collection of all necessary data, we established scoring The Governance aspect evaluates how inclusive and scales that conform to a statistical normal distribution. This Decentralised a protocol's governance structure is. It approach ensures that the scores are not only consistent examines the topology of the network, assessing who and fair but also reflect the actual data distribution across has the power to validate and run nodes, and whether the various protocols we studied. Each data point was again any authorities select or approve nodes. The funding scored on a scale from zero to three, shaped to match the and financial status, such as initial token distribution, are statistical normal distribution of the collected data. considered for their potential impact on governance and



This comprehensive data collection process, combining inputs from external partners and our own expert research, has enabled us to present a nuanced and in-depth analysis of each protocol. All data points used in our analysis are as of the date of June 30, 2023. For metrics that involve a time period, such as averages and volatility calculations, we have considered the timeframe from July 1, 2022, to June 30, 2023.

5. Protocol Characteristics Framework and Calculations

The following outlines the seven aspects and their corresponding data points:

(C) Crypto Valley





decentralisation. Additionally, the model for code updates is scrutinized to determine whether the community is involved, if there's a formal DAO process, or if updates are restricted to core developers. The legal entity behind the project, whether it be a company, consortium, a foundation or a DAO, is also analysed to understand the extent of community involvement in the protocol's leadership.

Performance Efficiency

This aspect focuses on the performance of a protocol in terms of transaction throughput and efficiency. It includes an analysis of the time it takes for a transaction to be confirmed and become practically unchangeable (transaction finality time). The stated capacity (as claimed) of the protocol in transactions per second (TPS) is considered. The average transaction fee over a specific period provides insights into the cost-effectiveness of the protocol. The base fee, or the minimum fee required for a transaction, is also evaluated.

Reliability

Reliability looks at how dependable the protocol is, considering factors like its longevity (mainnet live date), the extent of its use (number of total unique addresses), and its daily active usage (average daily unique active addresses). Market cap volatility over a year is analysed to understand the stability and market sentiment around the protocol. The aspect also examines recoverability, focusing on the mechanisms for transaction reversals or rollbacks, and the network's availability, including the duration and impact of outages. The number of full nodes, which indicates the network's robustness and trustworthiness, is also a key consideration.

Security

This aspect assesses the security of the protocol in terms of transaction safety, algorithms, and updates. It looks at the level of confidentiality offered by the protocol, such as the availability of private transactions and default data encryption. Community involvement in GitHub activities related to updates and error detection is a vital part of this assessment. The time taken for transactions to be finalized

on the chain is evaluated for its impact on security. The number of full nodes, ensuring the network's security and decentralisation, and the presence of audited concepts and standards, which indicate the protocol's adherence to high-security benchmarks, are also crucial components of this aspect.

Maintainability

This aspect evaluates how well the project is kept up to date and maintained, including with community involvement. It assesses the availability and quality of documentation, its frequency of updates, detail, and the presence of a wiki. The reusability, modifiability, and interoperability of smart contracts and code across different DLT protocols are examined to understand the flexibility of the protocol. Community involvement in GitHub regarding updates and contributions to maintainability is also a key factor.

Usability

Usability focuses on how user-friendly and accessible the protocol is. It considers the availability and functionality of block explorers, the number of software wallet providers, hardware wallet integration, and the establishment of token standards, which facilitate ease of use and interoperability. The integration with centralised exchanges and the availability of on/off-ramping platforms are also analysed to understand how easily users can interact with the protocol.

Adoption

This aspect determines the extent of the protocol's adoption and demand. It examines the total number of unique addresses to gauge the user base, the average daily active addresses to understand regular usage, and the number of new active addresses to assess recent adoption trends. The amount of software wallet providers and hardware wallet integrations are indicators of the protocol's accessibility and popularity. Market capitalisation and its development over time provide insights into the protocol's growth and performance, while market cap volatility and its development reflect the asset's maturity.

In our Protocol Characteristics Framework, we meticulously only and should not be the sole basis for any investment assign weightings to every indicator within each of the decisions or actions. seven aspects. This approach ensures that the significance of each indicator is represented in the overall evaluation Unless explicitly cited, all data shown, analyses conducted, of a protocol. The final output displayed in the Protocol and conclusions drawn within this report are the sole Characteristics Graph on the One Pager is the result of responsibility of Inacta Ventures Research. This includes the methodology and results of the Protocol Characteristics calculating the weighted average of these indicators. Each indicator is scored on a scale from zero to three, with the Framework, where the calculations and interpretations weightings factoring into this calculation. This method of the data are conducted exclusively by our team. Any produces a representation of each protocol's performance errors, inaccuracies, or misinterpretations in this report are across the various aspects, encapsulating the essence of the accountability of Inacta Ventures Research and should its strengths and effectively illustrating the unique profile not be attributed to our esteemed data partners. of each protocol within the framework.

6. Limitations and Disclaimer:

Looking forward, Inacta Ventures Research is committed Limitations to continually enhancing and expanding our analysis of Blockchain protocols. We recognise the fast-paced We acknowledge the inherent challenges in capturing the evolution of the Blockchain sphere and the importance full spectrum of characteristics for each protocol. While of staying abreast of new developments, technologies, we initially envisioned a framework with 60 indicators, and emerging protocols. Future iterations of this report encompassing more intricate aspects like the cost of could aim to incorporate more comprehensive metrics and network overtaking, historical instances of hacking, or cloud indicators, potentially including those initially considered service dependency, such a detailed analysis was beyond but deemed too extensive for the current scope, such as network overtaking costs, historical security breaches, and the scope of this report due to its extensive nature. We recognise that this approach may have its limitations, and cloud service dependencies. there is always room for enhancement in future research. Our current framework aims to strike a balance between Moreover, we plan to keep pace with the rapidly changing comprehensiveness and practicality, providing valuable Blockchain landscape, ensuring our analysis reflects insights within a manageable framework. Future iterations the latest trends and innovations. This will involve not of this report may explore these additional dimensions only updating existing protocol evaluations but also to offer even deeper analysis and understanding of each introducing new protocols that emerge as significant protocol. players in the Blockchain ecosystem. Our goal is to provide an ever-evolving, detailed, and insightful resource that Disclaimer aids in understanding the complexities and dynamics of Blockchain technology.

Inacta Ventures Research, in conducting this report, does not intend to rank protocols or suggest which is superior to In addition to refining our existing methodologies, we are open to exploring collaborative research efforts another. Our goal is to provide a comprehensive overview and showcase the unique strengths of each protocol and integrating feedback from the community. Such for our readership. This report is not meant to serve as collaborations and insights will be invaluable in enhancing investment or trading advice but is intended to enhance the accuracy, relevance, and depth of our future research, understanding of the diverse Blockchain landscape and fostering a more comprehensive and informed discourse in the distinct features of each protocol. All data, analyses, the Blockchain community. and conclusions presented are for informational purposes

GLOBAL PROTOCOL REPORT 2024



7. Future Research Directions:

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NEPTUNE - OPINION PIECE

Cryptocurrencies are profoundly disruptive and their potential is an order of magnitude in excess of what the current market capitalisation would suggest. Today's prices reflect the features and selling points that cause to fix this: they enable the external auditor to verify Cryptocurrencies to thrive in today's market environment, but today's market environment is precisely the thing that the incoming tidal wave of disruption will upend. The trillion dollar question is, what are the features that spell success in the market conditions of the future?

Cryptocurrencies stand to deprive the state of its monopoly on money and the privileges that come with it. As a result, the future market environment for Cryptocurrencies is marked by hostility from the state, and the conditions for them to thrive are precisely the features that make them resilient to state interference.

In this metric, Bitcoin stands head and shoulders above its competitors due to its Decentralised governance, widespread grassroots adoption, and ideological supporters, and robust intellectual immune system. None of these features are technical in nature. They are psychological, even sociological phenomena. The protocol and the code are merely focal points around which this shock. movement of open-source money manifests itself.

And yet, Bitcoin's first mover advantage is simultaneously its tragic fatal flaw. The protocol resists change by design. Meaningful upgrades are spaced further and further apart, because potential upgrades need consensus support from an ever-growing and ever-so-scrupulous community. Bitcoin's protocol stands to ossify and lock into place essentially the same blueprint that was there from the beginning. Tragically, Bitcoin stands not to benefit from technologies conceived in the wake of its success.

What technologies?

Smart contracts. Ethereum's preliminary success suggests that financial contracts -- and more generally, anything of value that can be verified by a virtual machine -- also belong on the Blockchain. When states start recognising tokenised rights to physical property, the industry will start booming in earnest.

Privacy. Possession of traceable Cryptocurrency induces holding risk -- the risk of having to return the coins to whoever the judge deems the rightful owner based on

the supplied evidence. The engineering solution is to void such legal claims by building in untraceability at the protocol level. Zero-knowledge proofs have the potential with Cryptographic certainty that the relevant account balances and amounts are positive while completely hiding all other data.

Light architecture. Light architectures integrate succinct-verifier proofs (cousins of zero-knowledge) into the Blockchain consensus logic and charge miners with producing these proofs. As a result, the entire Blockchain becomes easy to verify. The cost of running a full node drops and is no longer prohibitive, benefiting decentralisation metrics.

Post-quantum Cryptography. If (when?) quantum computers arrive, they will make all coins currently attached to quantumly-unsafe public keys accessible to the attacker. Quantum-safe Cryptography does exist, but regardless of whether Bitcoin adopts them for those users that are capable of updating their coins, the advent of quantum computers is likely to cause a massive supply

I am tooting my own horn, of course, because these technologies constitute the foundation of Neptune. However, the thesis of this piece is more generic: a major financial transformation is underway and right now Bitcoin stands head and shoulders above its competition in the race to become the new de facto world currency. But it has infancy flaws that risk being cast in stone, ultimately paving the way for a successor -- one armed with the lessons learnable only after Bitcoin showed the way.



Sui **EVOLVING THE Blockchain**

The Internet revolutionised commerce and communication came before it to create a distributed computing structure by enabling exchanges of data that were not previously that offers the benefits of decentralisation with scalability possible. Blockchain technology is the latest advance, but akin to the centralised servers that power traditional getting here took years of development. Sui Blockchain internet services. technology represents the latest iteration - a true First, Sui offers a level of object orientation that is unique.

Getting Beyond Bitcoin

alternative to centralised cloud computing. Digital assets on Sui represent first class citizens on the network, meaning that, on Sui, everything, from a game to an NFT, is an object on the network. Importantly, these Bitcoin's emergence in 2009 gave the world the first objects can be mutated directly. On other networks, glimpse of a Blockchain network, but its usefulness seems mutation is done artificially, by destroying the first object destined to be limited. In recent years, a second generation and then recreating an entirely new one in its place. of Blockchain including Ethereum, Solana and others have Likewise, objects on Sui can own or belong to each other, improved greatly upon the technology, offering the world creating extremely interesting use cases. For example, on a more Decentralised alternative to centralised cloud Sui, two NFTs can be combined to create a new object. servers. These Layer-1 Blockchain serve as completely However, since the two original objects still exist as open network operating systems where anyone can build independent entities, they can be subsequently separated and deploy apps. back into their original states.

The original Internet was conceived of as a set of Another extremely significant innovation unique to Sui redundant nodes running the same communication is zkLogin. This tooling, native to the Sui Blockchain, protocol. Taking any single node down would not affect enables end users to authenticate with applications on the rest. Blockchains achieve the same. Based on a similar Sui by simply using the same Google accounts and other redundancy, a Blockchain network also continues to run social logins that they are already familiar with. No more apps deployed to it even when a node goes down. memorizing seed phrases or creating wallets just to participate in the benefits of Web3. This feature removes However, unlike the legacy Internet, which is primarily a significant hurdle for millions of potential mainstream a data communication protocol, Blockchain run robust, users.

Decentralised operating systems which can process instructions programmed into apps. These apps include games, social media, logistics systems, productivity anything that can be run on a typical computer.

The iterative process that has occurred in the Blockchain industry so far has seen the innovations of Bitcoin and Moreover, the trust technology built into Blockchain also later, Ethereum and other Decentralised computing introduces the concept of verifiable ownership of digital platforms, but after 14 years, we are still making the case content. Digital documents, such as a property title or for Blockchain technology's usefulness in addressing real authenticity certificate, can be assigned to a unique owner world challenges. With this latest generation, however, the time for Blockchain technology to take its place has and neither stolen nor counterfeited. come.

Unlike Bitcoin, the tokens of these second generation platforms exist less as a store of value for traders than to offset the real-world costs of node operators who manage the network's state.

From Crypto to apps

However, despite their advances, the second generation Blockchain maintain many of the fundamentals of Bitcoin. As a result, their ability to support applications suffers mightily under heavy demand, with costs rising exponentially as traffic increases.

In contrast, Sui was built as a next generation Blockchain network. Newer than the others, Sui has consolidated learnings from the Blockchain and cloud services that

GLOBAL PROTOCOL REPORT 2024



It's time for Blockchain

Gregorios Siourounis Managing Director. Sui Foundation





THE RELEVANCE HOUSE.

LAYER WHAT? THE MIXED MESSAGING OF LAYER-1 BRANDS

Web3 is growing up, and for Blockchain brands, that's both an opportunity and a challenge. The industry is established enough to have multiple players jostling for position, but new enough that outsiders haven't yet figured out who those players are. As the drive toward mass adoption continues, every company in this space needs to be telling a clear and compelling story - not just the story of Blockchain, but their story. Unfortunately, very few have managed this yet.

We analysed messaging from 10 leading Layer-1s to assess the brand landscape. It showed that many Layer-1 brands define themselves broadly and compete on the same turf, suggesting that there is an opportunity open to those who can forge a more distinct identity.

Problem 1: Inconsistent messaging

Since Web3 insiders are plugged into a range of information sources (online forums, industry news sites, Telegram trading groups, YouTube and more), their impressions of a brand will be based on its reputation more than the company's own messaging. But newcomers to the space are likely to look first at a network's website, assessing what that platform says in its own words. And there's the rub: Layer-1s tend to use dry, technical language that may resonate with Web3 advocates, but can act as a barrier for outsiders. Furthermore, there are sometimes inconsistencies between the headlines and the body copy, or tensions between the underlying message and tone of voice.

Example: Cosmos boasts that it is "the most trusted way to build value" but this headline claim is not supported in the text which follows, which focuses on speed, fees and energy consumption. These mixed narratives dilute the clarity of the brand: the fastest or cheapest network is not necessarily the safest or most trustworthy. Ultimately, without clarification or reinforcement, few of these messages are likely to become embedded in the brand perception of the user.

To bolster the trust narrative and provide reassurance, Layer-1 networks can draw attention to things like network security, bug bounty programs, penetration testing, or high profile partnerships.

Problem 2: Trying to appeal to everyone with rhetoric cypherpunk

Unsurprisingly, Layer-1 networks are usually founded and run by energetic Web3 advocates who have soaked up the culture of the space. They are passionate about Web3 technology and are engrossed in the philosophical and technical arguments that surround it. While this knowledge and passion is an asset, it can also result in brands which attempt to project every problem through a cypherpunk lens.

Example: Examining the copy from Cardano's website below, the first paragraph rests predominantly on the trust narrative, highlighting "peer-reviewed research", "evidence-based methods" and "unparalleled security". In the next paragraph, the focus abruptly shifts to revolutionary rhetoric in underlining Cardano's mission to "redistribute power from unaccountable structures to the margins".

It is unclear who the target audience is in this passage. While the references to expertise and rigorous methodology would suggest a business or enterprise audience, this is immediately juxtaposed with libertarian, cypherpunk rhetoric. These messages are somewhat incompatible because trust is about reassurance and risk aversion, whereas revolution is about disruption and actively seeking risk.

To develop a more focused value proposition, Layer-1s should aim to select target audiences who have compatible needs and desires and speak to them on their level. For example, the healthcare and supply chain sectors both need data which is secure and traceable. As they value stability and regard regulatory compliance as a

given, however, they will have a very different perspective best performance, and the most flexible tools. The nearand lexicon to that of a cypherpunk. universal reliance on technical jargon and numbers, along with somewhat vague claims like "powering a Blockchain Problem 3: Who are you again? singularity", make it difficult to tell Layer-1 brands apart.

DIT

SCIENCE FOUNDATION

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There is a lack of clear differentiation between Layer-Honorable mention: Ethereum stands out as the only brand 1s. Many of the brands are too broadly defined to stand to have matched its tone of voice and visual presentation out - promising to be both revolutionary and reassuring, to its core message of inclusion and accessibility, using cutting-edge as well as established, enterprise-focused as simple and encouraging language. It is also the only Layer-1 well as community-driven. In addition, many of them make to devote most emphasis to the community narrative. similar promises, claiming to have the best ecosystem, the

BECOME A WEB3 PIONEER

Start a DAO, create a token, build dapps host assets with the full stack entiirely on-chain

ENTER A NEW UNIVERSE OF CONNECTED SERVICES

Build a Blockchain using the best-in-class open source libraries and services

We, alongside community and partners, are defining a new future: a decentralized without intermediaries, in which power is returned to the individual

Without a clear story, your audience won't hear a word.

Layer-1s could benefit from defining their target audience and communicating their brand promise more clearly. The huge potential of Web3 makes it tempting for brands to make grand, sweeping statements about their goals and ambitions. Ultimately, however, the ubiquity of such statements has made them generic.

Rather than claiming to be all things to all people, protocols should focus on highlighting their unique strengths to build trust and credibility with potential users. As an industry, we need to get better at showing what Blockchain can do. But as individual brands, we need to get better at showing what sets each one apart.



Don't miss out because it took too long to deploy on Mainnet. Take advantage of the low-code tooling and configurability that makes it easy to launch your Web3 innovation in less than 60 seconds

THROUGHPUT

Capacity horizontally scales as subnet bloackchains are seamlessly combines into one unified Blockchain. Blocks and transactions per second are unbounded

AN OPEN-SOURCE **PROTOCOLS BUILT** FOR EVERYONE

Methodology

The foundation of this report is THE RELEVANCE HOUSE's proprietary "brand map" methodology, based on proven psychological models. On the basis of the primary web presence of each Layer-1 network, we identified eight core narratives of Layer-1 brands. These narratives were then grouped into four positioning zones, which each capture a distinct set of user needs. We then conducted a quantitative analysis of the brand messaging on Layer-1 websites.

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Rather than claiming to be all things to all people, protocols should focus on highlighting their unique strengths to build trust and credibility with potential users. As an industry, we need to get better at showing what Blockchain can do. But as individual brands. we need to get better at showing what sets each one apart.



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THE 8 NARRATIVES AND 4 POSITIONING ZONES OF LAYER-1S







Dev-friendly

Emphasizes the familiarity of coding languages, the advantages of the development environment, and/or the quality of documentation available to developers.

Sample phrase (NEAR): "Code in a language you already know: The BOS is built on JavaScript, so you can get started creating new apps right away, without needing to learn a new language."



Green

Stresses the low environmental impact of the network.

Sample phrase (Internet Computer): "Scalability and utility with low carbon cost — the Internet Computer is committed to building green tech, not just making claims about it."



FOUNDATION BRANDING IN WEB3: A COMPARATIVE **ANALYSIS**

Foundations are typically used by Layer-1s to support 3. Different name and logo: Cosmos and Polkadot protocol and ecosystem development, award grants to Web3 projects, and provide advice and tools for developers. Although their roles are similar, the Layer-1s under review take widely contrasting approaches to branding and communicating their foundations. In some cases, the foundation is a minor footnote to the overall brand. In others, it is afforded a completely separate identity.

- 1. The branding of Layer-1 foundations can be categorised into four overall approaches:
- 2. Same name and logo: Solana, Cardano, NEAR, and Ethereum have chosen to use the same name and logo for their associated foundations. This strategy eliminates the need to build name recognition for a seperate brand, but makes it challenging to target distinct audiences such as policymakers or developers through the foundation.

- have separate names and visual identities for their foundations. While this approach requires significant resources to establish brand recognition, it allows the foundation to operate independently from the "mother brand" and pursue its own mission.
- 4. Different name, same logo: A hybrid approach has been adopted by Internet Computer and its foundation, DFINITY Foundation, which share the same logo but have different names. This creates some differentiation but may confuse audiences unfamiliar with the distinction between the two entities.
- 5. No web presence: Finally, BNB Chain and Tron do not maintain a separate brand or web presence for their foundation. This is the lowest cost option, but it precludes the possibility of targeting distinct audiences through the foundation and minimises the branding benefit derived from it.





About THE RELEVANCE HOUSE

- THE RELEVANCE HOUSE is a Swiss-based branding and marketing agency specialised in Blockchain and Web3. They offer a unique combination of Web3 and strategic marketing expertise, to ensure that your message doesn't get lost in this noisy market
- THE RELEVANCE HOUSE is where Blockchain expertise and strategic branding converge to build enduring brand value. The Swiss-based branding and marketing agency specialised in Blockchain & Web3, offers a unique combination of Web3 and strategic marketing expertise, to ensure that your message doesn't get lost in this noisy market. They focus on helping you build and communicate a relevant brand and story – because only relevance has impact.



DIFFERENT NAME AND LOGO

FOUNDATION NAME Interchain Foundation Web3 Foundation

FOUNDATION LOGO

INTERCHAIN FOUNDATION foundation

DIFFERENT NAME, SAME LOGO

FOUNDATION NAME **Dfinity Foundation**

FOUNDATION LOGO

DFINITY

NO SEPERATE WEB PRESENCE

FOUNDATION NAME

No seperate brand and web presence No seperate brand and web presence

FOUNDATION LOGO

German Ramirez Managing Co-Founder & Chief Relevance Officer. The Relevance House

Crypto Valley

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1 0 0 1 1 0 0 1 1 0 0 0 1 **PROTOCOL** 1 1 0 0 0 1 1 0 0 0 1 1 **FACT SUP FACT SHEETS** 0 0 1 1 0 <u>0 0 0</u> 1 0 0

The second part of the report contains fact sheets for each DLT protocol under examination. These fact sheets contains a condensed format of the attributes discussed earlier, facilitating easy comparison and analysis. For each protocol, readers can find essential details such as consensus mechanisms, transaction speeds, Tokenomics as well as a description of their essential strenghts, weaknesses and USPs. Additionally, selected protocols have an assessment that summarises, among other things, their adoption, efficiency, security 0 0 1 1 0 or reliability - based on over 30 individual data points.





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Logo

Definition as "Top" or "Additional" Protocols, according to the definition of Inacta Ventures Research rotoco PROTOCOL'S NAME (TICKER)

INTRODUCTION TO ONE PAGERS

This section of our report delves into the intricate world of Blockchain protocols, offering a curated exploration of 50 'Top Protocols' and 22 'Additional Protocols'. Our aim is to provide a clear, comprehensive overview of each protocol, capturing its essence, technological underpinnings, and unique position in the Blockchain landscape. Through these one-pagers, we present a balanced view, blending technical details with insights into each protocol's practical applications and potential impact. This segment is designed to equip readers with a deeper understanding of the diverse functionalities and innovations these protocols bring to the digital world, serving as a valuable guide in navigating the complex and ever-evolving terrain of Blockchain technology.

How to read the One Pagers

Each protocol in our report has its own one-pager. These protocols are divided into two lists:

- 1. The 50 Top Protocols in alphabetical order according to the definition of a Top Protocol in the "Research and Methodology" section.
- 2. 22 Additional Protocols, also in alphabetical order and selected according to our criteria. Each onepager has the same structure:

At the top left you will find the most important basic data of the protocol: logo, name, as well as classification as Layer-1 or 2, the primary use case of the protocol and a short description, which gives an overview.

Below this, under "Facts & Figures", you will find information on the entities associated with the protocol, the years of the first block mint and the mainnet go-live, as well as additional data on market capitalisation.

The "Technicals" section contains various technical information, followed by the "Tokenomics", which quantify the supply of the respective currency.

Finally, for selected protocols, there is a graphic showing 7 characteristics of the protocol. This graph is based on a framework of around 30 individual indicators and was developed and quantified by Inacta Ventures Research. At the end there is a summary of the respective protocol, which describes its strengths, use cases, the technologies used and features that differentiate them from other protocols.

Sources

The definition as "Top" or "Additional Protocol", as Layer 1 or 2 and the respective primary use case follow the criteria of the report.

Year of first block minting and Public Net go Live were researched by Inacta Ventures Research and can usually be found in the protocol's documentation.

The chart showing the evolution of market capitalisation was provided by Coindesk Indices, Inc. All rights reserved.

The market cap data was provided by our data partners according to the source, the calculation of the performance over the last 12 months as well as the "% of total GPR MCAP" was calculated by Inacta Ventures Research.

For the technicals, the consensus mechanism, the transaction finality time and the stated capacity were mostly taken from the official documentation of the protocol, the whitepaper and other documents of the respective foundation. The figures for the Average Transaction Fees and Total Number of Transactions were mostly taken from the official block explorers and calculated by Inacta Ventures Research where necessary.

In addition to block explorers, various Cryptocurrency overview pages were also available for tokenomics.

The texts of the short description and the summary at the end were written by Inacta Ventures Research and are based on our own research.

The calculation of the individual characteristics in the Protocol Characteristics Graph was carried out by Inacta Ventures Research. Both the calculation and the framework behind it were developed by Inacta Ventures Research. For more details on the approximately 30 individual data points behind the graphic, as well as the sources for these, please refer to the respective section in the 'Research & Methodology' area.

Ventures Research Short Description of the protocol, providing an overview

ACCORDING TO INACTA VENTURES RESERACH

Definition as Layer 1 or Layer 2, according to Inacta

THE PROTOCOLS PRIMARY USE CASE,

FACTS & FIGURES

The entities behind the protocol including founding year and official location



TECHNICALS

Name of the Protocol's consensus mechanism: Process to validate and agree on transactions in a Blockchain network.

Transaction finality time: Duration for a transaction to become irreversible on a Blockchain network, in seconds (s)

Stated capacity of Protocols: Maximum transactions per second (TPS) a network claims to handle.

Average transaction fee: Average cost per transaction on a Blockchain during the period of 01.07.2022-30.06.2023

Total transactions since inception on mainnet: Cumulative count of all transactions executed on a Blockchain since its initial launch until 30.06.2023.





PROTOCOL CHARACTERISTICS



Specific protocols have a "Protocol Characteristic" graph, which represents the protocol in 7 properties, according to a framework from Inacta Ventures Research, For more details: See section Protocol Characteristics Framework - Composition, Evaluation and Sources.

All protocols have a summary of their strengths, use cases, technology used and features that differentiate them from other protocols





TOP PROTOCOLS

Top Protocols are all Layer-1 and Layer-2 DLT platforms, with Forks such as Bitcoin Cash or Ravencoin being excluded, that were in the top 100 of CoinMarketCap and CoinGecko by market capitalisation on 30.06.2023. These 50 Protocols are in alphabetical order.

Bitcoin Algorand APTOS Arbitrum Arweave Avalanche **BNB** Chain Cardano Casper Chiliz Chain Conflux Cosmos Cronos Chain DYDX **EOS Network** Ethereum Fantom Filecoin Flow Hedera Immutablex Injective Protocol Internet Computer IOTA



Kava Klaytn Mantle Mina Protocol Monero Near Protocol Neo Optimism Polkadot Polygon Quant Radix Ripple Solana Stacks Stellar Sui Tezos The Graph Theta Network Toncoin Tron Vechain XDC Network ZCash





PAYMENT PROTOCOL

Layer-1

Bitcoin, originating in 2009, has undergone a notable evolution in both its maturity and adoption within the Blockchain space. Initially conceived as a pioneering digital currency, enabling transactions between two unknown actors and without any central authority, it has since transformed into a prominent financial asset and a subject of considerable global intrigue.

FACTS & FIGURES

Bitcoin Foundation, 2012, Washington D.C, USA



TECHNICALS

Consensus Mechanism F	Proof-of-Work (PoW)
Transaction Finality Time	3600s
Stated Capacity	10 TPS
Average Transaction-Fee	USD 5.23
Total number of Transactions since inception on N	lainnet 875M

TOKENOMICS



PROTOCOL CHARACTERISTICS



In terms of maturity, Bitcoin has demonstrated an increased degree of price stability over time, making it increasingly attractive to institutional investors seeking alternative assets and a robust store of value.

Particularly noteworthy is its adoption in regions grappling with economic volatility, where it functions as a resilient hedge against inflation and currency depreciation. Additionally, the underlying Blockchain technology, while inherently secure, has also found applications across diverse industries, reflecting its broader potential.

Comparatively, Bitcoin's Blockchain protocol stands as a unique entity, prioritising decentralisation and security. Unlike other Blockchain protocols like Ethereum, which offer more extensive capabilities for constructing Decentralised applications and smart contracts, Bitcoin's primary mission remains steadfast as a digital currency and store of value. This distinctive focus underscores the versatility of Blockchain technology and the specialised niche that Bitcoin occupies within the broader Blockchain ecosystem.

Performance wise, Bitcoin is at a clear disadvantage compared to the newer protocols. The slow transaction time and low throughput prevent bitcoin from becoming an efficient payment method.

In summation, Bitcoin's evolution from its experimental beginnings into a prominent financial asset represents a compelling journey within the Blockchain realm. Its emphasis on decentralisation sets it apart from other Blockchain protocols, making it an essential cornerstone for Blockchain experts navigating the intricate landscape of digital assets and Decentralised technologies.



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DAPPS PLATFORM

Layer 1

Algorand is a Layer-1 Blockchain protocol distinguished by its pure proofof-stake (PPoS) mechanism, prioritising efficiency, and scalability. It's designed for fast transaction processing with a strong emphasis on security and minimal energy usage. The protocol supports a range of applications across various sectors due to its flexible architecture, which includes features like atomic swaps and smart contracts. Algorand's focus on interoperability and user-friendly design makes it a noteworthy platform in the evolving landscape of Blockchain technology.

FACTS & FIGURES

Algorand Foundation, 2017, Singapore/ USA, Boston MAUSA



TECHNICALS

Consensus Mechanism	Proof-of-Stake (PoS) with a Practical Byzantine Fault Tolerance (PBFT)	
Transaction Finality Time	3.60s	
Stated Capacity	7,500TPS	
Average Transaction-Fee	USD <0.01	
Total number of Transactions s	ince inception on Mainnet 56.1M	

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PROTOCOL CHARACTERISTICS

Algorand is a Blockchain protocol that emphasises efficiency and scalability through its pure proof-of-stake (PPoS) mechanism. This approach facilitates fast transaction processing with reduced energy consumption, making it an eco-friendly option in the Blockchain landscape. Its scalability allows it to manage high volumes of transactions, catering to a diverse range of sectors including finance, government, and healthcare.

Security is a cornerstone of Algorand, with advanced Cryptographic methods ensuring safe transaction and data handling. This is crucial for industries dealing with sensitive information. The protocol also features smart contracts, enabling automated, condition-based processes, and atomic swaps for direct Cryptocurrency exchanges without intermediaries, enhancing liquidity in the digital asset market.

Interoperability is a key focus, allowing seamless interaction with other Blockchain systems, which is vital for creating a cohesive Blockchain network. Algorand's role in Decentralised finance (DeFi) is notable, offering a rapid and secure transaction environment conducive to innovation. Real-world use cases span secure transactions of high-value assets and therefore facilitating efficient cross-border payments, as well as enterprise applications, and scalable Decentralised applications (dApps), including streamlining supply chain management through transparent and tamperproof record-keeping, and enabling secure and instantaneous healthcare data sharing. These applications demonstrate its practical utility in various industries.

Overall, Algorand's blend of features like speed, security, and environmental friendliness, alongside smart contract and atomic swap capabilities, make it a significant protocol in the Blockchain field. Its adoption in various real-world applications underlines its potential and utility.





SMART CONTRACT PLATFORM

Layer-1

With its Mainnet going live in late 2022, Aptos is a relatively new entrant in the Blockchain space. Founded by former Meta (Facebook) employees, Aptos focuses on delivering a scalable, secure and highly usable Blockchain infrastructure. It aims to revolutionise Web3 by offering fast, secure transactions with a novel Move language integration and parallel transaction processing. Aptos stands out for its modularity, supporting frequent upgrades and providing a safer, transparent user experience. The platform targets widespread adoption and real-world application integration.

FACTS & FIGURES

Aptos Foundation, 2021, Singapore (Foundation) Aptos Labs (Company), Palo Alt, California, USA



TECHNICALS

Consensus Mechanism	Proof-of- Stake (PoS) with a Libra Byzantine Fault Tolerance (LibraBFT)	
Transaction Finality Time		<1s
Stated Capacity		100,000TPS
Average Transaction-Fee		USD 0.0002
Total number of Transaction	s since inception on Mainnet	226.5M

TOKENOMICS



PROTOCOL CHARACTERISTICS



Aptos is a high-performance Blockchain platform designed to deliver scalable and secure Decentralised applications (dApps) and services. With a vision of tackling the challenges encountered in Web3 adoption, Aptos is engineered with a focus on scalability, security, and flexibility. Aptos aims to establish a Blockchain infrastructure that is not only secure and scalable but also user-friendly. This is achieved through a design that simplifies interactions for both developers and end-users. For developers, Aptos offers an environment conducive to building a wide range of applications, from DeFi to NFT marketplaces, with ease and flexibility. For users, the platform promises a seamless and accessible experience, making Blockchain technology more approachable for a broader audience. Aptos further aims to foster a vibrant ecosystem of developers, users, and stakeholders. The platform provides comprehensive tools and resources for developers, to encourage the creation of innovative dApps.

One of Aptos's standout features is its modular architecture, offering developers the flexibility to incorporate frequent and seamless upgrades. This design aspect, akin to cloud infrastructure's adaptability, underscores the platform's commitment to staying at the forefront of technology advancements and swiftly accommodating emerging use cases. Additionally,

Aptos introduces parallel transaction processing, addressing challenges associated with irreducibility in complex transactions. This approach aims to enhance throughput and decrease latency. This innovation fosters an environment conducive to real-world applications, simplifying development processes and driving efficiency.

In conclusion, Aptos distinguishes itself in the Blockchain landscape through its dedication to developing a scalable, secure, and user-friendly infrastructure. Its innovative methods and emphasis on practical applications mark it as a significant addition with potential across diverse sectors. Aptos offers a viable option for developers and enterprises seeking to utilise Blockchain technology effectively, underscoring its relevance and potential impact in the evolving Blockchain domain.



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DEFI PLATFORM

Layer-2, Ethereum, Optimistic Rollup

Arbitrum is a Layer-2 scaling solution for Ethereum, designed to improve transaction speed and reduce costs while leveraging Ethereum's security. It employs optimistic rollup technology, allowing for high throughput and efficiency. Arbitrum's architecture is compatible with Ethereum's existing tools and smart contracts, making it a seamless choice for developers. It has been live since 2021 and leverages Ethereum's security to adjudicate fraud and operate trustless, while enabling scalable, faster, and more cost-effective transactions, catering to a growing demand for efficient Decentralised applications (dApps).

FACTS & FIGURES

Offchain Labs, 2018, New York, USA Arbitrum DAO



TECHNICALS

Consensus Mechanism	Proof-of-Stake (PoS)
Transaction Finality Time	900s
Stated Capacity	40,000TPS
Average Transaction-Fee	USD 0.37
Total number of Transactions since inception on Ma	innet 349M

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PROTOCOL CHARACTERISTICS



Arbitrum, a prominent Layer-2 scaling solution for Ethereum, addresses the critical challenges of scalability and transaction costs in the Ethereum network. By utilising optimistic rollup technology, Arbitrum significantly enhances transaction throughput and reduces fees, all while maintaining a high level of security inherited from Ethereum. This scaling solution stands out for its compatibility with Ethereum's ecosystem, enabling developers to deploy Ethereum-based smart contracts and dApps on Arbitrum without major modifications. This compatibility greatly simplifies the transition for developers looking to leverage Arbitrum's scaling capabilities. Arbitrum introduces innovative features like Stylus, allowing developers to write performant smart contracts in languages beyond Solidity.

A key feature of Arbitrum is its optimistic rollup technology, which assumes transactions are valid by default, only performing computation-intensive fraud proofs if a transaction is challenged. This approach dramatically increases efficiency and reduces transaction costs, making it an attractive option for applications requiring high transaction throughput. However, the reliance on Ethereum's security can be a double-edged sword; while it benefits from Ethereum's robust security model, it also means that any fundamental issues in Ethereum could impact Arbitrum.

Arbitrum's potential use cases are extensive, particularly in sectors requiring high transaction volumes like DeFi, gaming, and NFT markets. Its ability to offer faster transactions at lower costs makes it well-suited for these industries. Its multi-chain framework, including Arbitrum One and Nova, offers varied security options and transaction cost considerations, catering to diverse application needs.

In summary, Arbitrum's integration with Ethereum, combined with its innovative use of optimistic rollup technology, positions it as a key player in Ethereum's scaling solutions. Its potential to enhance the efficiency of a wide range of applications, while maintaining security and compatibility with Ethereum's ecosystem, makes it a noteworthy project in the Blockchain space. Further, Arbitrum's expansion into multiple chains showcases its adaptability and scalability efforts, providing users and developers with versatile options for optimised operations within the Ethereum ecosystem. As with all Layer-2 solutions, its long-term success will be closely tied to the evolution and adoption of the underlying Ethereum network.





DATA STORAGE AND COMPUTING PLATFORM

Arweave is a novel Blockchain protocol that offers permanent data storage solutions, operating as a globally accessible, Decentralised hard drive. Officially launched in June 2018, its main use case is the permaweb - a permanent, immutable web layer where information is stored indefinitely. Arweave's unique selling point is its sustainable endowment model, ensuring data persistence without recurring fees. It leverages a Proof of Access consensus mechanism and incentivises miners with AR tokens, aiming to create a knowledge preservation platform that counters data impermanence on the traditional web.

FACTS & FIGURES

Minimum Spanning Technologies Ltd., 2017, London, UK



TECHNICALS

Consensus Mechanism	Proof-of-Access
Transaction Finality Time	Near instant
Stated Capacity	5,000TPS
Average Transaction-Fee	N/A
Total number of Transactions since inception on Mainn	et 1.3Bn

TOKENOMICS



PROTOCOL CHARACTERISTICS

Arweave, launched in 2018, is a unique Blockchain protocol designed for permanent, low-cost data storage. It aims to prevent information loss on the web by utilising Blockchain technology to maintain data indefinitely. Utilizing a novel blockweave technology, it allows users to store data permanently with a single upfront fee, addressing the issue of data longevity andreliability.

Operating as a Decentralised Storage Network, Arweave's core USP lies in its "pay once, store forever" model, underpinned by a sustainable endowment ensuring data permanence. Arweave facilitates a version of the web, known as the permaweb, that allows for the storage of immutable data and applications, which are designed to be resistant to censorship and data loss.

In practical terms, Arweave has seen adoption in various fields. For content creators and archivists, it offers a reliable platform for storing digital works and historical records permanently. Its immutable nature also makes it suitable for applications requiring a high degree of data integrity, such as in governance and legal documentation.

The adoption of Arweave's technology is on an upward trend, particularly in areas where data integrity is crucial. The protocol is recognised for its reliability and user-friendly nature, though the demand for large-scale storage could pose scalability challenges. These are being addressed with solutions such as data bundling. Security is maintained through a Decentralised network of miners, and efforts are ongoing to enhance the efficiency of storage and retrieval operations. While the network maintains a high degree of governance and decentralisation, the management of its large volumes of data is an ongoing priority, especially as network activity increases.

Arweave's contribution to digital preservation is significant, aiming to securely archive data for future generations. As the digital landscape continues to evolve, the practical implications and performance of Arweave's "store forever" principle, in conjunction with its governance and scalability measures, will likely be areas of interest for observers and users of Blockchain technology. The protocol's progression and adaptation in response to increasing data demands and network activity will be critical factors in assessing its place within the ecosystem of Blockchain solutions.





DAPPS PLATFORM

Layer 1

Avalanche is a high-performance Blockchain platform known for its speed, scalability, and low transaction fees. It utilises a unique consensus protocol, the Avalanche Consensus, to achieve rapid transaction finality. Founded in 2020, Avalanche supports diverse Blockchain applications, including DeFi, NFTs, and enterprise solutions. Its distinct architecture allows for energy-efficient operations and empowers developers to create customised Blockchain or leverage existing subnets, delivering flexibility and interoperability within a Decentralised ecosystem.

FACTS & FIGURES

Avalanche Labs, NY, USA



TECHNICALS

Consensus Mechanism	Avalanche Consensus
Transaction Finality Time	<1s
Stated Capacity	6,500TPS
Average Transaction-Fee	USD 0.01
Total number of Transactions since inception on M	ainnet 981.6M





PROTOCOL CHARACTERISTICS



Avalanche, launched in 2020, quickly gained attention in the Blockchain world for its speed, scalability, and low transaction costs. The platform is built on a unique consensus mechanism known as the Avalanche Consensus, different from traditional proof-of-work or proof-of-stake systems. This consensus protocol is key to its ability to process transactions rapidly and achieve finality near-instantly, a significant advancement over many existing Blockchain.

The network is designed to support a wide array of applications, from Decentralised finance (DeFi) and non-fungible tokens (NFTs) to complex enterprise Blockchain solutions. This versatility is underpinned by its three interoperable Blockchain: the Exchange Chain (X-Chain) for asset creation and trading, the Platform Chain (P-Chain) for network coordination and subnet management, and the Contract Chain (C-Chain) for executing smart contracts. The X-Chain facilitates fast asset transfers, the P-Chain oversees validators and organises the network's structure, and the C-Chain, compatible with Ethereum's Solidity, is optimised for Decentralised applications. Together, these chains provide a versatile framework, supporting a diverse range of Blockchain applications and use cases within Avalanche's ecosystem.

Avalanche offers remarkable energy efficiency, accommodating diverse developer needs by enabling customised Blockchain or leveraging existing subnets. Its compatibility with the Ethereum Virtual Machine (EVM) enhances flexibility for developers. Security is further a priority for Avalanche, with its consensus mechanism designed to withstand various types of attacks.

In conclusion, Avalanche's approach to Blockchain technology, characterised by its unique consensus protocol and multi-chain architecture, offers potential advantages in speed and scalability. The platform's future growth will hinge on its ability to maintain security and a robust community, and effectively compete in the evolving Blockchain landscape.





DAPPS PLATFORM

Layer-1

BNB Chain, originally known as Binance Chain and later expanded into Binance Smart Chain (BSC), is a Blockchain platform developed by the Binance Cryptocurrency exchange. It is designed to offer high transaction throughput, low fees, and compatibility with Ethereum's smart contracts. BNB Chain aims to facilitate a wide range of Decentralised applications (dApps), Decentralised finance (DeFi) services, and tokenisation, with a focus on user and developer accessibility. Its native token, BNB, is central to network operations and transaction fee pay-

FACTS & FIGURES

Binance Holdings Ltd., 2017, Cayman Islands BNB Chain Innovation, Singapore



TECHNICALS

Consensus Mechanism Proof-of-Staked Authority	
Transaction Finality Time	7.5s
Stated Capacity	2,000 TPS
Average Transaction-Fee	USD 0.098
Total number of Transactions sinc	e inception on Mainnet 4.6Bn

TOKENOMICS



PROTOCOL CHARACTERISTICS



BNB Chain, evolving from Binance Chain and Binance Smart Chain (BSC), has emerged as a significant Blockchain platform in the Cryptocurrency ecosystem. Developed by Binance, one of the world's largest Cryptocurrency exchanges, it combines high transaction throughput with low fees, appealing to both users and developers. One of the key features of BNB Chain is its compatibility with Ethereum, allowing developers to easily migrate Ethereum-based dApps onto the platform. This compatibility is facilitated by the Ethereum Virtual Machine (EVM), making BNB Chain an attractive option for developers seeking alternatives with higher throughput and lower transaction fees.

The primary focus of BNB Chain is to support a diverse array of Decentralised applications (dApps), catering to various sectors including Decentralised finance (DeFi), gaming, and non-fungible tokens (NFTs). This versatility is achieved through its dual-chain architecture, which separates the Binance Chain for fast trading and Binance Smart Chain for smart contract functionality and dApp development. This structure enables the platform to balance speed and flexibility effectively.

BNB, the native token of the BNB Chain, plays a pivotal role in this ecosystem. It is used for transaction fee payments, participating in network governance, and staking. The token's utility within the platform and broader Binance ecosystem contributes to its value and adoption, with the platform hosting a multitude of DeFi projects, Decentralised exchanges (DEXs), and innovative applications.

Despite its advantages, BNB Chain faces unique challenges due to its close association with the Binance exchange, particularly in terms of centralisation and regulatory scrutiny. These issues become more pronounced as the platform grows in popularity and usage.

In summary, BNB Chain stands out for its transaction speed, low fees, and Ethereum compatibility, making it a compelling platform for a wide range of Blockchain applications. Its evolving ecosystem and strategic positioning within the broader Cryptocurrency market make it a key player in the Blockchain space, with ongoing development aimed at enhancing its scalability and user experience.





SMART CONTRACT PLATFORM Layer 1

Cardano, launched in 2017, is a Blockchain platform distinct for its researchoriented approach and utilisation of the proof-of-stake mechanism, Ouroboros. This protocol focuses on achieving a balance between security, scalability, and energy efficiency. Cardano's design caters to Decentralised applications and smart contracts, aiming to provide a secure and efficient platform. Its commitment to academic research and sustainability positions Cardano as an innovative player in the Blockchain ecosystem, striving for a balance between advanced functionality and environmental consciousness.

FACTS & FIGURES

Cardano Foundation, 2015, Zug, Switzerland



TECHNICALS

Consensus Mechanism	Proof-of-Stake (PoS)
Transaction Finality Time	86400s
Stated Capacity	250TPS
Average Transaction-Fee	USD 0.1
Total number of Transactions since inception on Ma	innet 73.2M

INACTA.

GLOBAL PROTOCOL REPORT 2024





PROTOCOL CHARACTERISTICS



Cardano, introduced in 2017, is recognised in the Blockchain world for its academically driven development and the use of the Ouroboros proofof-stake protocol. Launched in September 2017 by Charles Hoskinson, a co-founder of Ethereum, Cardano aims to address the scalability, interoperability, and sustainability issues faced by earlier Blockchain systems. Unlike its predecessors, it was the first Blockchain to incorporate a peer-reviewed research strategy into its core principles, emphasising a scientific approach to design and development.

Cardano's development is characterised by its reliance on academic research and peer review, a process intended to ensure the durability and technical soundness of its Blockchain technology. This process, involving collaboration with academics and industry experts, is aimed at fostering a forward-thinking and continuously evolving Blockchain platform.

The platform is engineered to support smart contracts and Decentralised applications (dApps), providing a secure and efficient environment for these technologies. At the heart of Cardano is its two-layer architecture: the Cardano Settlement Layer (CSL) and the Cardano Computation Layer (CCL). The CSL handles the ledger of accounts and balances, functioning as the balance sheet, while the CCL is responsible for the computational needs, including the execution of smart contracts and applications. This separation allows for greater flexibility and scalability, as updates and changes can be made to the computation layer without affecting the ledger.

Cardano has seen incremental adoption across various sectors, especially in scenarios that demand reliable and transparent digital ledgers. These include applications in education for credential verification, in healthcare for data management, and in finance. Additionally, the platform offers capabilities for identity verification and supply chain management, demonstrating its practical utility in diverse settings.

Overall, Cardano's combination of research-driven development, energyefficient protocol design, and a dual-layer architecture for various Blockchain applications marks it as a notable entity in the Blockchain industry. Its focus on balancing technical robustness with environmental considerations positions it as a significant and evolving Blockchain platform.





SMART CONTRACT PLATFORM

Layer-1

Casper, launched in 2021, is a Blockchain platform that emphasises enterprise-grade security and scalability. It utilises Proof of Stake (PoS) per the Highway Protocol, a specification of Correct-by-Construction (CBC) Casper, designed to offer enhanced speed, security, and scalability compared to traditional proof-of-stake models. Casper aims to facilitate enterprise adoption of Blockchain technology by providing a platform suitable for a variety of business applications, focusing on creating a secure, scalable, and adaptable environment for Decentralised applications and smart contract deployment.

FACTS & FIGURES

CasperLabs, 2018, Zug, Switzerland



TECHNICALS

Consensus Mechanism	Proof-of-Stake (PoS)
Transaction Finality Time	N/A
Stated Capacity	2.500TPS
Average Transaction-Fee	N/A
Total number of Transactions since inception on M	lainnet 1.1M

TOKENOMICS



PROTOCOL CHARACTERISTICS

Casper is a Blockchain platform that targets enterprise adoption with a focus on security, scalability, and developer-friendly features. It employs the Correct-by-Construction (CBC) Casper consensus mechanism, a variation of the proof-of-stake model, which is designed to provide a balance of efficiency, security, and decentralisation. This consensus model differentiates Casper from other Blockchain platforms and is key to its ability to handle a high throughput of transactions while maintaining robust security.

Casper emphasises enterprise needs. The platform is built to be futureproof, accommodating evolving business requirements and regulatory changes. This adaptability is crucial for businesses looking to integrate Blockchain technology into their operations, as it ensures longevity and relevance in a rapidly changing technological landscape. Its focus on enterprise adoption introduces predictable fees, upgradable contracts, on-chain governance, and developer-friendly languages, ensuring scalability and privacy flexibility. Casper's strengths reside in its enterprise-oriented features, providing an environment conducive to efficient business operations. Further, these features make it easier for developers to build and maintain Decentralised applications (dApps) on the platform, fostering a more vibrant and dynamic ecosystem.

Operating as a Layer 1 Blockchain, Casper stands out for its Highway consensus protocol, offering robust block finality and unprecedented flexibility, a significant improvement over conventional BFT models. The network allows for on-chain upgrades without the need for hard forks, ensuring smoother transitions and continuous improvement of applications.

In summary, Casper presents a unique value proposition in the Blockchain space, particularly for enterprise adoption. Its focus on security, scalability, and a developer-friendly environment, combined with its innovative CBC Casper consensus mechanism, positions it as a promising platform for businesses looking to explore and integrate Blockchain technology into various applications.





ENTERTAINMENT PLATFORM

Chiliz Chain, an EVM-compatible Layer-1 protocol, serves as the backbone for a Blockchain-based sports and entertainment ecosystem. Positioned in partnership with ANKR, it focuses on creating fan-centric experiences and B2B/B2C tools for IP rights holders. Chiliz Chain leverages the power of Blockchain to foster a more interactive and rewarding relationship between sports entities and their global fan bases.

FACTS & FIGURES

Chiliz, 2018, Malta



TECHNICALS

Consensus Mechanism	Proof-of-Authority (PoA)
Transaction Finality Time	N/A
Stated Capacity	400TPS
Average Transaction-Fee	N/A
Total number of Transactions since inception o	n Mainnet 4.3M





PROTOCOL CHARACTERISTICS

Chiliz Chain, an EVM-compatible Layer-1 protocol developed in collaboration with ANKR and launched in May 2023, stands as a foundational platform for the sports and entertainment sectors. It focuses on creating an ecosystem centered around fan experiences and providing business tools for IP rights holders. The protocol offers tailored solutions for IP rights management and project curation, with key aspects including robust measures for safeguarding IP rights and a governance-driven approach to developer selection. Operating specifically in the sports and entertainment industries, Chiliz Chain features stringent protections against IP rights infringements and employs a governance-centric method for whitelisting developers, prioritising their alignment with the ecosystem and regulatory compliance. The platform aims to leverage existing partnerships and user bases to foster adoption and facilitate third-party integrations.

Chiliz powers notable applications like Socios.com, a fan engagement and rewards app using the digital currency Chiliz (\$CHZ), where fans interact with prominent football clubs such as FC Barcelona, Inter Milan, and Manchester City – just to name a few, through Fan Tokens. Additionally, Socios Collectibles utilises Chiliz Chain to combat counterfeiting by embedding NFC chips in items and securing their data on the Blockchain, ensuring authenticity and ownership verification.

Chiliz Chain showcases its capabilities with a specialised emphasis on IP rights protection and selective developer curation, creating a secure platform for Blockchain projects in the sports and entertainment domains. It operates using a proof-of-authority (PoA) consensus mechanism, which enhances transaction efficiency and security, aligning well with its focus on fan engagement and tokenisation where swift and reliable transactions are essential.

In conclusion, Chiliz Chain represents a distinctive approach in the Blockchain industry, primarily targeting the sports and entertainment sectors. By emphasising tokenisation and fan interaction, it positions itself as an innovative platform in the digital landscape, offering new ways for sports entities to engage with their fans.





DAPPS PLATFORM

Laver-1

Conflux is a public Blockchain that launched powering applications with a unique Tree-Graph consensus combining Proof of Work and Proof of Stake. It boasts up to 3,000 TPS with low latency and incorporates a dual-space architecture to enhance scalability and developer accessibility. Conflux's primary use case spans Decentralised finance and gaming, leveraging a robust and secure network with built-in mechanisms to mitigate 51%-attacks and facilitate Ethereum-compatible smart contract deployment

FACTS & FIGURES

Conflux Foundation, 2018, Singapore Conflux - Shanghai Tree-Graph Blockchain Research institute 2020. Shanghai. China



TECHNICALS

Consensus Mechanism	Hybrid Consensus Mechanism (PoS and PoW)
Transaction Finality Time	20s
Stated Capacity	3,000TPS
Average Transaction-Fee	USD 0.0001
Total number of Transactions since incepti	on on Mainnet 120M

Stacked of %

Circulating Supp

10%

Circulating Supply

3.2Bn

Max Supply

Infinite

PROTOCOL CHARACTERISTICS

Conflux Network represents a significant advancement in Blockchain

technology, focusing on connecting creators, communities, and markets

across borders and protocols. Its innovative Tree-Graph consensus

algorithm enables high throughput by parallel processing blocks and

transactions, thus lowering confirmation times and increasing transactions

per second (TPS). This advanced algorithm allows Conflux to provide a

scalable solution without the usual bottlenecks encountered in other

Conflux operates on a Laver-1 protocol featuring the Tree-Graph ledger

structure, which intelligently incorporates concurrent blocks to bolster security and performance. The Greedy Heaviest Adaptive SubTree (GHAST) chain selection algorithm further fortifies its resilience against liveness

attacks. This framework enables processing up to 3000 transactions per

Interoperability is another key aspect of the Conflux ecosystem, achieved

through ShuttleFlow, a lightning-fast cross-chain asset bridge. ShuttleFlow

enables seamless asset transfers between multiple Blockchain protocols,

enhancing the network's flexibility and utility. This feature positions

Conflux as an interoperable platform capable of integrating diverse

The Conflux token economy revolves around the CFX token, serving

multiple roles within the network. CFX is used for paying transaction

fees, participating in network governance, and incentivising miners who

contribute to the network's security. Additionally, Conflux incorporates a

built-in staking mechanism, offering an annualised interest rate for staked

tokens. This staking feature underpins innovative DeFi applications and

contributes to the network's stability. Furthermore, Conflux has introduced a Fee Sponsorship Mechanism, allowing users with zero wallet balance

to engage with the Blockchain, thereby facilitating user onboarding and

In summary, Conflux Network stands out with its high throughput, security,

interoperability, and scalability. Its innovative consensus mechanism.

coupled with features like built-in staking and low fees, makes it a versatile

and efficient Blockchain platform, suitable for a wide range of applications

TOKENOMICS

Total Supply

5.3Bn

Blockchain

second.

Blockchain ecosystems

participation.

from DeFi to cross-chain asset transfers.



TOP PROTOCOLS Ø COSMOS (ATOM)

BLOCKCHAIN INTEROPERABILITY PLATFORM Laver 1

Cosmos, launched in 2019, is a Blockchain platform that stands out for its vision of creating an "Internet of Blockchains." It employs the Tendermint consensus mechanism and the Inter-Blockchain Communication (IBC) protocol to facilitate interoperability and scalability across different Blockchain networks. Cosmos aims to enable various Blockchain to communicate and transact seamlessly with one another, striving to create a Decentralised ecosystem where each network can maintain its sovereignty while benefiting from the shared infrastructure.

FACTS & FIGURES

Interchain Foundation, 2017, Zug, Switzerland Tendermint Inc., 2014, San Francisco, USA



TECHNICALS

Consensus Mechanism	Ignite Consensu (Byzantine Fault Tolerant Pr	is Framework oof-of-Stake)
Transaction Finality Time		1s
Stated Capacity		10,00TPS
Average Transaction-Fee		USD 0.01
Total number of Transactio	ons since inception on Mainnet	29.5M

GLOBAL PROTOCOL REPORT 2024





PROTOCOL CHARACTERISTICS



Introduced in 2019. Cosmos presents a distinctive approach to Blockchain technology with its aim of establishing an interconnected network of Blockchain, often referred to as the "Internet of Blockchains." Its foundation is the Tendermint consensus engine, which underpins the Cosmos Hub. the central Blockchain in the network. Tendermint is recognised for its efficiency and fast transaction finality, an advantage over traditional proofof-work models.

The Tendermint consensus mechanism is a key component of Cosmos, providing a high-performance, consistent, and secure framework for Blockchain networks. This mechanism enables various Blockchain in the Cosmos network to achieve consensus efficiently, which is vital for maintaining the integrity and security of transactions

Cosmos's IBC protocol allows for the seamless exchange of data and value between independent Blockchain, enabling them to communicate and transact without sacrificing their autonomy. This capability is a significant step towards overcoming the isolation and scalability challenges faced by many Blockchain networks, offering a more collaborative and flexible Blockchain ecosystem.

Cosmos also includes a modular framework that allows developers to build custom Blockchain easily. This framework, known as the Cosmos SDK, is designed to simplify Blockchain development, providing the tools and building blocks necessary to create tailored Blockchain solutions.

In practice, Cosmos has been utilised for various applications, including Decentralised finance (DeFi), token exchanges, and cross-chain applications. Its ability to facilitate communication and interoperability between different Blockchain has implications for numerous industries, enhancing the efficiency and scope of Blockchain applications

In summary, Cosmos is characterised by its emphasis on interoperability, scalability, and facilitating Blockchain development, making it a notable participant in the Blockchain sector. The platform's initiative to foster a network of interconnected Blockchain has the potential to enhance the scope and utility of Blockchain technology significantly.





SMART CONTRACT PLATFORM

Layer-1

Cronos is an Ethereum-compatible, Cosmos SDK-based Layer 1 Blockchain network launched in November 2021. Designed for scaling DeFi and GameFi, its primary use enables developers to easily port dApps from Ethereum and EVM-compatible chains using familiar tools. With strategic partnerships and a carbon-neutral validator network, Cronos leverages the \$CRO token for transaction fees and empowers the Crypto.com ecosystem.

FACTS & FIGURES

Cronos Labs, California, USA Crypto.com, 2016, Singapore



TECHNICALS

Consensus Mechanism	Tendermint Core Consensus Engine
Transaction Finality Time	65
Stated Capacity	50,000TPS
Average Transaction-Fee	USD 0.02
Total number of Transactions si	nce inception on Mainnet 77M

TOKENOMICS



PROTOCOL CHARACTERISTICS

Cronos emerges as a Layer 1 Blockchain protocol that synergises the Ethereum Virtual Machine's flexibility with the Cosmos ecosystem's interoperability. The protocol facilitates the seamless migration and operation of dApps, harnessing Ethereum's toolset and the Cosmos SDK's scalability.

Cronos is known for its EVM compatibility and Cosmos SDK infrastructure, enhancing dApp portability and multi-chain connectivity. Its pivotal role in the DeFi and GameFi arenas exemplifies its utility, offering developers a productive ground for innovation with extensive support tools like Ethermint and IBC.

The growth of dApps on Cronos has been significant, setting the stage for further ecosystem development. Cronos Labs is actively supporting this growth through initiatives like hackathons, the Cronos Accelerator, and the Cronos Ecosystem Grants program, aimed at nurturing existing projects and attracting new talent and ideas.

Cronos is introducing innovative technologies like Cronos Rollups to improve transaction throughput and "Cronos Next Level," a project that explores methods to maintain high throughput without compromising on application composability. These initiatives are crucial for future-proofing the network against heightened demand. Furthermore, the Cronos Gravity Bridge is being developed to facilitate seamless ERC-20 transfers between Ethereum and Cronos, enhancing the user experience through smooth asset movement across major chains.

In conclusion, Cronos is aiming to consolidate its position by matching Ethereum's developer-friendly environment with Cosmos's expansive network. With its strategic initiatives and ongoing development, Cronos is aiming to strengthen its position in the Web3 community and the broader Blockchain ecosystem.

INACTA.





DEFI PLATFORM

Layer 2, Ethereum, Multiparty Computation

dYdX is a non-custodial Decentralised finance (DeFi) platform facilitating Layer-2 scalability for cross-margined perpetuals trading. Since its Layer-2 inception, dYdX has operated on a unique governance token system (DYDX), enabling swift, gas-free transactions. Its main uses are trading, providing liquidity, and community-led governance. The innovative StarkEx scalability engine and robust smart contract architecture ensure that operations are safe, Decentralised, and consistent in protocol improvement.

FACTS & FIGURES

dYdX, 2018, San Francisco, California, USA



TECHNICALS

Consensus Mechanism	Tendermint Proof-of-Stake
Transaction Finality Time	840s
Stated Capacity	3,000TPS
Average Transaction-Fee	N/A
Total number of Transactions since inceptio	n on Mainnet N/A

GLOBAL PROTOCOL REPORT 2024





PROTOCOL CHARACTERISTICS

dYdX is a Decentralised finance protocol leveraging a Layer-2 solution for trading cross-margined perpetuals. Operating on the Ethereum network, it utilises StarkEx's zkSTARKs to facilitate transactions.

The protocol operates on Layer-2 and uses zero-knowledge proofs to make it scalable and cost-effective, which is one of its main advantages. It targets the specific trading use case, emphasising security and speed facilitated by off-chain computation.

The adoption of dYdX reflects effective transaction processing and governance by its token holders, which promotes Decentralised protocol governance. The integration with Ethereum, while providing security, ties its performance to the underlying Blockchain's capabilities. The audits of its contracts by Peckshield and others ensure its robustness, although no system is immune to all risks.

In conclusion, dYdX's current infrastructure supports a Decentralised trading environment with a governance model driven by its community. Future development is likely to focus on further optimising the efficiency and scalability of its Layer-2 solutions.

103



EOS NETWORK (EOS)

DAPPS PLATFORM

Layer-1

EOS Network, launched in 2018, is a prominent Blockchain platform known for its scalability, flexibility, and user-friendly design. It utilises a unique Delegated Proof of Stake (DPoS) consensus mechanism to facilitate quick and efficient transaction processing. EOS aims to support a wide range of Decentralised applications (dApps) and smart contracts, offering developers the tools needed to create scalable and intuitive dApps. Its emphasis on usability and performance makes it a popular choice for developers and businesses in the Blockchain space.

FACTS & FIGURES

EOS Network Foundation (ENF), 2021, Calgary, Alberta, Canada Block.one, 2017, Cayman Islands



TECHNICALS

Consensus Mechanism	Delegated Proof-of-Stake (DPoS)
Transaction Finality Time	2-3s
Stated Capacity	10,000TPS
Average Transaction-Fee	No Tx-Fee
Total number of Transactions since	inception on Mainnet 5Bn

TOKENOMICS



PROTOCOL CHARACTERISTICS

EOS Network, introduced in 2018, quickly emerged as a significant player in the Blockchain industry, focusing on scalability, flexibility, and user experience. It operates using a Delegated Proof of Stake (DPoS) consensus mechanism, which differs from traditional Proof of Work (PoW) and Proof of Stake (PoS) systems. In DPoS, token holders vote for a select number of delegates who are responsible for validating transactions and maintaining the network's integrity. This system allows EOS to achieve higher transaction throughput and faster confirmation times compared to many other Blockchain platforms.

A key aspect of EOS is its strong emphasis on usability, both for developers and end-users. The platform offers a rich set of tools and features that simplify the process of developing, hosting, and executing dApps. It supports multiple programming languages and provides an accessible environment for developers, reducing the barrier to entry for creating Decentralised applications.

EOS also focuses on flexibility and upgradability, allowing for quick and seamless updates to the network without requiring hard forks. This adaptability ensures that EOS can evolve with the changing landscape of Blockchain technology and user needs.

The network has been leveraged for a variety of applications, ranging from Decentralised social media platforms to enterprise-level solutions. Its scalability and efficient transaction processing make it particularly suitable for applications requiring high throughput, such as gaming and large-scale dApps.

In summary, EOS Network is recognised for its combination of high scalability, user-friendly design, and flexible infrastructure. Its DPoS consensus mechanism and robust development tools position it as a versatile and efficient platform for a wide array of Blockchain applications, appealing to a diverse range of developers and businesses in the Blockchain ecosystem.

DLT SCIENCE FOUNDATION

TOP PROTOCOLS ETHEREUM (ETH)

SMART CONTRACT PLATFORM

Ethereum is a Decentralised Blockchain platform that enables developers to build and deploy smart contracts and Decentralised applications (dApps). It was proposed by Vitalik Buterin in late 2013 and the development began in early 2014, with the network going live on the 30th of July 2015. Ethereum's native Cryptocurrency, Ether (ETH), fuels transactions and computational operations on the network, and it has played a pivotal role in the growth of the Decentralised finance (DeFi) and non-fungible token (NFT) ecosystems.

FACTS & FIGURES

Ethereum Foundation, 2014, Zug, Switzerland



TECHNICALS

Consensus Mechanism	Proof-of-Stake (PoS)
Transaction Finality Time	900s
Stated Capacity	30TPS
Average Transaction-Fee	USD 8.71
Total number of Transactions since inception on Ma	innet 2.1Bn





PROTOCOL CHARACTERISTICS



Ethereum has demonstrated increasing price stability over time, making it an attractive option for institutional investors exploring Blockchain-based assets and serving as a robust foundation for Decentralised applications. When it comes to adoption, Ethereum stands as a dynamic platform that underpins a wide range of dApps and pioneering use cases. Its smart contract capabilities empower developers to create programmable contracts and sophisticated Decentralised applications, setting it apart as a fertile ground for Blockchain Innovation. Ethereum has seen widespread adoption in various sectors, including DeFi, Tokenization, NFTs, and more. Countless businesses and projects now leverage its Blockchain infrastructure.

Ethereum's Blockchain protocol prioritises programmability and versatility, enabling developers to craft Decentralised applications with diverse functionalities. This focus on programmability has positioned Ethereum as a dynamic hub for Blockchain innovation, nurturing a thriving ecosystem of Decentralised projects and applications. Ethereum enjoys strong adoption, maintainability and reliability thanks to its thriving community and robust infrastructure. Yet, it lags scalability and efficiency, grappling with network congestion and limitations that hinder its ability to handle large transaction loads effectively as a Layer 1 Blockchain, necessitating the use of Layer 2 solutions to achieve the required scaling.

In summary, Ethereum's journey from its inception to its current status as a versatile Blockchain platform underscores its role within the Blockchain landscape. Its emphasis on programmability and support for Decentralised application development make it a pivotal choice for Blockchain experts and innovators exploring the potential of Blockchain technology and Decentralised ecosystems.





DAPPS PLATFORM

Fantom, launched in 2019, is a high-performance Blockchain platform known for its speed and scalability. It employs a unique consensus mechanism called Lachesis, which enables extremely fast transaction processing and low fees. Fantom is designed to support a variety of Decentralised applications (dApps) and digital assets, with a particular emphasis on DeFi applications. The platform's ability to handle high transaction volumes efficiently makes it a popular choice for developers looking to build scalable and responsive Blockchain-based applications.

FACTS & FIGURES

Fantom Foundation, 2018, Cayman Islands Fantom Operations Ltd., 2018, Cayman Islands



TECHNICALS

Consensus Mechanism	Lachesis Consensus Mec	hanism (DAG)
Transaction Finality Time		1-2s
Stated Capacity		20,000TPS
Average Transaction-Fee		USD <0.01
Total number of Transaction	ns since inception on Mainnet	509M

TOKENOMICS



PROTOCOL CHARACTERISTICS

Fantom, introduced in 2019, has quickly gained attention in the Blockchain space for its advanced technology and focus on delivering high-speed, scalable solutions. At the heart of Fantom's efficiency is its Lachesis consensus mechanism, an innovative approach that differs from traditional Proof of Work (PoW) and Proof of Stake (PoS) models. Lachesis is a form of Directed Acyclic Graph (DAG) consensus, which allows for asynchronous confirmation of transactions, leading to significantly reduced transaction times and lower costs.

This high-throughput capability is crucial for applications that require fast and reliable transaction processing. Fantom's architecture is designed to support a broad range of Decentralised applications, especially in the DeFi sector, where speed and scalability are paramount. The platform's compatibility with the Ethereum Virtual Machine (EVM) also allows for easy migration of Ethereum-based applications to Fantom, offering developers greater flexibility and resources.

Fantom focuses on creating a developer-friendly ecosystem, offering tools and resources that simplify the development of dApps. This approach has led to a growing community of developers and a diverse range of applications being built on the platform, from financial services to gaming and supply chain management. The network's scalability and low fee structure have been particularly appealing in the Blockchain community, attracting both users and developers.

In summary, Fantom stands out for its fast transaction processing, scalability, and developer-friendly environment. Its unique Lachesis consensus mechanism and compatibility with Ethereum make it a powerful platform for a wide variety of Blockchain applications, particularly in the rapidly evolving DeFi space.

DLT SCIENCE FOUNDATION

INACTA.



DATA STORAGE AND COMPUTING PLATFORM

Layer-1

Filecoin, launched in 2020, is a Decentralised storage network designed to offer secure and efficient data storage solutions. It operates by incentivising users to rent out their unused storage space, creating a marketplace for data storage. Filecoin utilises Blockchain technology to facilitate transparent, trustless, and verifiable transactions between users and storage providers. The platform aims to provide a more robust, efficient, and affordable alternative to traditional cloud storage services, appealing to individuals and businesses seeking Decentralised storage options.

FACTS & FIGURES

Filecoin Foundation, 2014, San Francisco, California, USA Protocol Labs, 2014, San Francisco, California, USA



TECHNICALS

 Expected Consensus Algorithm (Proof-of-Consensus Mechanism Replication (PoRep) and Proof-of-Spacetime (PoSt)

 Transaction Finality Time
 27000s (7.5 hours)

Stated Capacity	N/A
Average Transaction-Fee	USD <0.01
Total number of Transactions since inception on Mainnet 42M	





PROTOCOL CHARACTERISTICS

Filecoin, introduced in 2020, has established itself as a notable Decentralised storage network in the Blockchain space. It functions by allowing users to rent out their spare storage capacity, thereby creating a peer-topeer market for data storage. This approach to Decentralised storage is innovative, as it leverages underutilised storage around the world, offering a more efficient and cost-effective alternative to conventional cloud storage solutions.

The platform operates on a Blockchain-based marketplace, where users seeking storage space can find and pay storage providers in Filecoin tokens (FIL). This token incentivises participants to act honestly and efficiently, ensuring the reliability and security of the network. Storage providers are required to prove they are correctly storing the data they are paid for, which is verified through Cryptographic proofs on the Blockchain.

Filecoin's design emphasises data integrity and security, making it a robust solution for a variety of storage needs. It is particularly attractive for large-scale data storage, such as archival data, scientific data, or video content, where trust and verifiability are crucial. The Decentralised nature of Filecoin means that it is resistant to censorship and less prone to central points of failure, unlike traditional centralised storage services.

The network has seen growing adoption due to its innovative approach to data storage. It appeals to both individuals looking for secure and affordable storage options and businesses seeking to leverage Decentralised storage for enhanced security and reliability.

In summary, Filecoin represents a significant advancement in Decentralised data storage. Its Blockchain-based marketplace, incentive structure, and focus on security and reliability position it as a leading solution in the realm of Decentralised storage services, challenging traditional cloud storage models and offering a scalable, secure alternative for diverse storage needs.

107





DAPPS PLATFORM

Laver-1

Dapper Labs introduced Flow, a Layer-1 protocol, in late 2020 for developing games, apps, and digital assets like NFTs and Decentralised applications. Using a multirole design, it scales without sharding and processes transactions efficiently. The platform targets NFT and Decentralised gaming with minimal transaction costs and a user-friendly interface. Unlike previous Blockchain, Flow uses a pipeline of validator activities in Collection, Consensus, Execution, and Verification nodes. Its resourceoriented programming language, Cadence, makes producing Crypto assets and apps safe and easy, and it is tailored for mainstream customers, making fiat-to-Crypto transitions easy.

FACTS & FIGURES

Dapper Labs, 2018, Vancouver, BC, Canada



TECHNICALS

Consensus Mechanism	Flow Proof of Stake (FLOW PoS)
Transaction Finality Time	Within seconds
Stated Capacity	100TPS
Average Transaction-Fee	USD <0.00001
Total number of Transactions since ince	ption on Mainnet 430M

TOKENOMICS



PROTOCOL CHARACTERISTICS

Flow is a Layer 1 Blockchain protocol, created by Dapper Labs, the minds behind CryptoKitties and NBA Top Shot, that has rapidly gained traction in the digital asset space, especially in the realm of NFTs and interactive applications. It was conceived in response to the scalability challenges faced by traditional Blockchain, offering a unique architecture that enables high throughput without resorting to sharding. This design choice preserves the network's cohesion and security while facilitating efficient and seamless transactions.

A defining characteristic of Flow is its focus on supporting the creation and trading of digital assets, particularly NFTs. The platform's infrastructure is tailored for the development of rich and dynamic digital experiences, including games and interactive applications. Flow has been the backbone of several high-profile projects, most notably NBA Top Shot, which has revolutionised the sports collectibles market

Flow employs a multi-role architecture, dividing the responsibilities of the network among four node types: Collection, Consensus, Execution, and Verification. This division allows the network to handle large-scale throughput while maintaining a user-friendly and developer-friendly environment. Developers benefit from Flow's inclusive and accessible ecosystem, which offers tools and resources that simplify the process of creating Decentralised applications.

The network has fostered a vibrant community of creators, developers, and users, attracted by its optimised handling of NFTs and digital collectibles. This community-driven approach has led to the development of a diverse range of applications and projects on Flow, showcasing its potential as a leading platform for innovative digital experiences.

In summary, Flow's specialised architecture and focus on digital assets and NFTs make it a standout Blockchain platform. Its approach to scalability, combined with its commitment to creating an engaging and accessible environment for digital experiences, positions it as a key enabler of the evolving landscape of digital assets and interactive applications



INACTA.



WEB3 GAMING PLATFORM

Laver-1

GALA is a Blockchain-powered platform offering multiple games that grant true ownership of in-game items via NFTs. Launched in 2020, it rewards players with GALA tokens for gameplay. GALA stands out for quality gaming experiences, featuring RPGs, MOBAs, and strategy games. GALA expanded into the Blockchain space with its own Layer 1 network. This network is designed to support the gaming ecosystem, focusing on decentralisation, player empowerment, and Blockchain-based game development. GALA aims to revolutionise the gaming industry by offering a platform where developers can create and players can enjoy Decentralised games. The introduction of its Layer 1 Blockchain signifies GALA's commitment to providing a robust and player-centric gaming experience.

FACTS & FIGURES

Blockchain Game Partners Inc. (Gala Games), 2018, Jackson, Wyoming, USA



TECHNICALS

Consensus Mechanism	(Proof-of-Work, Proof-of- Stake and Proof-of- Storage)
ransaction Finality Time	N/A
Stated Capacity	N/A
Average Transaction-Fee	N/A
otal number of Transactions since	inception on Mainnet 2.3M

Trinla Concensus Mashanian





PROTOCOL CHARACTERISTICS

GALA Games, founded in 2020, pioneers Blockchain-based gaming with a suite of diverse games, each embracing non-fungible tokens (NFTs) for genuine ownership of in-game assets. GALA ventured into the Blockchain arena with its own Layer 1 network in 2022, marking a significant expansion of its ecosystem. The GALA network is tailored to enhance the gaming experience, emphasising decentralisation, player empowerment, and the creation of Blockchain-based games. This shift represents GALA's dedication to shaping the future of gaming by leveraging Blockchain technology to offer more transparent, equitable, and immersive gaming experiences.

The GALA Laver 1 Blockchain is designed to support a range of gaming applications, providing the necessary infrastructure for developers to build Decentralised games. This Blockchain network focuses on speed, scalability, and low transaction costs, which are crucial for gaming environments that require real-time interactions and high-volume transactions. By offering these capabilities, GALA creates an appealing platform for game developers looking to integrate Blockchain technology into their games.

A key aspect of the GALA network is its player-centric approach. The network empowers players by giving them more control over their in-game assets and decisions, fostering a more engaging and interactive gaming community. This empowerment is facilitated through the use of NFTs and Decentralised governance, allowing players to have a stake in the game worlds they inhabit. GALA distinguishes itself with a wide game range embracing player-owned assets, and an active community of 1.3+ million users.

GALA's move to establish its Layer 1 network reflects its ambition to be at the forefront of Blockchain gaming. The network aims to bridge the gap between traditional gaming and Blockchain technology, creating a space where Decentralised gaming can thrive.

In summary, GALA's development of its Layer 1 Blockchain network underscores its commitment to revolutionising the gaming industry. With a focus on decentralisation, player empowerment, and supporting Blockchain-based game development. GALA is positioning itself as a leader in the emerging field of Blockchain gaming, offering a platform that is both developer-friendly and player-centric.





SMART CONTRACT PLATFORM

Hedera Hashgraph is a next-generation distributed ledger technology, distinguished by its Hashgraph algorithm, which offers rapid transaction speeds and high-level security. Hedera prioritises decentralisation, scalability, and fairness. Governed by a rotating council of leading global organisations, it promises stability without the risk of forks. From finance to healthcare, its versatile platform supports various applications, marking Hedera as an innovative force in the Blockchain realm.

FACTS & FIGURES

Hedera Hashgraph LLC, 2018, Richardson, Texas, USA Swiss Hashgraph Association, 2021



TECHNICALS

Consensus Mechanism Ha	ashgraph Consensus
Transaction Finality Time	3-5s
Stated Capacity	10,000TPS
Average Transaction-Fee	USD 0.0010
Total number of Transactions since inception on Mai	nnet 12.5Bn

TOKENOMICS



PROTOCOL CHARACTERISTICS



Hedera Hashgraph is a Decentralised public network that offers a unique approach to distributed ledger technology. Diverging from traditional Blockchain structures, Hedera uses an algorithm known as the Hashgraph which is an implementation of a directed acyclic graph (DAG), allowing for faster transaction speeds and improved scalability. Hedera's algorithm is touted as a secure alternative to conventional Blockchain. It promises Byzantine Fault Tolerance, making it resilient to malicious actors. Unlike traditional Blockchain, Hedera further ensures there are no forks, adding another layer of security and predictability. Notable for its promise of achieving thousands of transactions per second and demonstrating one of the highest values of processed transactions in the entire protocol space, the platform is designed to be secure, fair, and efficient.

Hedera stands out for its governance model: a council comprised of a diverse set of reputable global organisations oversees the platform's direction and updates. These members are rotated over time to ensure decentralisation and prevent undue influence. Hedera offers various services, including Cryptocurrency transactions, smart contracts, and file storage, while ensuring low fees and high-speed finality. Its emphasis on security and transparency is underpinned by the platform's commitment to periodic third-party audits.

Although younger than some other Blockchain platforms, Hedera has rapidly matured, evidenced by its extensive real-world applications and increasing transaction volumes. Hedera has fostered collaborations with numerous organisations, resulting in its integration into diverse industries, including finance, health-care, and supply chains. Organizations have utilised Hedera for purposes like fraud mitigation, supply chain transparency, and secure data sharing, suggesting a growing utility for the platform. Hedera offers as well a wealth of resources for developers, including Java Enterprise SDKs, making it easier to build on the platform.

In summary, Hedera Hashgraph presents itself as a scalable, secure, and sustainable platform with a distinctive governance structure, aiming to address the challenges faced by earlier Blockchain technologies.



INACTA





NFT TRADING PLATFORM

Layer-2, Ethereum, zkRollup

Immutable X is a Layer-2 scaling solution for Ethereum, specifically designed for NFTs. It offers high scalability and zero gas fees for minting and trading NFTs. Utilizing StarkWare's zk-rollup technology, Immutable X ensures that users benefit from the security of Ethereum while enjoying a seamless and cost-effective NFT experience. It aims to revolutionise the NFT market by addressing issues of scalability and environmental impact, making NFT transactions more accessible and sustainable.

FACTS & FIGURES

Immutable, 2018, Sydney, New South Wales, Australia



TECHNICALS

Consensus Mechanism	Delegated Proof-of- Stake (DPoS)
Transaction Finality Time	840s
Stated Capacity	9,000TPS
Average Transaction-Fee	2% of every trade
Total number of Transactions sinc	e inception on Mainnet 515.1K





PROTOCOL CHARACTERISTICS

Immutable X, launched in 2021, emerged as a significant advancement in the NFT space as a Layer-2 scaling solution built on Ethereum. Its primary focus is on NFTs, offering a platform that addresses key issues like high gas fees, slow transaction times, and scalability. Immutable X uses StarkWare's zk-rollup technology, which allows for scaling Ethereum while maintaining its robust security features. This technology enables Immutable X to offer fast trade confirmations and zero gas fees for NFT minting and trading, making it a more user-friendly and cost-effective platform for NFT enthusiasts and creators.

The platform's integration with Ethereum means that users enjoy the security and decentralisation benefits of the Ethereum network while avoiding its common pitfalls, such as network congestion and high transaction costs. This dual advantage is crucial for users who prioritise both security and efficiency in their NFT transactions.

Immutable X has already seen adoption by various NFT projects and marketplaces, leveraging its advantages to offer a better experience for users. Its focus on zero gas fees, fast confirmations, and Ethereum-level security positions it as an attractive solution for NFT-related activities.

In summary, Immutable X represents a key innovation in the NFT sector, providing a scalable, secure, and environmentally friendly platform. Its use of zk-rollup technology and integration with Ethereum makes it a notable choice for users and creators looking for efficient and sustainable ways to mint, buy, and sell NFTs.



TOP PROTOCOLS INJECTIVE PROTOCOL (INJ)

DAPPS PLATFORM

Layer-2, Ethereum, zkRollup

Injective Protocol is a Layer-1 Blockchain tailored for finance, offering an advanced platform for Decentralised finance (DeFi) applications. It went live with the aim to revolutionise financial markets by enabling fast, cross-chain transactions and robust Decentralised applications (dApps). Its main use cases include Decentralised exchanges, prediction markets, and various on-chain strategies, supported by its interoperability with major Blockchain like Ethereum and Cosmos. Built on the Cosmos SDK and leveraging Tendermint's proof-of-stake consensus, it provides instant transaction finality and high transaction throughput.

FACTS & FIGURES

Open DeFi Foundation, Cayman Islands



TECHNICALS

Consensus Mechanism F	Proof-of- Stake (PoS)
Transaction Finality Time	N/A
Stated Capacity	10,000+TPS
Average Transaction-Fee	USD <0.01
Total number of Transactions since inception on Ma	innet 272.7M

TOKENOMICS



PROTOCOL CHARACTERISTICS

Injective Protocol emerges as a Blockchain platform specifically engineered for the burgeoning DeFi sector. It distinguishes itself with its highspeed transaction capabilities, interoperability, and a strong commitment to environmental sustainability. This platform aims to revolutionise the way financial applications are developed and interact across a multitude of Blockchain networks. By integrating innovative features and a user-friendly environment, Injective Protocol aims to transform the landscape of Decentralised finance, making it more accessible and efficient for users and developers alike.

As a layer-one Blockchain, Injective Protocol harnesses the power of the Cosmos SDK and Tendermint Proof-of-Stake consensus mechanism, ensuring rapid transaction finality and a capacity exceeding 10,000 transactions per second (TPS). Its unique selling points are its fully Decentralised, miner-extractable value (MEV) resistant on-chain orderbook and inherent interoperability with major Blockchain like Ethereum, Cosmos and non-EVM chains such as Solana. This enables a broad spectrum of financial markets, including spot, futures, and options, all operating fully on-chain.

Further enhancing its appeal is the advanced smart contract platform based on CosmWasm, which allows for effortless multi-chain transactions and application development. Injective Protocol's commitment to a nogas-fee structure and its scalable, high-performance infrastructure make it an attractive platform for developers looking to build DeFi applications.

The Injective Protocol stands out in terms of adoption and usability, offering a developer-friendly environment supported by Rust and Golang, which encourages the creation of innovative DeFi applications. Its security is reinforced by the Tendermint-based Proof of Stake (PoS) mechanism, contributing to its scalability and efficiency. Its Decentralised governance model and community-driven approach are notable strengths, promoting a transparent and inclusive decision-making process.



TOP PROTOCOLS INTERNET COMPUTER (ICP)

SMART CONTRACT COMPUTING PLATFORM

Layer-1

DLT

SCIENCE

Internet Computer is a Blockchain protocol that aims to resolve traditional Internet problems such as poor security, online monopolies, and inappropriate use of personal data. The network makes it easy to create Decentralised applications (dApps) while being entirely Decentralised with storage hardware that is hosted by independent authorities. The Cryptocurrency is called ICP and is used to execute smart contracts.

FACTS & FIGURES

DFINITY Foundation, 2016, Zurich, Switzerland



TECHNICALS

Consensus Mechanism	Internet Computer Consensus (ICC)
Transaction Finality Time	1-2s
Stated Capacity	11,500TPS
Average Transaction-Fee	USD 0
Total number of Transactions sin	ce inception on Mainnet 6.5M

112





PROTOCOL CHARACTERISTICS



The Internet Computer is a Blockchain-based project that employs innovative techniques like Chain Key Technology to create a user-friendly, Decentralised, and tamper-proof environment for building Web3 services and enterprise systems on a public network. It leverages a unique consensus mechanism that allows for horizontal scalability, enabling a high throughput of transactions and smart contract execution, contributing positively to its performance efficiency. Launched by DFINITY Foundation in May 2021, the platform has witnessed continuous updates and improvements, reflecting the developer community's commitment to realising a mature, stable, and innovative Decentralised internet infrastructure.

Its characteristics include seamless scalability, where applications can grow dynamically, and advanced security protocols ensuring data protection and secure transactions. One of its most notable characteristics is its ability to run software at web speed with high performance. It achieves this through its unique network of "canisters," which are essentially smart contracts that can host code and data. This setup enables developers to create Decentralised applications (dApps) that can run directly on the Internet Computer Blockchain.

The project's ambition extends beyond just hosting dApps; it envisions replacing traditional web services, allowing users to interact with these Decentralised applications seamlessly through their web browsers. This approach has the potential to reshape the internet landscape by reducing reliance on centralised servers and improving data privacy.

In summary, ICP has gained attention for its approach to redefining the internet infrastructure and has made significant strides in performance efficiency and usability. There is, however, a substantial need for broader adoption to realise the full potential of the platform.



INTERNET OF TRUSTED THINGS (IOT) PROTOCOL

Layer-1

IOTA, launched in 2017, represents a paradigm shift in distributed ledger technology (DLT) with its Tangle ledger. This innovative architecture allows for scalable, feeless transactions, making IOTA uniquely suited for the Internet of Things (IoT). It aims to facilitate seamless data and value exchange in IoT ecosystems. IOTA's focus on providing a lightweight, efficient platform without the need for mining distinguishes it from traditional Blockchain, making it a suitable solution for a wide range of IoT applications and data integrity solutions.

FACTS & FIGURES

IOTA Foundation, 2017, Berlin, Germany



TECHNICALS

Consensus Mechanism	Tangle Directed Acyclical Graph (DAG	al Graph (DAG)	
Transaction Finality Time	120s		
Stated Capacity	1,000TPS		
Average Transaction-Fee	No fees		
Total number of Transaction	s since inception on Mainnet N/A		

TOKENOMICS



PROTOCOL CHARACTERISTICS

IOTA is a Blockchain alternative specifically designed for the Internet of Things (IoT), using a unique data structure known as the Tangle. Unlike traditional Blockchain, the Tangle is a Directed Acyclic Graph (DAG) that enables transactions to be processed in parallel, resulting in high scalability, zero transaction fees and the absence of a chain of blocks. This makes IOTA particularly well-suited for environments with numerous microtransactions and data exchanges, such as IoT networks.

One of the key advantages of IOTA's Tangle technology is its ability to handle a high volume of transactions efficiently, without the need for miners or staking. This approach eliminates the typical bottlenecks and costs associated with Blockchain mining, making IOTA a more practical choice for IoT applications where small, rapid transactions are common.

While IOTA's Tangle offers unique advantages in terms of scalability and transaction fees, it does face different security challenges compared to traditional Proof of Work (PoW) or Proof of Stake (PoS) systems. The Tangle's structure, being a Directed Acyclic Graph (DAG), is less proven than the PoW used by Bitcoin, which has been extensively tested and shown to be highly secure over many years. The security of DAG-based systems like IOTA's Tangle is still an area of ongoing research and development, with potential vulnerabilities and solutions continually being explored.

In practice, IOTA has been applied in a range of industries, from smart energy and supply chain management to mobility and smart city initiatives. Its ability to seamlessly integrate with IoT devices and handle large-scale data exchanges efficiently positions it as a significant technology in the growing IoT sector.

In summary, IOTA's Tangle technology and focus on IoT applications set it apart in the Blockchain space. Its scalability and zero transaction fees make it a tailored platform for a variety of IoT-related applications, offering innovative solutions for data and value exchange in an increasingly connected world.





SMART CONTRACT PLATFORM Layer-1

The Kava Network, a Layer-1 Blockchain, merges the speed of Cosmos SDK with Ethereum's developer ecosystem. It offers a suite of financial services including lending, borrowing, and stablecoins, built on a Cosmos SDK-based Blockchain with Ethereum compatibility. Kava stands out for its focus on cross-chain interoperability, allowing users to leverage assets from various Blockchain. This approach positions Kava as a versatile and inclusive DeFi platform, catering to a diverse range of financial needs and users.

FACTS & FIGURES

Kava Labs, 2018, San Francisco, California, USA



TECHNICALS

Consensus Mechanism	Proof of Stake (PoS)
Transaction Finality Time	1s
Stated Capacity	10,000TPS
Average Transaction-Fee	USD <0.01
Total number of Transactions since inception on Mai	nnet 24M





PROTOCOL CHARACTERISTICS

Kava, introduced in 2019, represents a significant convergence in the DeFi space, merging the capabilities of the Cosmos and Ethereum ecosystems. This DeFi platform provides a range of financial services, including lending, borrowing, and stablecoin issuance. Built on a Blockchain framework developed using the Cosmos SDK, Kava also offers compatibility with Ethereum, facilitating a broad spectrum of Decentralised applications and financial products.

The platform's core feature is its cross-chain interoperability, which is achieved through the integration of multiple Blockchain protocols. This allows users to utilise a variety of digital assets from different Blockchain within the Kava ecosystem, enhancing liquidity and providing more options for financial management. Kava's interoperability extends its reach and functionality, making it an attractive option for users and developers from different Blockchain communities.

Kava operates using a collateralized debt position (CDP) system for its stablecoin issuance. Users can deposit various Cryptocurrencies as collateral to mint Kava's stablecoin, USDX. This mechanism provides a Decentralised and secure way to generate stablecoins, contributing to the stability and efficiency of the platform's financial services.

The network utilises a Proof of Stake (PoS) consensus mechanism, ensuring security and efficiency in transaction processing. Additionally, Kava's governance model allows stakeholders to participate in decision-making processes, fostering a community-driven approach to the platform's development and management.

In summary, Kava's unique blend of Cosmos and Ethereum features, along with its focus on cross-chain interoperability and inclusive financial services, positions it as a versatile and innovative DeFi platform. Its ability to cater to a wide range of financial activities, backed by a robust and user-centric ecosystem, makes Kava a notable player in the evolving DeFi landscape.



SMART CONTRACT PLATFORM

Layer-1

Klaytn, a BFT-based public Blockchain, prioritises enterprise-grade reliability with immediate finality, high TPS, and reduced operational costs. Launched in June 2019 with Cypress mainnet, boasting 1-second block generation, 4,000 TPS, and low gas fees, it supports EVM for Solidity contracts. It focuses on combining the features of public and private Blockchain to provide high scalability and accessibility. Klaytn aims to facilitate mainstream adoption of Blockchain technology, especially for businesses and services, by offering a platform that is both robust and easy to use, thus bridging the gap between Blockchain and practical business applications.

FACTS & FIGURES

GroundX, 2018, South Korea Klaytn Foundation, 2021, Singapore



TECHNICALS

Consensus Mechanism	Klaytn Consensus Protocol (Combination of PoS and DPoS)
Transaction Finality Time	1s
Stated Capacity	4,000TPS
Average Transaction-Fee	N/A
Total number of Transactions since	inception on Mainnet N/A

TOKENOMICS



PROTOCOL CHARACTERISTICS

Klaytn, introduced in 2019 by GroundX, the Blockchain subsidiary of the South Korean technology giant Kakao Corp, is a Blockchain platform that stands out for its hybrid approach, blending the features of both public and private Blockchain. This design is aimed at maximising scalability and accessibility, making Blockchain technology more approachable for mainstream adoption, particularly in the business sector.

Klaytn's architecture is tailored to provide a high-performance and user-friendly environment. It achieves this through an efficient consensus mechanism and a streamlined development process, enabling quick transaction processing and easy application development. These features make Klaytn an appealing choice for businesses looking to integrate Blockchain into their operations without the complexities often associated with this technology.

Operational as a Layer-1 Blockchain, Klaytn prioritises enterprise reliability, showcasing 1-second block finality, 4,000 TPS, and Ethereum compatibility with reduced gas fees. Its unique selling points include a tiered network architecture with role-based node types, facilitating Core Cell and Endpoint Node networks for mainnet operations, while Service Chains offer dedicated environments for scalable application deployment.

The platform supports a range of Decentralised applications (dApps) and digital assets, fostering a vibrant ecosystem of applications that span various industries, including finance, entertainment, and lifestyle. Klaytn's focus on a seamless user experience extends to the end-user as well, offering an intuitive interface that encourages wider adoption among non-technicalusers.

Klaytn also places a strong emphasis on interoperability and collaboration. It has established partnerships with various organisations and Blockchain projects to expand its ecosystem and enhance the functionality of its platform. These partnerships are a testament to Klaytn's commitment to building a comprehensive and versatile Blockchain ecosystem.

In summary, Klaytn's hybrid Blockchain approach, combined with its focus on scalability, user-friendliness, and mainstream adoption, positions it as a significant platform in the Blockchain space. Its commitment to bridging the gap between Blockchain technology and practical business applications makes it a promising option for businesses and developers looking to leverage Blockchain for innovative and efficient solutions.



INACTA.



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MODULAR SCALING SOLUTION

Layer-2, Ethereum, Optimistic RollUp

Mantle, an Ethereum Layer-2 project, enhances Blockchain scalability and efficiency with its Mantle LSP (Liquid Staking Protocol). Launched in 2023, Mantle provides users with a novel approach to stake ether and receive rewards, boosting Ethereum's scalability. Its architecture utilises optimistic rollups and multi-party computation, optimising performance and cost-effectiveness. Mantle's focus is on improving Ethereum's functionality, aiming to offer users a seamless experience with enhanced transaction speeds and reduced costs.

FACTS & FIGURES

BitDAO, 2021, Panama City, Panama ByBit, 2018, Singapore



TECHNICALS

Consensus Mechanism	N/A
Transaction Finality Time	Instantaneous on Layer-2
Stated Capacity	500TPS
Average Transaction-Fee	N/A
Total number of Transactions since inception on Mainnet	

GLOBAL PROTOCOL REPORT 2024





PROTOCOL CHARACTERISTICS

Mantle Network, launched in 2023, is a modular Layer 2 EVM-compatible Blockchain that employs optimistic rollups and EigenLayer's EigenDA for data availability. This Layer 2 scaling solution on Ethereum enhances user experience without sacrificing security or decentralisation by modularizing Blockchain operations. Mantle leverages optimistic rollups to execute transactions in batches and a sequencer to arrange blocks, saving time and fees. Information on transactions is stored on Mantle's Data Availability nodes powered by EigenDA, accessible on the Ethereum mainnet.

Mantle Network operates with four core components: optimistic rollup technology, a modular network architecture, multi-party computation, and Mantle Data Availability nodes. These elements work in synergy to deliver a resource-efficient and secure network, maintaining tight communication with the main network. Optimistic rollups arrange transactions into batches for one-off validation on Ethereum, while Mantle introduces MPC nodes to affirm the validity of blocks produced by the sequencer. Mantle's modular architecture separates execution, settlement, consensus, and data availability, enhancing efficiency and security.

Mantle's Data Availability nodes, powered by EigenDA, store rollup transactions and provide data to verifiers. Mantle offers significantly lower transaction fees and higher transaction speeds compared to Ethereum, claiming 500 transactions per second, about 20 times faster than Ethereum's 32 TPS. As an EVM-compatible network, Mantle allows existing Ethereum developers to easily transition their applications, maintaining the same level of decentralisation and security as Ethereum.

Overall, Mantle Network's innovative approach to Layer 2 scaling, combining cost savings and enhanced performance, positions it as a strong contender in the Blockchain space, offering an efficient and scalable platform for Decentralised applications.



TOP PROTOCOLS MINA PROTOCOL (MINA)

DAPPS PLATFORM

Layer-1

Mina Protocol is an innovative Layer 1 Blockchain platform that uses zeroknowledge proofs (ZKP) and smart contracts to offer a more efficient Blockchain architecture. Distinguished as the world's first Cryptocurrency protocol with a succinct Blockchain, it leads to a consistent Blockchain size of only 22KB, irrespective of the network's growth. Mina aims to provide an efficient distributed payment system with enhanced scalability and security. Its primary use case is enabling users to verify the platform's authenticity from its genesis block, utilising Zero-Knowledge Succinct Non-Interactive Arguments of Knowledge (zk-SNARKs). This approach ensures scalability, security, and decentralisation without the computational overhead typical in traditional Blockchain.

FACTS & FIGURES

Mina Foundation, 2017, Delaware and San Francisco, USA



TECHNICALS

Consensus Mechanism	Proof-of-Stake (PoS)
Transaction Finality Time	2,700s
Stated Capacity	N/A
Average Transaction-Fee	USD 0.0176
Total number of Transactions since inception on Ma	innet 4M

TOKENOMICS



PROTOCOL CHARACTERISTICS

Mina Protocol, introduced in 2021, revolutionises Blockchain technology with its ultra-lightweight structure. The protocol maintains a consistent Blockchain size of approximately 22KB, regardless of the number of transactions. This unique feature is enabled by the use of zk-SNARKs (Zero-Knowledge Succinct Non-Interactive Arguments of Knowledge), a form of Cryptographic proof that allows Mina to compress the entire Blockchain into a small, easily verifiable snapshot.

The core of Mina's philosophy is ensuring privacy and scalability. By utilising zk-SNARKs, the protocol allows every user to act as a full node, verifying the network's integrity without the need for substantial computational resources. This approach drastically reduces barriers to participation and makes the network more Decentralised and secure.

Mina's focus on privacy extends to its smart contract capabilities. The protocol supports private smart contracts, allowing users to interact with and leverage Decentralised applications (dApps) while keeping their data confidential. This privacy feature is especially significant in a landscape where data security and user anonymity are increasingly prioritised.

Additionally, Mina's lightweight design means it can operate efficiently on mobile devices, further expanding its accessibility. The protocol's ability to provide secure, private, and scalable Blockchain solutions with minimal hardware requirements sets it apart in the Blockchain ecosystem.

In summary, Mina Protocol's innovative approach to Blockchain technology, characterised by its minimal size and emphasis on privacy and scalability, positions it as a groundbreaking platform in the Blockchain space. Its use of zk-SNARKs and focus on user-friendly Blockchain interaction makes it an attractive option for users and developers looking for efficient and private Blockchain solutions.





PAYMENT PROTOCOL

Layer-1

Monero is a privacy-focused Cryptocurrency that emphasises anonymity and untraceability. Utilizing advanced Cryptography, such as ring signatures, stealth addresses, and Ring Confidential Transactions (RingCT), Monero ensures that transactions remain completely private and untraceable. This focus on privacy makes Monero distinct from many other Cryptocurrencies, appealing to users who prioritise confidentiality in their digital transactions. Monero's commitment to security and privacy positions it as a leading choice for users seeking financial privacy in the digital world.

FACTS & FIGURES

Monero Community Crowdfunding System (CCS), Whitepaper in 2012 by Pseudonymous "Nicolas van Saberhagen"



TECHNICALS

Consensus Mechanism	Proof-of- Work (PoW)
Transaction Finality Time	1,200s
Stated Capacity	1,700TPS
Average Transaction-Fee	USD 0.04
Total number of Transactions since inception on N	lainnet 32M

INACTA.





PROTOCOL CHARACTERISTICS

Monero, introduced in 2014, has established itself as a premier privacy-centric Cryptocurrency. It is distinguished by its use of sophisticated Cryptographic techniques to ensure complete anonymity and untraceability of transactions. Key to Monero's privacy features are ring signatures, stealth addresses, and Ring Confidential Transactions (RingCT). Ring signatures conceal the identity of the sender by mixing their transaction with others, making it practically impossible to trace the transaction's origin. Stealth addresses add another layer of privacy by creating unique, onetime addresses for each transaction, ensuring that the recipient's identity remains hidden. RingCT further enhances privacy by obscuring the transaction amount.

Monero's Blockchain is designed to be opaque, which prevents transaction details from being publicly accessible, unlike most other Cryptocurrencies where transaction histories and balances of addresses can be viewed transparently. This opacity is central to Monero's philosophy of providing financial privacy and anonymity.

The privacy features of Monero come with trade-offs in terms of scalability and transaction size. The enhanced privacy measures result in larger transaction sizes compared to many other Cryptocurrencies, which can lead to scalability challenges as the network grows. Despite this, Monero has maintained a strong community and user base, largely due to its unwavering commitment to privacy and security.

In summary, Monero stands out in the crowded Cryptocurrency space due to its strong emphasis on privacy and security. Its advanced Cryptographic features make it one of the most private and untraceable digital currencies available, catering to users who prioritise confidentiality and anonymity in their financial transactions.



TOP PROTOCOLS NEAR PROTOCOL (NEAR)

DAPPS PLATFORM

Layer-1

NEAR is a Decentralised application platform launched in 2020. It leverages innovative Nightshade sharding technology to enhance scalability and transaction speed. NEAR is tailored for accessibility, supporting a spectrum of applications from Decentralised finance (DeFi) to non-fungible tokens (NFTs). NEAR's focus on seamless user experience and developer support, coupled with its efficient transaction processing, marks it as a significant player in the Blockchain arena, bridging advanced technology with versatile, real-world applications.

FACTS & FIGURES

Near Foundation, 2019, Zug, Switzerland



TECHNICALS

Consensus Mechanism	Proof-of-Stake (PoS)
Transaction Finality Time	2s
Stated Capacity	100,000TPS
Average Transaction-Fee	USD 0.005
Total number of Transactions since inception on Ma	innet 344M

TOKENOMICS



PROTOCOL CHARACTERISTICS



The NEAR Protocol, established in 2020, distinguishes itself in the Blockchain sector with its Nightshade sharding mechanism, a technological innovation that propels high transaction throughput and scalability. This advancement enables the platform to accommodate complex and high-volume applications, maintaining robust performance as network demands grow.

NEAR's approach to user and developer engagement is a central aspect of its design. The platform enhances user interaction through intuitive features like human-readable account names and lower transaction fees, broadening the appeal of Blockchain technology. For developers, NEAR fosters a conducive environment with support for multiple programming languages and a suite of development tools, encouraging diverse dApp creation.

The protocol's practical applications span various sectors. In Decentralised finance, NEAR's scalability and speed streamline transactions, enhancing operational efficiency. The platform also carves a niche in the NFT market, offering a streamlined and efficient ecosystem for creators and users. Beyond these domains, NEAR's technology aids in supply chain management, offering solutions for transparent and secure product tracking.

NEAR's ecosystem is marked by strategic partnerships and collaborations, extending its influence across different industries and showcasing its technology's versatility in addressing real-world challenges. The platform's blend of advanced sharding technology, user-centric design, and a robust developer support system positions it as a versatile and formidable presence in the Blockchain landscape.

In essence, NEAR Protocol's fusion of technological innovation, emphasis on user experience, and a broad spectrum of applications underscore its role as a key platform in the ongoing evolution of Decentralised solutions.



INACTA.

TOP PROTOCOLS NEO (NEO)

DAPPS PLATFORM

Layer-1

Neo, often referred to as the "Ethereum of China," is a Blockchain platform that enables the development of digital assets and smart contracts. It aims to create a "smart economy" by integrating digital assets, digital identities, and smart contracts into a single system. Neo offers a feature-rich environment for Decentralised app development. Supporting multiple languages like C#, Python, and Java, Neo allows seamless smart contract-based asset management. Its native tokens, NEO and NeoGas (GAS), govern the network and manage resource control, respectively. Neo's strong infrastructure includes Decentralised storage, oracles, and domain name services.

FACTS & FIGURES

Neo Foundation, 2014, Shanghai, China



TECHNICALS

Consensus Mechanism	Proof-of-Stake (PoS)
Transaction Finality Time	15s
Stated Capacity	10,000TPS
Average Transaction-Fee	USD <0.01
Total number of Transactions since inception on Ma	innet 218.3M

GLOBAL PROTOCOL REPORT 2024





PROTOCOL CHARACTERISTICS

Neo, initially introduced in 2014 as Antshares and later rebranded to Neo, is a Blockchain platform that seeks to build a "smart economy." This concept involves the integration of digital assets, digital identities, and smart contracts. It positions itself as a comprehensive Blockchain solution for various applications, particularly appealing to developers looking to leverage Blockchain technology for diverse use cases.

The platform's native consensus mechanism is designed to provide high performance and finality in transactions, which is crucial for applications requiring quick and definitive transaction processing. This makes Neo an attractive option for businesses and developers needing a scalable and efficient Blockchain platform.

Neo supports multiple programming languages, including C#, Java, and Python, which lowers the barrier to entry for developers. This language flexibility is a significant advantage, as it allows a broader range of developers to build on the platform without the need to learn a new programming language.

Another key aspect of Neo is its dual-token model, consisting of NEO and GAS tokens. NEO is used for governance, allowing token holders to vote on network decisions, while GAS is used to pay for transaction fees and smart contract deployments. This model ensures a clear distinction between using the tokens for governance and operational purposes.

In summary, Neo's vision of a smart economy, combined with its unique dBFT consensus mechanism, multiple language support, and dual-token model, positions it as a comprehensive Blockchain platform. Its ability to provide a high-throughput, efficient, and developer-friendly environment makes it suitable for a wide range of Blockchain applications and use cases.



DAPPS PLATFORM

Layer-2, Ethereum, Optimistic RollUp

Optimism, launched in 2021, is a Layer-2 scaling solution for Ethereum, designed to enhance the Blockchain's scalability and transaction speed. It employs Optimistic Rollups, a technology that enables faster and cheaper transactions while leveraging the security of the Ethereum mainnet. Optimism is geared towards improving the Ethereum user experience by reducing gas fees and increasing transaction throughput. Its focus is on enabling a more efficient Ethereum ecosystem, making it a popular choice for users and developers seeking to optimise their interactions with Ethereum-based applications.

FACTS & FIGURES

Optimism Foundation, 2019, Cayman Islands



TECHNICALS

Consensus Mechanism F	Proof-of-Stake (PoS)
Transaction Finality Time	180s
Stated Capacity	2,000TPS
Average Transaction-Fee	USD 0.6-0.9
Total number of Transactions since inception on Mai	nnet 151M

TOKENOMICS



PROTOCOL CHARACTERISTICS

Optimism, introduced in 2021, represents a significant development in Ethereum's Layer-2 scaling solutions, focusing on improving scalability and reducing transaction costs. Its primary technology, Optimistic Rollups, bundles multiple transactions into a single rollup block, which is then processed on the Ethereum mainnet. This method allows for increased transaction throughput and significantly lower gas fees, addressing some of Ethereum's primary scalability challenges.

The platform provides a seamless experience for Ethereum users and developers, as it maintains compatibility with Ethereum's smart contracts and tools. This compatibility means that developers can easily migrate their existing Ethereum applications to Optimism, benefiting from improved performance without significant changes to their code.

Operating as a Layer-2 system, Optimism prioritises simplicity, reducing code complexity and enhancing security. Leveraging Ethereum's codebase, it ensures compatibility and encourages community contributions. With a pragmatic approach, Optimism iteratively develops features based on real-world needs, exemplified by its EVM Equivalence. Sustainability guides its design, fostering a simple codebase for long-term maintenance and community engagement. Optimism excels in simplicity, security, and real-world usability. Its iterative development approach facilitates continuousimprovement.

The network has seen widespread adoption, particularly among DeFi applications, due to its ability to facilitate faster and more cost-effective transactions. This has led to significant growth in the number of applications and users on the Optimism network, further solidifying its position as a leading Layer-2 solution for Ethereum.

In summary, Optimism stands out for its effective implementation of Optimistic Rollups, compatibility with Ethereum, and focus on user and developer experience. Its approach to scaling Ethereum, combined with its commitment to security and community governance, positions it as a key player in the Ethereum ecosystem, offering a scalable, efficient, and accessible platform for Ethereum-based applications.



INACTA.

BLOCKCHAIN INTEROPERABILITY PLATFORM

Layer-1

Polkadot, introduced in 2020, is a distinctive multi-chain Blockchain protocol, designed to promote interoperability and scalability among diverse Blockchain. It features a central Relay Chain and various Parachains, each with specific functionalities. This architecture not only facilitates seamless cross-chain communication but also optimises transaction speed and efficiency. Polkadot aims to create a more interconnected Blockchain environment, addressing the challenges of isolated and applications.

FACTS & FIGURES

Web3 Foundation, 2017, Zug, Switzerland



TECHNICALS

Consensus Mechanism	Nominated Proof-of- Stake (NPoS)
Transaction Finality Time	12-60s
Stated Capacity	1,000TPS
Average Transaction-Fee	USD 0.15
Total number of Transactions since	inception on Mainnet 11M





PROTOCOL CHARACTERISTICS



Polkadot offers a unique approach to Blockchain technology with its multi-chain architecture. This design is centered around a central Relay Chain, which coordinates the network's shared security and interoperability, and various Parachains, each tailored to specific needs and use cases. This setup enables distinct Blockchain to communicate and transfer data and value efficiently, enhancing the overall functionality and reach of the network.

The Relay Chain is the heart of Polkadot's system, responsible for maintaining consensus, interoperability, and overall security. The Parachains, connected to the Relay Chain, benefit from its security while offering diverse functionalities, from financial services to data management. This modular structure allows for significant scalability, as transactions are processed in parallel across multiple chains, effectively handling high transaction volumes.

Polkadot's technology also includes advanced features like cross-chain composability, enabling developers to build applications that leverage capabilities across multiple Blockchain. This fosters a rich ecosystem of interconnected applications, expanding possibilities beyond singlechain limitations. Additionally, Polkadot's emphasis on upgradability allows the network to evolve seamlessly, adapting to new technological advancements and user needs without disruptive hard forks.

In terms of practical applications, Polkadot's interoperability makes it suitable for a variety of use cases. It has been particularly impactful in areas requiring cross-chain interactions, like DeFi, where it facilitates smooth asset transfer and communication between different Blockchain networks. This capability has broader implications for industries such as supply chain management, where secure and efficient data exchange is crucial.

In conclusion, Polkadot's unique multi-chain structure and focus on interoperability and scalability provide a robust foundation for a diverse range of Blockchain applications. Its ability to connect different networks in a secure and efficient manner positions it as a significant contributor to the evolving landscape of Blockchain technology.





DAPPS PLATFORM

Layer-2, Ethereum Sidechain

Polygon is a platform that enhances Ethereum's scalability and usability. It operates as a Layer-2 scaling solution and sidechain network, using a modified proof-of-stake consensus mechanism to facilitate faster and cheaper transactions. Polygon aims to address Ethereum's limitations regarding transaction speed and cost, providing a framework for building interconnected Blockchain networks. Its role as a bridge to Ethereum's platform makes it a key player in the broader Blockchain ecosystem.

FACTS & FIGURES

Polygon Labs, 2017, Camana Bay, Cayman Islands



TECHNICALS

Consensus Mechanism	Proof-of-Stake (PoS)
Transaction Finality Time	300s
Stated Capacity	7,000TPS
Average Transaction-Fee	USD 0.0079
Total number of Transactions since inception on Mai	innet 3Bn

TOKENOMICS



PROTOCOL CHARACTERISTICS



Polygon, formerly known as Matic Network and rebranded in 2021, serves as a multifaceted Ethereum scaling and infrastructure development platform. Its primary objective is to tackle some of Ethereum's most pressing issues: limited scalability, high transaction fees, and slow transaction speeds. By operating as a Layer-2 scaling solution alongside a sidechain network, Polygon enhances the overall efficiency and functionality of Ethereumbased applications.

At the core of Polygon's technology is a modified proof-of-stake (PoS) consensus mechanism. This mechanism allows for a more efficient transaction validation process, leading to faster transaction speeds and significantly reduced costs compared to Ethereum's mainnet. These improvements are crucial for developers and users who require a more scalable and cost-effective Blockchain environment.

Polygon's architecture is designed to support a variety of Blockchain networks, allowing them to interoperate with Ethereum while maintaining their unique features and governance models. This flexibility is key to Polygon's vision of a more accessible and interconnected Blockchain landscape. It enables developers to build versatile Decentralised applications (dApps) that can leverage the security and robustness of Ethereum's Blockchain while avoiding its performance constraints.

The platform has seen wide adoption in various sectors, particularly in Decentralised finance (DeFi), gaming, and non-fungible token (NFT) marketplaces. Its ability to facilitate faster, more affordable transactions makes it an attractive option for dApps requiring high throughput.

In summary, Polygon stands out in the Blockchain space for its role in enhancing Ethereum's scalability and usability. Its innovative approach to Layer-2 scaling and sidechain solutions provides a vital bridge for Ethereum, enabling a more efficient and interconnected Blockchain ecosystem, and paving the way for diverse and practical Blockchain application



INACTA.



BLOCKCHAIN INTEROPERABILITY PLATFORM Layer-1

Quant, introduced in 2018, is a Blockchain operating system designed to connect Blockchain and networks on a global scale, without reducing the efficiency and interoperability of the network. It's known for its Overledger Network, which facilitates the creation of multi-chain applications (MApps). Quant aims to bridge the gap between different Blockchain, fostering a more interconnected and inclusive digital ecosystem. This platform is particularly appealing for enterprises and developers looking to leverage the benefits of multiple Blockchain within a single, seamless application.

FACTS & FIGURES

Quant Network Ltd., 2015, London, UK



TECHNICALS

Consensus Mechanism	Hybrid Consensus Mechanism (PoS and PoA)
Transaction Finality Time	Dependant on used DLT-Network
Stated Capacity	N/A
Average Transaction-Fee	N/A
Total number of Transactions since inception on Mainnet	

GLOBAL PROTOCOL REPORT 2024





PROTOCOL CHARACTERISTICS

Quant, launched in 2018, offers a solution for Blockchain interoperability through its Overledger Network. This platform is recognised for enabling connections between various Blockchain. Overledger, the main technology behind Quant, supports the development of multi-chain applications (MApps) that interact with different Blockchain networks, aiming to overcome the common challenge of interoperability among diverse Blockchain systems.

Overledger functions akin to an operating system for Blockchain, acting as a layer above existing Blockchain to facilitate their interconnection. This structure streamlines the development of applications that require interaction with multiple Blockchain, potentially reducing complexity and the time needed for development. Quant's interoperability efforts extend beyond Blockchain networks, encompassing integration with external networks and traditional financial systems.

The Quant Token (QNT) plays several roles within the Overledger ecosystem, including facilitating network transactions, accessing platform features, and rewarding network contributors. This tokenomics structure supports the operation and security of the Overledger Network.

Quant is positioned as a resource for enterprises and developers creating applications that operate across various Blockchain platforms. Its emphasis on seamless data and asset transfer between different networks contributes to the development of more cohesive and effective Blockchain solutions, a factor often considered vital for the broader adoption of Blockchain technology.



TOP PROTOCOLS RADIX (XRD)

DAPPS PLATFORM

Laver-1

Radix is a Layer-1 Blockchain platform designed specifically for DeFi applications. It aims to address scalability and security challenges in DeFi by implementing its unique consensus mechanism, Cerberus, and a purpose-built DeFi-programming environment. Radix's mission is to overcome technological barriers hindering the growth of DeFi, aiming to fulfill the long-term requirements of the DeFi sector on a global scale.

FACTS & FIGURES

Radix Foundation, 2013, London, UK



TECHNICALS

Cerberg Consensus Mechanism	us BFT Consensus Mechanism
Transaction Finality Time	5s
Stated Capacity	1,400,000TPS
Average Transaction-Fee	USD <0.003
Total number of Transactions since inception on Mainne	et N/A

TOKENOMICS



PROTOCOL CHARACTERISTICS

Radix, initially known as eMunie, was introduced in 2013 and later evolved into a Layer-1 smart contracts development platform, with a particular focus on revolutionising the DeFi industry. The platform seeks to provide an alternative to first-generation DeFi development platforms like Ethereum, offering a specialised environment for secure and scalable development. Its mission is to address the technological limitations that restrict DeFi's growth, aiming to create a protocol that meets the sector's long-term globalneeds.

A key component of Radix's architecture is the Cerberus consensus mechanism, a Byzantine Fault Tolerant (BFT) algorithm known for its sharding capabilities. Cerberus is designed to maintain network security while offering Practical Infinite Linear Scalability and Cross-Shard Atomic Composability. This innovative approach enables Radix to scale dynamically to meet network demand while ensuring transactional integrity. The Radix Engine, similar to Ethereum's Virtual Machine, serves as the application layer for executing smart contracts, simplifying the development process for DeFi applications.

Radix also introduces the Radix Developer Royalties System (DSR), an innovative mechanism allowing developers to earn royalties for building smart contracts within the Radix ecosystem. This system incentivises the creation of high-quality applications and contributes to network growth. Additionally, Radix's native utility token, XRD, plays a vital role in the ecosystem's economy, with a portion of the supply reserved for backing potential stablecoins. Furthermore, its development environment is made accessible through SCrypto, a language tailored for creating secure and efficient dApps

In summary, Radix presents itself as a tailored solution for DeFi, offering scalability, security, and a developer-friendly environment. Its unique consensus mechanism, combined with innovative features like the Radix Engine and DSR, positions it as a significant Layer-1 platform for DeFi development and beyond.

INACTA



RIPPLE (XRP)

PAYMENT PROTOCOL

Laver-1

DIT

SCIENCE FOUNDATION

Ripple, launched in 2012, is a Blockchain-based digital payment protocol known for its focus on facilitating real-time, cross-border financial transactions. It uses a unique consensus mechanism, distinct from traditional proofof-work or proof-of-stake models, enabling quick and cost-effective international payments. Ripple aims to modernize the global financial infrastructure by streamlining payment processes and connecting different financial networks. Its native Cryptocurrency, XRP, plays a key role in facilitating liquidity for transactions within the Ripple network.

FACTS & FIGURES

Ripple Labs Inc., 2012, USA, San Francisco, California



TECHNICALS

Consensus Mechanism	Federated Consensus Mechanism
Transaction Finality Time	3-6s
Stated Capacity	300-500TPS
Average Transaction-Fee	USD <0.01
Total number of Transactions since i	nception on Mainnet 490M





PROTOCOL CHARACTERISTICS



Ripple, established in 2012, stands as a notable Blockchain solution in the financial sector, specifically designed for global payment systems. Its pri-mary focus is on enabling real-time, cross-border transactions, providing an efficient alternative to traditional banking systems and payment net-works like SWIFT. Ripple's unique consensus mechanism, which differs significantly from conventional proof-of-work or proof-of-stake models is optimised for speed and low transaction costs, making it ideal for international money transfers

Ripple connects banks and financial institutions through its RippleNet payment platform, which provides a seamless, real-time cross-border payment solution. Using RippleNet, these institutions can transact direct-ly and instantly across national borders without the need for traditional intermediaries, thereby reducing transaction times and costs. XRP, the native Cryptocurrency of Ripple, is used within the RippleNet as a bridge currency for facilitating transactions between different fiat currencies. This minimises liquidity costs and allows for near-instantaneous money transfer, which is a significant advantage over traditional banking systems that can take days to process international transactions.

Ripple's vision extends beyond just facilitating payments; it aims to transform the way money is moved around the world, making financial trans-actions more inclusive, transparent, and accessible. Its network connects various financial entities, including banks and payment providers, allowing for seamless interoperability between different financial systems and currencies

Despite its promising application in revolutionising financial transactions, Ripple has faced regulatory scrutiny, particularly concerning the classifi-cation and handling of XRP as a digital asset. These challenges highlight the complexities of integrating Blockchain technology within the existing financial regulatory framework.

In summary, Ripple presents a specialised Blockchain solution focused on improving global payment systems. Its unique consensus mechanism and the strategic use of XRP position it as a significant player in the ef-fort to modernize and streamline international financial transactions. The platform's ongoing development and navigation through regulatory land-scapes will play a critical role in its future impact and adoption in the financial sector.





SMART CONTRACT AND DAPPS PLATFORM Laver-1

Solana is recognised for its high-speed transaction processing and scalability in the Blockchain domain. It employs a unique hybrid consensus mechanism combining Proof of History (PoH) with Proof of Stake (PoS), facilitating rapid and efficient transaction throughput. This capability positions Solana as a robust platform for Decentralised applications (dApps) and various Blockchain projects, appealing particularly to sectors requiring fast and high-volume transaction processing, such as Decentralised finance (DeFi) and digital marketplaces.

FACTS & FIGURES

Solana Foundation, 2020, Zug, Switzerland Solana Labs, 2017, California, San Francisco, USA



TECHNICALS

Consensus Mechanism	Proof-of-History (PoH) combine with Proof-of-Stake (Po	PoH) combined f-of-Stake (PoS)	
Transaction Finality Time	21-465	;	
Stated Capacity	50,000TPS	;	
Average Transaction-Fee	USD 0.000125	;	
Total number of Transactions since	e inception on Mainnet 207.3Br	1	

TOKENOMICS



PROTOCOL CHARACTERISTICS



Solana, introduced in 2020, has quickly become a noteworthy Blockchain platform, primarily due to its exceptional transaction speed and scalability. The core of Solana's efficiency lies in its innovative consensus mechanism, which blends Proof of History (POH) with Proof of Stake (PoS). Proof of History is a unique innovation that creates a historical record that proves that an event has occurred at a specific moment in time. This is combined with the energy-efficient PoS model to secure the network, resulting in high throughput and reduced transaction times.

This high-throughput capability is a defining feature of Solana, making it an attractive option for a wide array of applications, particularly those requiring rapid transaction processing. Its architecture is specially designed to address common scalability issues faced by other Blockchain, enabling it to handle thousands of transactions per second with lower transaction costs. This makes Solana a competitive choice for developers and businesses looking to build Decentralised applications, especially in areas like Decentralised finance (DeFi), non-fungible tokens (NFTs), and Cryptocurrency exchanges.

The Solana ecosystem has experienced significant growth, attracting a diverse range of projects and developers. Its ability to facilitate fast and cost-effective transactions, along with robust support for smart contracts, has spurred innovation and development of various dApps within its network.

However, Solana's rapid growth has also brought challenges, including network congestion and performance issues, as it scales to accommodate its expanding user base. These issues are part of Solana's ongoing evolution and optimisation efforts as it continues to develop its infrastructure.

In summary, Solana stands out in the Blockchain landscape for its highspeed and scalable infrastructure. Its unique consensus mechanism and growing ecosystem position it as a strong platform for a variety of Blockchain applications. As it continues to evolve, Solana's focus on addressing scalability and performance challenges will be crucial in maintaining its role as a significant player in the Blockchain space.



INACTA.



DAPPS PLATFORM FOR BITCOIN

Layer-2, Bitcoin, Proof of Transfer Technology (Mining and Stacking)

Stacks, an open-source Layer-2 Blockchain, launched its Mainnet in 2021, evolving from its initial groundwork as Blockstack in 2013. It integrates smart contracts and Decentralised applications (dApps) into the Bitcoin ecosystem, leveraging Bitcoin's robust security and network effects. Using the Proof-of-Transfer (PoX) consensus mechanism, Stacks connects to Bitcoin, creating Bitcoin-native DeFi, DAOs, and NFTs. Its main USP is bringing programmability to Bitcoin, enhancing its utility beyond a mere store of value.

FACTS & FIGURES

Stacks Open Internet Foundation, 2020, Delaware, USA



TECHNICALS

Consensus Mechanism	Proof-of-Transfer (PoX)(SCP)
Transaction Finality Time	2400s
Stated Capacity	7TPS
Average Transaction-Fee	USD <0.1
Total number of Transactions since incer	otion on Mainnet >14M

GLOBAL PROTOCOL REPORT 2024





PROTOCOL CHARACTERISTICS

Stacks represents a significant innovation in Blockchain technology by introducing smart contracts and Decentralised applications to Bitcoin. This Layer-2 solution, operational since October 2018, leverages Bitcoin's inherent security and network effects to expand its capabilities.

Operating as a Layer-2 Blockchain, Stacks utilises a unique Proof-of-Transfer (PoX) consensus mechanism to anchor itself to Bitcoin. This enables Stacks to leverage Bitcoin's stability while introducing smart contracts through Clarity, a language designed for predictability and security. Notable applications include Decentralised finance (DeFi) platforms, non-fungible tokens (NFTs), and Decentralised autonomous organisations (DAOs) that directly interact with Bitcoin.

Stacks enhances Bitcoin's utility without compromising its security, a critical achievement in Blockchain technology. The Clarity language further strengthens this by providing secure and predictable smart contracts. However, unlike independent Blockchain, Stacks' dependence on Bitcoin's network could limit its scalability and adaptability to rapid changes. Moreover, while promising, its adoption and ecosystem growth are still in nascent stages compared to more established platforms.

Stacks marks a pivotal advancement in Blockchain by integrating smart contracts into the Bitcoin ecosystem, enhancing Bitcoin's functionality. It bridges the gap between Bitcoin's secure foundation and the dynamic world of Decentralised applications.

129





SMART CONTRACT PLATFORM

Layer-1

Stellar, launched in 2014, is a Blockchain network focused on facilitating cross-border transactions and digital asset exchanges. Its main goal is to connect financial institutions and provide affordable financial services worldwide. Stellar operates on a unique consensus protocol, the Stellar Consensus Protocol (SCP), which ensures fast, secure, and low-cost transactions. By prioritising ease of use and broad financial inclusion, Stellar aims to revolutionise the traditional banking system, making financial transactions more accessible and efficient for users globally.

FACTS & FIGURES

Stellar Development Foundation, 2014, San Francisco, California, USA



TECHNICALS

Consensus Mechanism	Stellar Consensus Protocol (SCP)
Transaction Finality Time	3-5s
Stated Capacity	3,000TPS
Average Transaction-Fee	USD <0.00001
Total number of Transactions since	nception on Mainnet 6.6M

TOKENOMICS



PROTOCOL CHARACTERISTICS



Stellar established in 2014 is a Blockchain platform with a distinct focus on enhancing global financial access and connectivity. It employs the Stellar Consensus Protocol (SCP), a unique mechanism that provides a balance of speed, security, and decentralisation. This protocol enables the network to process transactions rapidly and with minimal fees, a critical feature for its primary application in cross-border payments and remittances.

Stellar's main objective is to bridge the gap between traditional financial institutions and the digital economy. It offers tools for seamless asset issuance, transfer, and exchange, aiming to democratise access to financial services. This approach is particularly beneficial for underbanked and unbanked populations, offering them a more inclusive financial ecosystem.

The network supports the creation and trading of various digital assets. including its native Cryptocurrency, Lumens (XLM). These assets can represent fiat currencies, commodities, or other types of value, facilitating fluid exchange and movement of funds across borders. This flexibility makes Stellar an attractive platform for businesses and individuals seeking efficient and cost-effective financial solutions.

In practice. Stellar has been implemented in diverse real-world applications. It has been used for micro-payment services, mobile banking, and international remittances, demonstrating its utility in making financial transactions more accessible and affordable. Furthermore, its partnerships with financial institutions and payment networks underscore its potential to integrate with and enhance existing financial infrastructures.

In summary. Stellar stands out in the Blockchain space for its dedication to financial inclusivity and global connectivity. Its unique consensus protocol and focus on cross-border transactions position it as a key player in revolutionising financial services, aiming to make them more accessible and efficient for a global audience.



INACTA.

TOP PROTOCOLS \bigcirc SUI (SUI)

SMART CONTRACT PLATFORM Laver-1

Launched in 2023, Sui is a Layer-1 Blockchain that aims to bring fluidity and flexibility to the Web3 ecosystem, drawing inspiration from the Japanese word for water. Designed by Mysten Labs, it focuses on streamlining development across various use cases, from gaming to DeFi. Sui utilises the adapted Move language called Sui Move and features parallel transaction execution, gasless transactions, and a unique consensus mechanism

FACTS & FIGURES

SUI Foundation, 2022, Cayman Islands Mysten Labs, 2021, Pao Alto, California



TECHNICALS

Consensus Mechanism	Delegated Proof-of- Stake (DPoS)
Transaction Finality Time	0.48s
Stated Capacity	297,000TPS
Average Transaction-Fee	USD 0.0010
Total number of Transactions since	inception on Mainnet 965.9M





PROTOCOL CHARACTERISTICS



Sui, a recently introduced Blockchain protocol, presents a novel approach to Decentralised application development and execution. Central to its design is the Sui Move Language, an object-oriented programming language tailored for Blockchain use, allowing developers to articulate complex data relationships and business logic seamlessly, while helping to minimise vulnerabilities and offering an environment conducive to building secure applications.

Distinguishing itself from traditional models. Sui supports parallel transaction execution, facilitating enhanced throughput and potentially addressing scalability issues faced by many contemporary chains. The protoco further also allows dApps the option to front gas fees, These sponsored transactions enable apps to make onboarding much easier, as users don't have to purchase any Crypto to start making transactions. Anoth-er strength of Sui is its gas pricing mechanism, which eliminates the demand-driven fluctuations in transaction costs that thwart development.

Additionally, Sui prioritises developer experience with its unique data model. In this model, on-chain data structures can be directly referenced, simplifying the development process. This ease of reference eliminates the need for complex address-based lookups common in other platforms and simplifies development processes, enhancing application usability.

As a recent entrant in 2023, Sui is still in its early stages of adoption. However, its distinct features like the Sui Move Language have intrigued developers, leading to the inception of applications in the gaming sphere such as Abyss World and Run Legends, exploiting Sui's efficiency in handling in-game assets. On the DeFi frontier, platforms like Turbos Finance and OmniBTC have gravitated towards its robust framework. Beyond these, platforms like Polymedia Chat and Suia are forging the path for Decentralised social engagement atop Sui.

Sui's reliability and maintainability remains to be thoroughly tested given its recency. However, its foundational principles suggest a design opti-mised for consistent and smooth performance.

While facing hurdles such as developer adoption rates and transactional velocity, the unique attributes and growing real-world use cases of Sui highlight its potential in the ever-evolving Web3 landscape.



TOP PROTOCOLS TEZOS (XTZ)

DAPPS PLATFORM

Layer-1

Tezos is a Blockchain network known for its on-chain governance and self-amendment capabilities. This approach allows the network to evolve continuously through community consensus, enabling protocol upgrades without hard forks. Tezos is designed to foster a collaborative and democratic environment, allowing stakeholders to directly influence its development. Tezos aims to provide a robust platform for smart contracts and Decentralised applications (dApps), making it a dynamic and sustainable choice in the Blockchain landscape for various developers and stakeholders.

FACTS & FIGURES

Tezos Foundation, 2016, Zug, Switzerland



TECHNICALS

Consensus Mechanism	Proof-of-Stake (PoS)
Transaction Finality Time	60s
Stated Capacity	N/A
Average Transaction-Fee	USD 0.01
Total number of Transactions since inception on Ma	innet 185.2M

TOKENOMICS



PROTOCOL CHARACTERISTICS



Tezos is a Decentralised, open-source Blockchain network that supports smart contracts and offers a platform for building Decentralised applications (dApps). Launched in 2018 after one of the most successful initial coin offerings (ICO) at the time. Recognized in the Blockchain sector for its on-chain governance model and the ability to self-amend, the platform features a consensus mechanism that complements its governance structure, facilitating community involvement in decision-making. This setup enables Tezos to implement continuous upgrades and adapt to changes without the disruptions of hard forks, which are common in other Block-

A key aspect of Tezos is its self-amendment capability, integral to its design, allowing the protocol to evolve in alignment with community input and technological developments. This feature keeps Tezos aligned with the evolving landscape of Blockchain technology, ensuring its ongoing relevance and operational efficiency.

The governance model of Tezos underscores stakeholder participation, with token holders actively engaging in proposing, voting on, and implementing protocol changes. This inclusive process promotes a Decentralised and collaborative environment, reflecting the diverse perspectives and interests of its user base.

Tezos is designed to support the development of smart contracts and Decentralised applications (dApps), providing a secure and adaptable platform suitable for various uses by incorporating formal verification and testing practices to safeguard smart contracts and the network. It has been adopted for multiple applications across different sectors, such as finance, gaming, and digital art, particularly in projects that require a Blockchain foundation that is both stable and capable of adaptation.

In summary, Tezos stands as a Blockchain network characterised by its governance and self-amendment features. Its approach to community-driven protocol evolution, combined with a supportive environment for smart contracts and dApps, renders it a distinctive and adaptable choice in the Blockchain ecosystem, suitable for diverse and long-term applications.

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SCIENCE FOUNDATION



INDEXING PROTOCOL

Layer-2, Arbitrum, State Channel

The Graph, established in 2020, is a Decentralised protocol for indexing and querying Blockchain data, primarily from Ethereum. It simplifies Blockchain data access through open APIs, known as subgraphs. The Graph aims to enhance the efficiency of Decentralised applications (dApps) by providing developers with easy access to Blockchain data. Its contribution to the Blockchain ecosystem lies in facilitating data retrieval, crucial for the development and smooth operation of a wide range of dApps.

FACTS & FIGURES

Edge & Node, 2021, San Francisco, California, USA The Graph Foundation, 2020, San Francisco, California, USA



TECHNICALS

Consensus Mechanism	Proof of Stake (PoS)
Transaction Finality Time	N/A
Stated Capacity	N/A
Average Transaction-Fee	No Transaction Fees
Total number of Transactions since inception on Mainnet	

GLOBAL PROTOCOL REPORT 2024





PROTOCOL CHARACTERISTICS

The Graph, launched in 2020, revolutionises how developers interact with Blockchain data. It provides a Decentralised protocol for indexing and querying data, mainly from the Ethereum Blockchain, through subgraphs. These subgraphs are open APIs that organise and extract Blockchain data efficiently, making it easily accessible for developers. This functionality is particularly important for building sophisticated Decentralised applications (dApps) that require seamless access to Blockchain data.

The Graph employs a Decentralised network of Indexers, Curators, and Delegators to organise and serve the data. This model not only ensures open access to data but also promotes security and reliability in data retrieval. By democratising access to Blockchain data, The Graph aligns with the principles of transparency and decentralisation fundamental to Blockchain technology.

The protocol has become essential in the Blockchain development community, particularly for Ethereum-based projects. Its utility is evident in various applications, including DeFi platforms and NFT marketplaces, where accurate and quick data access is crucial. The Graph simplifies the development process, enabling creators to focus on building more efficient and user-friendly dApps.

The Graph's role extends beyond just data indexing; it's instrumental in advancing the broader Blockchain infrastructure. Its contribution to the ecosystem is significant, providing a necessary tool for developers and enhancing the capabilities of dApps. The continued growth and adoption of The Graph are indicative of its value and potential in the Blockchain space.

In conclusion, The Graph's innovative approach to data indexing and querying positions it as a crucial component in the Blockchain ecosystem. Its ability to provide efficient access to Blockchain data fosters the development and operation of diverse and effective dApps.



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TOP PROTOCOLS THETA NETWORK (THETA)

MEDIA AND ENTERTAINMENT PLATFORM Laver-3

Theta Network, launched in 2019, is a Blockchain-powered network specifically designed for video streaming. It utilises a Decentralised peer-to-peer network to improve video delivery quality and reduce streaming costs. Theta's innovative approach leverages users' spare bandwidth and computing resources, rewarding them with its native token, THETA. The network aims to revolutionise the streaming industry by offering a more efficient, cost-effective, and high-quality streaming experience, making it a pioneering platform in the intersection of Blockchain and digital media.

FACTS & FIGURES

Theta Labs, 2017, San Jose, California, USA



TECHNICALS

Consensus Mechanism	Proof-of-Stake (PoS)
Transaction Finality Time	1-2s
Stated Capacity	1,000TPS
Average Transaction-Fee	Near Zero
Total number of Transactions since inception on Ma	ainnet N/A

TOKENOMICS



PROTOCOL CHARACTERISTICS

Theta Network, established in 2019, stands out in the Blockchain world as a dedicated platform for optimising video streaming services. It harnesses Blockchain technology to create a Decentralised peer-to-peer network that enhances the quality and efficiency of video delivery. This approach addresses some of the fundamental challenges in the streaming industry, such as high content delivery costs and uneven quality, especially in regions with less developed infrastructure.

At the heart of Theta Network's innovation is its use of viewers' excess bandwidth and computing resources. By participating in the network, users contribute to the streaming infrastructure and, in return, are rewarded with THETA tokens. This incentive mechanism encourages community participation and resource sharing, leading to a more robust and efficient streaming network.

Theta's Blockchain is also designed to support a Decentralised governance model, involving various stakeholders in the decision-making process. This model fosters a more democratic and transparent approach to managing the network, aligning with the core principles of Blockchain technology.

The platform has seen significant adoption in the digital media space, with partnerships and collaborations across various streaming and content platforms. Its ability to reduce costs and improve streaming quality makes it an attractive solution for content creators, advertisers, and viewers alike.

In summary, Theta Network's unique application of Blockchain technology to the video streaming sector positions it as an innovative and impactful platform. Its Decentralised approach not only improves streaming quality and efficiency but also promotes a more participatory and reward-based streaming ecosystem. Theta Network's ongoing development and growing adoption highlight its potential to significantly transform the video streaming industry.



INACTA.

PAYMENT AND ECOSYSTEM PROTOCOL

Layer-1

TON (The Open Network), initially developed by Telegram and launched as an independent project in 2018, is a Layer-1 Blockchain known for its scalability and adaptability. TON comprises a versatile, multi-Blockchain platform with high transaction throughput, smart contracts, and a robust peer-to-peer network. TON facilitates micropayments, distributed file storage, service hosting, and DNS services. Its distinctive features include instant routing and anonymous network layers, enabling extensive functionalities beyond typical Blockchain frameworks.

FACTS & FIGURES

TON Foundation, 2023, Zug, Switzerland Telegram, 2013, Dubai, UAE



TECHNICALS

Consensus Mechanism	Proof of Stake (PoS)
Transaction Finality Time	<6s
Stated Capacity	55,000TPS
Average Transaction-Fee	USD <0.01
Total number of Transactions since inception on Ma	innet N/A

17





PROTOCOL CHARACTERISTICS

TON, originally introduced by Telegram in 2018 as Telegram Open Network, has evolved into an advanced Layer-1 Blockchain, known as The Open Network, with its native Cryptocurrency, Toncoin. TON is built on the Proof-of-Stake (PoS) model, offering high scalability and robust security, suitable for billions of global users. Its sophisticated Blockchain capabilities, such as Turing-complete smart contract transactions, allow it to handle complex transactions on both its primary Blockchain and associated work chains.

The TON ecosystem, managed by the TON Foundation, has rapidly expanded, encompassing various features and services. It includes TON VPN, Tonstarter, The Open Disk, Tonox Minter, and TON Box, covering areas from VPN services and launchpads to file selling platforms and NFT minting. The ecosystem also hosts gaming projects and social networking spaces, demonstrating its versatility.

Toncoin, TON's native token, is integral to the ecosystem, facilitating transactions and services within the network. Users can easily purchase or transfer Toncoin via the Telegram app, with no transaction fees required for transfers using the app. Toncoin is used for Decentralised data storage payments, TON Proxy and DNS, payments within dApps, validator rewards, and voting in TON's on-chain governance program.

Since its inception, TON has overcome legal and developmental challenges, transitioning from Telegram's oversight to a community-driven project. This adaptability and community support have led to a significant increase in active TON wallets.. TON's high transaction capacity, quick block validation, and sharding support give it a competitive edge over many other Layer 1 projects.



TOP PROTOCOLS TRON (TRX)

DAPPS PLATFORM

Layer-1

Tron is a Blockchain platform known for its high throughput and scalability, supporting a broad range of Decentralised applications (dApps) and smart contracts. Originally focused on digital entertainment, Tron has evolved to encompass a wider array of Blockchain functionalities. It aims to facilitate a Decentralised internet by offering a platform for efficient digital content distribution and various other applications, striving to streamline the transaction process and enhance accessibility for users and developers in the Blockchain ecosystem.

FACTS & FIGURES

TRON Foundation, 2017, Singapore



TECHNICALS

Consensus Mechanism	Delegated Proof of Stake (DPoS)
Transaction Finality Time	35
Stated Capacity	2,000 TPS
Average Transaction-Fee	USD 0.000005
Total number of Transactions since in	ception on Mainnet 6Bn

TOKENOMICS



PROTOCOL CHARACTERISTICS



Tron, founded by Justin Sun and live since 2018, is a Decentralised Blockchain platform that has expanded its scope beyond its initial focus on the global entertainment and digital content sectors. Originally envisioned as a system for cost-effective digital content sharing, Tron has grown to support a wide range of Decentralised applications (dApps) across various domains.

Operating on a delegated proof-of-stake (DPoS) consensus mechanism, Tron's network is maintained by 27 Super Representatives (SRs), who are elected by TRX token holders. This consensus model is designed to provide a balance between democratic user participation and efficient processing of transactions, contributing to the network's scalability and performance. The native Cryptocurrency of the platform, TRX, is utilised for executing transactions, interacting with applications, and participating in network governance through staking and voting for Super Representatives.

Tron's architecture, characterised by its ability to handle a high volume of transactions, is a key element in its capability to support a wide array of applications. This feature is essential for applications that demand quick transaction processing and scalability, such as interactive entertainment and financial services on the Blockchain.

Tron features its own stablecoin, USDD (United States Dollar Digital), pegged to the US dollar, enhancing its Decentralised finance (DeFi) offerings. This integration bolsters financial stability and transaction efficiency on the Tron network. USDD, maintained through algorithmic mechanisms, underscores Tron's commitment to providing diverse financial services within its Blockchain ecosystem.

The platform's ecosystem encompasses a range of applications, including those in Decentralised finance (DeFi), gaming, and social media. Tron's compatibility with Ethereum's programming language, Solidity, facilitates the migration of Ethereum-based dApps to Tron, enhancing its appeal to developers seeking an alternative Blockchain network.

In summary, Tron has transitioned from a niche focus on digital entertainment to a more comprehensive Blockchain platform. Its capabilities in supporting a wide range of Decentralised applications and smart contracts, combined with its efficient transaction processing, position it as a significant player in the broader Blockchain ecosystem, with potential applications across multiple sectors.



INACTA.



SUPPLY-CHAIN PLATFORM

Laver-1

VeChain, launched as a private consortium chain in 2015 and transitioning to a public Blockchain in 2018, is distinguished by its focus on supply chain management and the Internet of Things (IoT). It uses distributed governance and advanced IoT technologies to create an ecosystem that addresses data challenges across various industries. VeChain is particularly noted for enhancing transparency, traceability, and efficiency in supply chains, offering an immutable ledger for tracking product lifecycles from production to delivery.

FACTS & FIGURES

VeChain Foundation, 2017, San Marino VeChain, 2015, Shanghai, China



TECHNICALS

Consensus Mechanism	Proof of Authority (PoA)
Transaction Finality Time	N/A
Stated Capacity	10,000TPS
Average Transaction-Fee	N/A
Total number of Transactions since inception of	on Mainnet 48.2M

GLOBAL PROTOCOL REPORT 2024





PROTOCOL CHARACTERISTICS

VeChain, which started as a private consortium chain in 2015 and became a public Blockchain in 2018, is tailored to revolutionise supply chain management and IoT applications. Initially collaborating with enterprises in the supply chain and food industries, VeChain leverages Blockchain technology to enhance transparency and traceability across various sectors, including medical, energy, and sustainability.

The platform operates on a dual-token system comprising VET and VTHO. VET is used for value transfer across the network, while VTHO is used as a transaction fuel for smart contracts, enhancing the platform's sustainability and creating a smart contract layer. This dual-token model facilitates efficient information flow and resource management within organisations.

VeChain's primary focus on supply chain management sets it apart in the Blockchain space. It provides a transparent and immutable ledger for tracking the production, shipment, and delivery of products. This focus enhances trust and accountability between consumers and businesses. Additionally, VeChain offers Toolchain, a suite of developer tools for creating dApps and smart contracts tailored to various industries. These tools aid developers in building industry-specific Blockchain solutions. Furthermore, VeChain has formed strategic partnerships with industry leaders in logistics, automotive, and healthcare, expanding its global presence and impact. These collaborations demonstrate VeChain's commitment to real-world Blockchain applications.

In summary, VeChain is a significant player in the Blockchain world, contributing to the advancement and adoption of Blockchain technology with a strong focus on real-world applications, particularly in supply chain management. Its dual-token system, supply chain focus, and strategic partnerships position it as a key innovator in Blockchain-based solutions for various industries.



TOP PROTOCOLS **XDC NETWORK (XDC)**

TRADE FINANCE AND **TOKENISATION PLATFORM** Laver-1

The XDC Network, an enterprise-grade Blockchain, offers an open-source, EVM-compatible Layer 1 protocol. It focuses on the tokenisation of trade finance instruments and assets, aiming to enhance efficiency in the trade finance sector. This network is recognised for its notable features, including high transaction speed, scalability, and low fees, while ensuring robust security. XDC Network's compatibility with Ethereum's toolset makes it accessible for developers to transition their skills and applications onto its platform.

FACTS & FIGURES

XDC Foundation, 2021, Grand Cayman, Cayman Islands



TECHNICALS

Consensus Mechanism	XinFin Delegated Proof	of Stake (XDPoS)
Transaction Finality Time		2s
Stated Capacity		2,000+ TPS
Average Transaction-Fee		USD 0.00001
Total number of Transactior	s since inception on Mainnet	446M

TOKENOMICS



PROTOCOL CHARACTERISTICS

XDC Network, an enterprise-grade, open-source Blockchain protocol, is designed with a specific focus on the trade finance industry. Its compatibility with the Ethereum Virtual Machine (EVM) facilitates the tokenisation of various trade finance instruments and assets, enhancing efficiency and transparency in financial transactions. This Layer 1 Blockchain stands out for its ability to enforce smart contracts and support the digitization of trade finance.

The network's architecture ensures high transaction speed, scalability, and low fees, alongside maintaining security. These features make XDC Network suitable for businesses seeking to improve record-keeping, data exchange, and asset transfer processes. The emphasis on security and efficiency positions the network as a viable option for enterprises looking to leverage Blockchain technology for operational improvements.

XDC Network's EVM compatibility is a significant advantage, as it allows developers familiar with Ethereum's environment to easily adapt and build on this platform. This adaptability extends the network's utility to a wider range of Decentralised applications and use cases beyond trade finance.

In summary, XDC Network offers a unique blend of features geared towards modernizing the trade finance sector. Its focus on tokenising trade finance instruments, coupled with EVM compatibility and enterprise-grade capabilities, establishes it as a noteworthy Blockchain platform. The network's potential to streamline financial transactions and improve business processes in the global market underscores its relevance and utility in the evolving landscape of Blockchain technology.

INACTA



PAYMENT PROTOCOL

Laver-1

DLT

SCIENCE FOUNDATION

Zcash, launched in 2016, is a privacy-focused Cryptocurrency that offers users the option of "shielded" transactions. These transactions are encrypted using advanced Cryptographic techniques, specifically zk-SNARKs (Zero-Knowledge Succinct Non-Interactive Arguments of Knowledge), to en-sure transaction data remains confidential while still being verifiable by the network. Zcash aims to balance privacy with transparency, allowing users to choose between transparent and private transactions. This feature positions Zcash as a unique digital currency in the Blockchain space, emphasising user privacy and financial confidentiality.

FACTS & FIGURES

Electric Coin Company, 2016, Colorado, USA Zcash Foundation, 2017, Delaware, USA



TECHNICALS

Consensus Mechanism	Proof of Work (PoW)
Transaction Finality Time	1800s
Stated Capacity	26TPS
Average Transaction-Fee	USD <0.01
Total number of Transactions since inception on Ma	innet 13.3M





PROTOCOL CHARACTERISTICS

Zcash, introduced in 2016, represents a significant development in the realm of Cryptocurrencies, focusing on enhancing user privacy while maintaining the integrity of a Decentralised network. It employs a sophisticated Cryptographic technique known as zk-SNARKs to offer "shielded" transactions, where transaction details, such as sender, receiver, and amount, are encrypted yet remain verifiable by the Blockchain network.

The primary innovation of Zcash lies in its ability to provide enhanced privacy features without compromising the public Blockchain's transparency and security. Users have the option to conduct shielded transactions, which keep their financial information private, or transparent transactions, similar to those in Bitcoin, where transaction details are publicly visible on the Blockchain. This flexibility allows users to choose the level of privacy they require, catering to various needs and preferences.

Zcash operates on a proof-of-work (PoW) consensus mechanism, similar to Bitcoin, ensuring the network's security and decentralisation. Its unique privacy feature, however, sets it apart from other Cryptocurrencies, making it an attractive option for users seeking confidential and secure financial transactions.

In terms of real-world application. Zcash has been recognised for its potential in areas where financial privacy is paramount, such as in business transactions that require confidentiality or for individuals concerned about privacy in their financial dealings.

In summary, Zcash offers a unique solution within the Cryptocurrency landscape, addressing the growing demand for privacy in digital transactions. Its combination of advanced Cryptographic techniques and the option for shielded transactions positions it as a distinctive digital currency. As discussions around financial privacy and data security continue to evolve, Zcash's role in the Blockchain and Cryptocurrency space remains increasingly relevant.





ADDITIONAL PROTOCOLS

Additional Protocols are Layer-1 and Layer-2 DLT platforms, which were not in the top 100 according to CoinMarketCap and CoinGecko with their market capitalisation on 30.06.2023, but which bring innovation to the field of DLT platforms through their specific technology and use cases and therefore, in the opinion of Inacta Ventures Research, can bring new insights into the world of DLT for the readership. These 22 Protocols are in alphabetical order.

> Aeternity Aleph Zero Base Concordium E Credits Everscale Gnosis Chain Harmony Haven1 Lisk Loopring Neptune



Neptune Partisia Blockchain Powerledger PWR Chain Qtum RBTC SEI Coin Skale Network Storj Venom Ziliqa



SMART CONTRACT PLATFORM

Aeternity, launched in 2018, is a Blockchain platform designed to improve scalability, privacy, and efficiency in smart contracts and Decentralised applications (dApps). It employs a unique hybrid consensus mechanism combining Proof of Work (PoW) and Proof of Stake (PoS). Aeternity introduces state channels for off-chain contract execution, reducing on-chain congestion. Its focus on scalable smart contracts, integrated oracles for real-world data, and user-friendly interfaces positions Aeternity as a versatile and efficient platform in the Blockchain ecosystem.

FACTS & FIGURES

Aeternity Foundation, 2016, Liechtenstein, Vaduz



TECHNICALS

Consensus Mechanism	Hybrid Consensus Mechanism (PoS and PoW)
Transaction Finality Time	1080s
Stated Capacity	100TPS
Average Transaction-Fee	N/A
Total number of Transactions since in	ception on Mainnet >57M

TOKENOMICS



PROTOCOL CHARACTERISTICS

Aeternity, introduced in 2018, aims to address some of the fundamental challenges faced by traditional Blockchain systems, such as scalability, privacy, and efficient smart contract execution. It does so through a unique hybrid consensus mechanism that blends Proof of Work (PoW) with Proof of Stake (PoS), aiming to combine the security benefits of PoW with the efficiency and scalability of PoS.

A core feature of Aeternity is its implementation of state channels. These channels allow smart contracts to be executed off-chain, significantly reducing the burden on the main Blockchain. This approach not only speeds up transaction processing but also enhances privacy, as the details of these transactions are not recorded on the public Blockchain.

Another distinctive aspect of Aeternity is its built-in oracle system, which provides smart contracts with accurate and reliable real-world data. This feature is crucial for many applications, especially those requiring up-todate information from external sources. The integration of oracles directly into the platform simplifies the process for developers and increases the potential use cases for dApps built on Aeternity.

The platform also emphasises user-friendly interfaces, making it accessible for both developers and users. This focus on usability is evident in the development tools and resources provided, aimed at fostering a more inclusive and vibrant developer community.

In summary, Aeternity presents itself as an innovative Blockchain solution, offering enhanced scalability, efficient smart contract execution, and reliable real-world data integration. Its unique combination of features, including state channels and integrated oracles, positions it as a versatile and user-friendly platform for a wide range of Blockchain applications. DLT SCIENCE FOUNDATION

INACTA



SMART CONTRACT PLATFORM

Layer-1

Aleph Zero, launched in 2021, is a public Blockchain platform that stands out for its unique combination of a Directed Acyclic Graph (DAG)-based structure with AlephBFT consensus algorithm. This innovative approach enables high scalability, rapid transaction finality, and enhanced security. Aleph Zero is geared towards ensuring privacy through advanced Cryptographic techniques, including potential zero-knowledge proofs, while maintaining high transaction throughput and low cost. Aleph Zero aims to address Blockchain Trilemma concerns, providing businesses with efficient, Decentralised communication.

FACTS & FIGURES

Aleph Zero Foundation, 2018, Zug, Switzerland



TECHNICALS

Consensus Mechanism	Proof-of- Stake (PoS) with a DAG Architecture
Transaction Finality Time	0.9s
Stated Capacity	89,600TPS
Average Transaction-Fee	USD 0.0003
Total number of Transactions since incept	tion on Mainnet 1.1M





PROTOCOL CHARACTERISTICS

Aleph Zero, introduced in 2021, represents a novel approach in the Blockchain landscape by integrating elements of a Directed Acyclic Graph (DAG) with its peer-reviewed AlephBFT consensus algorithm. This hybrid structure allows Aleph Zero to capitalise on the scalability and speed advantages of DAG, while AlephBFT provides robust security and Byzantine Fault Tolerance. This combination results in a platform capable of processing transactions with high speed and finality, making it suitable for applications requiring rapid and secure transactions and addressing shortcomings in current distributed ledger technology. The "hub and spoke" model it employs further allows businesses to maintain private instances, ensuring efficient, trustless interactions with the Decentralised ledger.

A distinctive feature of Aleph Zero is its focus on privacy enhancements, potentially incorporating zero-knowledge proof technology. This Cryptographic method enables transaction verification without revealing sensitive information, ensuring user privacy while maintaining the integrity of the Blockchain. This aspect of Aleph Zero is particularly appealing for industries like finance and healthcare, where confidentiality is paramount.

The platform is noted for its high transaction per second (TPS) capacity and low transaction costs. These features are crucial for a wide range of applications, from Decentralised finance (DeFi) to supply chain management, where efficiency and cost-effectiveness are key. The high TPS ensures that the network can handle large volumes of transactions seamlessly, a significant advantage in the rapidly growing Blockchain ecosystem.

In practice, Aleph Zero's combination of speed, security, and privacy has potential applications in various fields. For instance, in the financial sector, it can facilitate secure and efficient payment processing and settlement. In supply chain management, its privacy features can be used to securely track goods while protecting sensitive data.

In summary, Aleph Zero's innovative use of a DAG-based structure with AlephBFT, coupled with privacy enhancements and high transaction throughput, positions it as a versatile and cutting-edge Blockchain platform. Its emphasis on speed, low cost, and privacy features make it an attractive choice for developers and businesses looking to leverage Blockchain technology for efficient and secure digital solutions while navigating the complexities of the Blockchain Trilemma.


ADDITIONAL PROTOCOLS

BASE

DAPPS PLATFORM

Layer-2, Ethereum,

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Base, incubated within Coinbase and launched in 2023, is a Layer 2 Blockchain platform built on Ethereum's network. Utilizing Optimism's Optimistic Rollup technology, Base aims to enhance Ethereum's scalability, improve user interfaces, and lower transaction costs. This platform is designed for seamless integration with Ethereum L1 and the broader Coinbase ecosystem, positioning it as a strategic choice for Decentralised application development. Base's goal is to make Blockchain technology more accessible, expanding its use beyond digital currency to a broader audience.

FACTS & FIGURES

Coinbase Global Inc., 2012, Wilmington, Delaware, USA



TECHNICALS

Consensus Mechanism	N/A
Transaction Finality Time	Few Seconds
Stated Capacity	N/A
Average Transaction-Fee	USD < 0.1
Total number of Transactions since inception on Mainnet	New Protocol

TOKENOMICS



PROTOCOL CHARACTERISTICS

Base emerges as an Ethereum Layer 2 (L2) solution incubated within Coinbase, prioritising accessibility and decentralisation for broader Cryptoeconomic inclusion. Base envisions a future where secure, cost-effective transactions are fundamental. Functioning as a Layer 2 protocol, it adheres to Ethereum's framework, guaranteeing the security, stability, and scalability necessary for on-chain applications.

Key unique selling points (USPs) revolve around its integration with Ethereum's ecosystem, enabling seamless transitions for users and assets from Ethereum Layer 1 (L1) and other compatible chains. Moreover, it offers an EVM-compatible environment at reduced costs, empowering developers with tools like Account Abstraction (ERC4337) and gasless transaction APIs, augmenting ease of use.

Anchored on an open-source framework, Base utilises the MIT-licensed OP Stack, collaborating with Optimism to fortify it as a public good. Coinbase's backing positions Base to leverage its established products and distribution channels, granting dApps convenient integration with Coinbase services, fiat onramps, and access to a vast user base.

Regarding network fees, Base transactions encompass both L2 execution fees and L1 security fees. The L2 fee covers transaction execution within the L2 ecosystem, while the L1 fee represents the cost of publishing the transaction on Ethereum's Layer 1. Strategies to minimise costs involve flexible timing of transaction submissions during periods of lower gas fees on L1.

Base's vision extends beyond merely facilitating digital currency transactions. The platform seeks to onboard over a billion users into the Crypto economy, highlighting its potential for diverse applications and utility. This ambitious goal underscores Coinbase's commitment to expanding the reach and impact of Blockchain technology, making it more inclusive and accessible to a global audience.

In summary, Base endeavors to foster inclusivity and affordability in the Crypto economy, building a secure, cost-effective Ethereum L2 environment with Coinbase support and seamless integration with Ethereum and other chains. Base's aim to broaden the use of Blockchain technology beyond digital currency to various real-world applications marks a significant step towards the widespread adoption and evolution of Blockchain solutions.



INACTA.

ADDITIONAL PROTOCOLS CONCORDIUM (CCD)

ID-CENTRED AND PRIVACY-PRE-SERVING FOCUSED PLATFORM

Laver-1

Concordium, a Layer 1 Blockchain launched in 2021, uniquely merges encrypted ID in transactions while ensuring privacy through zero-knowledge profs. Its focus on Web3, ESG, and AI renders it an ideal platform for privacy-focused applications. The Blockchain prioritises user privacy with a robust identity layer backed by trusted issuers. It aims to bridge the gap between Blockchain technology and traditional business needs, making it an attractive solution for businesses seeking the benefits of Blockchain with regulatory compliance.

FACTS & FIGURES

Concordium Foundation, 2018, Zug, Switzerland



TECHNICALS

Consensus Mechanism	Proof of Stake (PoS)
Transaction Finality Time	11s
Stated Capacity	400TPS
Average Transaction-Fee	USD 0.01
Total number of Transactions since inception on Ma	innet 14M

GLOBAL PROTOCOL REPORT 2024





PROTOCOL CHARACTERISTICS

Concordium presents an innovative approach by embedding encrypted ID within every on-chain transaction. Operating at Layer 1, the protocol prioritises user privacy through zero-knowledge proofs while maintaining regulatory compliance. The platform's unique selling point is its builtin identity layer that ensures transactional privacy while allowing for regulatory compliance. This feature makes Concordium particularly suitable for businesses and industries that require a balance between confidentiality and regulatory accountability.

A key aspect of Concordium is its commitment to transparency and regulatory compliance. By providing a Blockchain solution that adheres to regulatory standards, Concordium aims to facilitate the adoption of Blockchain technology in sectors where compliance is a critical concern, such as finance, healthcare, and government services. This approach is intended to bridge the gap between the innovative potential of Blockchain technology and the practical requirements of traditional business and regulatory frameworks.

Concordium's platform is designed to support a variety of applications, from Decentralised finance (DeFi) and tokenisation to supply chain management and identity verification. Beyond its identity-centric approach, Concordium exhibits a robust execution environment for smart contracts and digital financial primitives, catering to enterprise-grade applications. Its features include high throughput, fast finality, low fixed transaction costs, and a regulated DeFi Lab. The combination of privacy, compliance, and scalability makes it a versatile and attractive option for businesses looking to leverage Blockchain technology for secure, efficient, and compliant operations.

In summary, Concordium presents a unique proposition in the Blockchain ecosystem, focusing on regulatory compliance and privacy. Its innovative approach to combining Blockchain benefits with regulatory adherence positions it as a significant platform for enterprises seeking to integrate Blockchain technology into their operations, without compromising on compliance and privacy standards.



PEER-TO-PEER LENDING AND BORROWING PAYMENT PROTOCOL Layer-1

eCredits is a Layer-1 public Blockchain that uses Ethereum Core-Code, optimised for daily transactions, offering a five-second block-time and Ethereum Virtual Machine (EVM) compatibility. Facilitating micro-enterprise ecosystems, it rewards user activity through ECS Cryptocurrency, supporting local businesses. Its transparent, immutable transactions and on-chain governance uphold accountability. The platform's design caters to ease of use and community engagement, making it a practical choice for everyday transactions within local economies.

FACTS & FIGURES

The People's SCE, Luxembourg Fintech Launchpad Ltd., London, UK

First Block Minted 2021 PRubblick/Neet/Gool_Livee 2021 Image: Additional state of the state of th			
Dec 2022 Ma	r 2023 Jun 2023	Sep 2023 Dec 2023	
Market Cap (USD) N/A	Performance Last 12 Months N/A	% of total GPR MCAP N/A	

TECHNICALS

Consensus Mechanism	Proof of Authority (PoA)
Transaction Finality Time	30s
Stated Capacity	100TPS
Average Transaction-Fee	USD 0.01
Total number of Transactions since inception o	n Mainnet 650.8M



PROTOCOL CHARACTERISTICS

eCredits is a Layer-1 Blockchain, leveraging Ethereum's proven technology, establishing a swift and secure platform for everyday transactions. It aims to empower micro-enterprise ecosystems, nurturing local economies and offering ECS Cryptocurrency rewards for user activity, fostering loyalty and service expansion.

Primarily, eCredits envisions creating and enhancing local and regional micro-ecosystems, catering to Micro, Small, and Medium-sized Enterprises (MSMEs), fostering a competitive edge against larger market players. Its innovative approach lies in the incentivisation of user activity through ECS, promoting additional services and partnerships within the ecosystem. Its native Cryptocurrency, eCredits (ECS), is central to this ecosystem, designed to be used as a medium of exchange in everyday transactions, thereby fostering a local circular economy.

The platform's architecture is geared towards security, efficiency, and userfriendliness. By leveraging Blockchain technology, eCredits ensures secure and transparent transactions, which is crucial for building trust within local communities. The platform also emphasises ease of use, making it accessible to individuals and businesses with varying degrees of technical expertise. This user-centric approach is key to its goal of widespread adoption in local commerce.

Operating as a Layer-1 EVM-compatible Blockchain, eCredits ensures transparency and immutability akin to Ethereum, enabling public scrutiny and traceability of transactions. Notably, it employs Scorechain for compliance with Crypto regulations, ensuring a trusted and regulated environment. Technical strengths encompass its Decentralised consensus mechanism, ensuring network security by distributing control, and smart contract security protocols. The platform emphasises smart contract audits, formal verifications, and standardised open-source contracts for robustness.

In essence, eCredits emerges as an Ethereum Core-Code based Layer-1 Blockchain, fostering local economies and incentivising user activity through ECS rewards. Its emphasis on creating a secure, efficient, and user-friendly platform for community-centric transactions positions it as an innovative tool for enhancing local commerce and fostering stronger community connections.



ADDITIONAL PROTOCOLS EVERSCALE (EVER)

SMART CONTRACT PLATFORM

Layer-1

Everscale, formerly known as Free TON, is a Decentralised Blockchain network known for its high scalability and throughput. Launched in 2020, it utilises a unique multi-threaded, shard-based architecture to achieve exceptional processing speeds and efficiency. Everscale aims to provide a comprehensive and user-friendly environment for Decentralised applications (dApps) and services, catering to a wide range of use cases. Its focus on scalability and flexibility makes it a viable platform for complex Blockchain solutions in various industries. Everscale targets real-world applications in gaming, finance, and micro-payments with its unique features, including Reliable External Messaging Protocol (REMP) and soft majority consensus.

FACTS & FIGURES

Everscale Foundation, 2022, Zug, Switzerland



TECHNICALS

Consensus Mechanism	Proof of Stake (PoS)
Transaction Finality Time	6s
Stated Capacity	>63000TPS
Average Transaction-Fee	USD 0.0015
Total number of Transactions since inception on Ma	innet 205M

INACTA.





PROTOCOL CHARACTERISTICS

Everscale, an offshoot of Telegram Open Network's rebranded Free TON project, has evolved into a robust layer-one Blockchain post-TON's discontinuation in 2020. Emphasizing speed, security, and scalability, it aims to power various real-world applications through innovative features inherited from TON's architecture. The network employs a distinctive shard-based, multi-threaded architecture, enabling it to process a vast number of transactions simultaneously. This architectural approach allows Everscale to handle the increasing demands of modern Blockchain applications, making it one of the most scalable networks in the industry.

Operating as a layer-one Blockchain, Everscale harnesses Telegram Open Network (TON) architecture, enabling fast and scalable transactions. Its core strengths lie in sharding, proof-of-stake (PoS) consensus, and low gas costs. The platform introduces the Reliable External Messaging Protocol (REMP), enhancing scalability and security. Additionally, it adopts soft majority consensus, improving validation and coordination within the network. The Blockchain aims to process over 63'000 transactions per second, catering to gaming, finance, and micro-payment sectors.

Everscale's unique strengths revolve around its TON-based architecture, aiming for high speed, scalability, and low gas costs. Sharding and soft majority consensus further fortify its robustness. The platform is designed to support a broad spectrum of Decentralised applications (dApps) and services, offering developers a flexible and efficient environment for building complex Blockchain solutions. Everscale's infrastructure is optimised to facilitate various use cases, from Decentralised finance (DeFi) and non-fungible tokens (NFTs) to enterprise-level applications, by providing the necessary speed and scalability.

A key feature of Everscale is its user-friendly approach, which is evident in its easy-to-use interface and supportive ecosystem for developers. The network aims to make Blockchain technology accessible to a wider audience, reducing the entry barriers for developers and users alike. This focus on usability is coupled with robust security measures, ensuring the safety and integrity of transactions on the network.

In summary, Everscale presents itself as a highly scalable and user-friendly Blockchain network, suitable for a wide range of applications. Its innovative architecture, coupled with a focus on accessibility and communitydriven governance, positions it as a versatile and robust platform in the Blockchain ecosystem. Everscale's commitment to scalability, flexibility, and user engagement makes it a promising choice for developers and businesses looking to leverage Blockchain technology.





DEFI PLATFORM

Layer-2, Ethereum, Sidechain

Gnosis Chain, previously known as xDai Chain, is a Blockchain platform recognised for its stable transaction fees and efficient Ethereum compatibility. Launched in 2020, it primarily utilises the stablecoin xDai as its native currency. Gnosis Chain is designed to facilitate fast and affordable transactions, making it a popular choice for Decentralised applications (dApps) and Blockchain projects seeking predictable costs. Its focus on stability and Ethereum interoperability positions it as a pragmatic solution for developers and users within the Blockchain ecosystem.

FACTS & FIGURES

GnosisDAO, 2020 Gnosis, 2017, Gibraltar



TECHNICALS

Consensus Mechanism	Proof-of-Authority (PoA) with Proof-of-Stake (PoS)
Transaction Finality Time	350s
Stated Capacity	N/A
Average Transaction-Fee	USD 0.00002
Total number of Transactions since ir	aception on Mainnet 145M

TOKENOMICS



PROTOCOL CHARACTERISTICS

Gnosis Chain, initially launched as xDai Chain in 2018, has established itself as a unique Blockchain platform, particularly noted for its stable transaction fees and seamless integration with Ethereum. The network's use of the stablecoin xDai as its primary currency sets it apart, providing a stable and predictable environment for transactions and smart contracts.

The platform's architecture is built around efficiency and affordability, aiming to address some of the scalability and cost issues associated with Ethereum. By using xDai, a stablecoin pegged to the US dollar, Gnosis Chain ensures that users and developers can transact with consistent and stable fees, a feature particularly appealing in the volatile Cryptocurrency market. This stability is crucial for various Blockchain applications, especially those requiring predictable transaction costs.

Gnosis Chain is compatible with Ethereum, allowing for easy migration of Ethereum-based dApps and assets to its network. This compatibility extends the reach of Gnosis Chain, making it a practical choice for projects initially developed on Ethereum but seeking a more cost-effective environment. The platform supports a wide range of applications, from DeFi to NFTs, and is particularly suited for micro-transactions and everyday use cases due to its low fees and high efficiency.

The network also emphasises user and developer accessibility, with a user-friendly interface and tools that lower the barrier to entry for Blockchain technology adoption. Its commitment to a stable and efficient Blockchain solution has led to a growing community of users and developers.

In summary, Gnosis Chain offers a distinctive approach in the Blockchain space, combining stable transaction fees with robust Ethereum compatibility. Its focus on stability, cost-effectiveness, and user accessibility makes it a compelling platform for a wide array of Blockchain applications, from small-scale transactions to larger, more complex dApp deployments.





DAPPS PLATFORM

Harmony, launched in 2019, is a Blockchain platform designed for high throughput and low latency. It employs a sharding-based consensus mechanism, which divides the network into smaller, more manageable groups (shards) to process transactions and smart contracts efficiently. Harmony aims to address scalability and speed issues in Blockchain technology, making it a suitable choice for Decentralised applications (dApps) that require quick transaction processing. Harmony aspires to build a diverse, open node network called Pangaea, with 1,000 nodes already operational.

FACTS & FIGURES

Harmony, 2018, Mountain View, California, USA



TECHNICALS

Consensus Mechanism	Effective Proof of Stake (EPoS)
Transaction Finality Time	25
Stated Capacity	2,000TPS
Average Transaction-Fee	USD 0.001
Total number of Transactions since in	ception on Mainnet 784M

INACTA

14





PROTOCOL CHARACTERISTICS

Harmony stands as a robust Blockchain platform embracing speed, security, and decentralisation. The platform utilises a sharding-based consensus mechanism, effectively partitioning the network into multiple shards to parallelize transaction processing, enabling 2-second block finality, while its Effective Proof-of-Stake (EPoS) mechanism ensures stake distribution and decentralisation. Harmony's goal is to foster a diverse and open node network named Pangaea, currently encompassing 1,000 operational nodes globally.

Operating at the layer-one level, Harmony leverages several innovative features. Its scalable sharding technology extends to network communication, transaction validation, and Blockchain state, ensuring scalability across all aspects. Secure random sharding is a hallmark, utilising distributed randomness generation for shard assignment. Harmony's sharding technique is complemented by its use of the EPoS consensus model. EPoS is designed to optimise network security and decentralisation while ensuring energy efficiency. This consensus model enables Harmony to balance scalability with sustainability, making it an eco-friendly choice in the Blockchain landscape.

The platform is particularly tailored for Decentralised applications (dApps) that require fast and efficient transaction processing. Harmony's infrastructure supports a wide range of applications, from Decentralised finance (DeFi) to non-fungible tokens (NFTs), and is well-suited for projects that demand high transaction speed and scalability. In addition to its technical capabilities, Harmony also focuses on fostering a collaborative and open developer community. The platform provides various tools and resources to support dApp development, encouraging innovation and growth within its ecosystem.

In summary, Harmony offers a high-performance Blockchain solution, characterised by its sharding-based architecture and EPoS model. Its commitment to scalability, speed, and energy efficiency, combined with a supportive environment for developers, positions it as a promising platform for a variety of Blockchain applications, particularly those requiring high throughput and low latency.

49





DEFI PLATFORM: ENVIRONMENT FOR FINANCIAL TRANSACTIONS ON-CHAIN Laver-1

Haven1 is a Layer 1 Blockchain incubated by Yield App, prioritising security, scalability, and regulatory compliance and set to launch in Q1 2024. Using an eco-friendly Proof of Authority (PoA) consensus, it bridges traditional finance with DeFi, introducing innovative features like provable identity frameworks. This enables Decentralised credit scores and tokenised real-world asset integration. Designed to complement Ethereum, Haven1 envisions revolutionising digital finance, facilitating seamless and secure on-chain transactions for both institutional and retail investors.

FACTS & FIGURES

N/A

First Block Minted N,	A Public Net G	Launch scheduled o Live in 2024
	NI / A	
	N/A	
Dec 2022 Mar 2023 Jun 2023 Sep 2023 Dec 2023		
Market Cap (USD) N/A	Performance Last 12 Months N/A	% of total GPR MCAP N/A

TECHNICALS

Consensus Mechanism	Proof-of-Authority (PoA)	
Transaction Finality Time	N/A	
Stated Capacity	N/A	
Average Transaction-Fee	Application-Specific Fee Model	

Total number of Transactions since inception on Mainnet Not Launched yet



Max Supply

PROTOCOL CHARACTERISTICS

Haven1, set to launch in Q1 2024, is a Laver 1 Blockchain platform developed

by Yield App. It's designed to bridge the gap between traditional finance

and Decentralised finance (DeFi) and operates with an eco-friendly Proof

of Authority (PoA) consensus mechanism. Central to Haven1 is its provable

identity framework, enabling use cases in the DeFi sector that have been

challenging before, such as the creation of Decentralised credit scores.

This identity framework provides a balance between decentralisation and

transaction verification, aiming to enhance user and institutional trust in

This framework also facilitates the tokenisation of real-world assets where

identity verification is paramount. With a strategic alignment to Ethereum, Haven1 is initialized as a sidechain, with plans to transition into a rollup, lev-

eraging Ethereum's established infrastructure as a global settlement laver.

Haven1 addresses industry challenges, including standardization, risk man-

agement, and regulatory compliance. Its identity framework, for instance,

can enable tokenised representations of property ownership through

non-fungible tokens (NFTs) and more efficient global exchanges of tra-

ditional assets like securities and bonds. Positioned at a crucial juncture

in the digital finance evolution, Haven1 focuses on creating a compliant,

secure platform that remains open to all. It prioritises standardization, security, and compliance, making Blockchain technology more inclusive and accessible. Haven1 envisions itself as a pivotal player in the digital age,

This ensures increased interoperability and capabilities.

spearheading the next generation of digital finance.

N/A

TOKENOMICS

Total Supply

N/A

the platform.



ADDITIONAL PROTOCOLS LISK (LSK)

DAPPS PLATFORM

Laver-1

Lisk is a Blockchain-based platform focused on enabling the development of Decentralised applications (dApps). Lisk stands out for its sidechain architecture, which enhances scalability and flexibility, and for using JavaScript, a widely-used programming language, for dApp development. Lisk's design aims to make Blockchain technology more accessible and adaptable, allowing developers to create customised sidechains for specific applications without being confined by the main Blockchain's limitations.

FACTS & FIGURES

Lisk Foundation, 2016, Zug, Switzerland



TECHNICALS

Consensus Mechanism	Delegated Proof-of-Stake (DPoS)
Transaction Finality Time	3060s
Stated Capacity	75TPS
Average Transaction-Fee	USD 0.001
Total number of Transactions since	inception on Mainnet 4.5M

Stacked of %

Circulating Suppl

N/A

Circulating Supply

N/A





PROTOCOL CHARACTERISTICS

Lisk, established in 2016, emerged from a fork of the Crypti project with a vision to make Blockchain technology more accessible. It provides an opensource application platform to bridge the gap between potential users and Blockchain technology, offering tools and infrastructure for creating and deploying Decentralised applications (dApps). Using Delegated Proof of Stake (DPoS). Lisk aims for Blockchain interoperability, allowing token transfers, voting, and smart contract execution.

Lisk's core technology comprises Blockchain and sidechain technologies. Its main Blockchain acts as a distributed ledger, while the sidechains, connected through a two-way bridge, allow for scalability and flexibility. This structure permits multiple sidechains linked to the mainchain, distributing computational load and enhancing overall network performance.

The platform's use of JavaScript as the primary programming language for developing applications is a key advantage, making it accessible to a vast number of developers. This approach enables developers to leverage their existing JavaScript skills to build dApps without needing to learn a new language or framework.

In conclusion, Lisk offers a platform for building Decentralised applications, providing scalability, flexibility, and accessibility through its sidechain architecture and JavaScript compatibility. Real-world use cases include token transfers, smart contracts, and voting mechanisms, providing a versatile platform for various Decentralised applications.



PAYMENTS AND EXCHANGE PROTOCOL

Layer-2, Ethereum, zkRollup

Loopring, established in 2019, is a Blockchain platform focused on Decentralised exchange (DEX) services. It utilises a unique combination of Blockchain technology and zero-knowledge proofs to enable high-speed and secure trading. Loopring's main feature is its Layer-2 scaling protocol which significantly reduces transaction fees and increases throughout. This technology is aimed at improving the efficiency and cost-effectiveness of Cryptocurrency trading, making Loopring a notable solution in the DEX space and appealing to users seeking fast, secure, and low-cost trading experiences

FACTS & FIGURES

Loopring Foundation, 2017, Shanghai, China G2H2 Capital, 2017, New York, USA



TECHNICALS

Consensus Mechanism	Loopring consensus using Multi-Operator Multi-Party Computation (MOMPC)	
Transaction Finality Time		Near Instant
Stated Capacity		2,000TPS
Average Transaction-Fee		USD 0.09-0.29
Total number of Transactio	ons since inception on Mainnet	11M

TOKENOMICS



PROTOCOL CHARACTERISTICS

Loopring has carved a niche in the Blockchain ecosystem as a platform specialising in Decentralised exchange (DEX) services. The core of Loopring's technology is its Layer-2 scaling protocol, which leverages zero-knowledge proofs to enhance the speed and security of Crypto trading. This approach allows Loopring to process trades quickly and securely while significantly reducing transaction costs, a vital feature in the dynamic world of Cryptocurrencytrading.

The platform's use of zero-knowledge proofs, a form of Cryptographic technology, enables it to offer high-speed transactions without compromising on security. This technology ensures that trade details are verified without revealing any sensitive information, maintaining privacy and security for users. Loopring's protocol is designed to alleviate common issues associated with DEXs, such as high fees and slow transaction speeds, by moving the majority of transaction processing off-chain.

One of Loopring's key advantages is its ability to reduce Ethereum's gas fees and congestion by handling transactions on its Layer-2 solution. This efficiency makes it an attractive platform for traders and liquidity providers, who benefit from lower costs and enhanced trading experiences.

Loopring also supports the creation of Decentralised automated market makers (AMMs) and order book-based exchanges on its platform, providing flexibility and variety for users. This feature enables users to participate in different trading mechanisms, catering to diverse preferences and strategies.

In summary, Loopring presents an innovative solution in the Blockchain space, focusing on Decentralised exchange services with enhanced efficiency and security. Its Layer-2 scaling protocol, combined with the use of zero-knowledge proofs, positions it as a competitive platform for highspeed, secure, and cost-effective Cryptocurrency trading. Loopring's technology is a significant contribution to the evolution of DEXs, offering a more efficient and user-friendly trading environment.

INACTA.



ADDITIONAL PROTOCOLS NEPTUNE

PEER-TO-PEER PAYMENT PROTOCOL Laver-1

Neptune is an emerging layer-one Blockchain harnessing advanced Cryptography to architect the financial infrastructure of the future. Integrating innovations like transparent, post-quantum SNARKs, Neptune promises unique features: irrevocability via proof-of-work, unparalleled privacy akin to cash, scalability ensuring minimal workload for participants, and smart contract capabilities with post-quantum security. Its design eliminates the need for trusted setups in SNARKs, ensuring robustness against quantum threats while maintaining operational efficiency and privacy in transactions.

FACTS & FIGURES

Triton Software AG, 2021, Zug, Switzerland



TECHNICALS

Consensus Mechanism Proof-of-Work	
Transaction Finality Time	N/A
Stated Capacity	N/A
Average Transaction-Fee	N/A

Total number of Transactions since inception on Mainnet Not Launched yet





PROTOCOL CHARACTERISTICS

Neptune is an anticipated layer-one Blockchain protocol in the development phase, aiming to reshape the financial infrastructure by integrating 20thcentury Cryptography and more recent advancements.

Central to its architecture is the employment of post-quantum SNARKs-Succinct Non-interactive Arguments of Knowledge. These are Cryptographic proofs that allow for the authentication of computer program executions in a secure manner. With such a feature, Neptune is ensuring future resilience against potential threats from quantum computers while also providing efficient performance, enabling users to synchronize rapidly and bundle transactions seamlessly

Designed with scalability as a core value, Neptune intends to keep the system's workload minimal, regardless of its eventual adoption rates. A significant promise lies in its emphasis on privacy; the vision for Neptune is to handle its currency transactions with the discretion of physical cash, granting users a high level of Privacy.

Furthermore, Neptune's design includes the use of transparent SNARKs. This choice sidesteps the security concerns of trusted setups seen in some other protocols, aiming for a more robust security profile.

Although still in its building phase, Neptune's potential in the realm of advanced Cryptographic Blockchains is evident. As with any emerging technology, queries about its real-world performance and integration in a landscape populated by seasoned protocols are natural. Its evolution and how it stands up to these challenges will be pivotal in determining its position in the Crypto space



PARTISIA BLOCKCHAIN

MULTIPARTY COMPUTATION PLATFORM

Partisia Blockchain is a Blockchain platform uniquely designed to integrate privacy and interoperability. It employs Multi-Party Computation (MPC) technology, offering a blend of privacy, transparency, and efficiency. This platform is tailored to support applications that require confidential data processing while ensuring transparency and security. Partisia Blockchain aims to bridge the gap between privacy and openness in Blockchain applications, making it suitable for sectors like finance, healthcare, supply chain management or even elections, where data privacy is paramount.

FACTS & FIGURES

Partisia Blockchain Foundation, 2020, Zug, Switzerland Partisia, 2008, Aarhus, Denmark



TECHNICALS

Consensus Mechanism	Proof-of-Trust (PoT)
Transaction Finality Time	near instant
Stated Capacity	3,000TPS
Average Transaction-Fee	USD 0.01
Total number of Transactions since inception on Ma	innet 6.8M

TOKENOMICS



PROTOCOL CHARACTERISTICS

Partisia Blockchain stands out in the Blockchain landscape for its innovative integration of privacy and interoperability using Multi-Party Computation (MPC) technology. This technology enables the platform to handle sensitive data securely and privately, while still maintaining the transparency and trust inherent in Blockchain technology. This unique combination is particularly crucial in applications where confidentiality is essential, yet transparency and security cannot be compromised.

MPC technology allows multiple parties to jointly compute a function over their inputs while keeping those inputs private. In the context of Partisia Blockchain, this means that sensitive data can be processed and verified without exposing the actual data, thereby maintaining privacy. This feature is a key differentiator for the platform, making it appealing for use cases in finance, healthcare, and supply chain management, where privacy is a critical concern.

The platform's architecture is designed to be both scalable and efficient, ensuring that it can support a wide range of applications and transaction volumes. The focus on interoperability also allows Partisia Blockchain to seamlessly integrate with other Blockchain networks, enhancing its utility and reach.

Partisia Blockchain has seen adoption in various sectors, demonstrating the practical utility of its privacy-centric approach. For instance, in the financial sector, it can facilitate confidential transactions and settlements, while in healthcare, it can securely handle sensitive patient data for research and treatment purposes.

In summary, Partisia Blockchain's innovative use of MPC technology for privacy and interoperability positions it as a unique and valuable platform in the Blockchain ecosystem. Its ability to balance confidentiality with transparency and security makes it suitable for a variety of applications where data privacy is a critical requirement. DLT SCIENCE FOUNDATION

ADDITIONAL PROTOCOLS POWERLEDGER (POWR)

ENERGY TRADING AND TRACEABILITY PLATFORM Layer-1

Powerledger, a Swiss company, founded in 2016, provides Blockchain-based software solutions that remove the obstacles to 24/7 renewable energy. These solutions empower utilities and large corporations to track, trace, and trade every kilowatt of energy, addressing the challenges of grid congestion and grid instability by incorporating renewables into their systems.

FACTS & FIGURES

Powerledger AG, 2023, Zug, Switzerland



TECHNICALS

Consensus Mechanism	Proof-of-History (Po with Proof-	oH) combinded of-Stake (PoS)
Transaction Finality Time		5s
Stated Capacity		50,000TPS
Average Transaction-Fee		USD <0.000001
Total number of Transactions sine	ce inception on Mainnet	207M





PROTOCOL CHARACTERISTICS



Powerledger software is being used in more than 10 countries, including Australia, Thailand, and the United States. These solutions are designed for provenance tracking of energy and portfolio management (PPA Vision), providing alternatives for cheaper renewable energy through secondary markets and peer-to-peer energy trading (Secondary PPA Exchange and xGrid), and building efficient marketplaces for environmental commodity trading(TraceX).

Powerledger solutions use Blockchain in a variety of ways, for example, Vision and PPA Vision use Blockchain for tracking each kilowatt hour in terms of type, time, and place. For energy trading use cases, Blockchain is used to record the transactions between buyers and sellers and can also be used for settlements. For environmental commodities trading, these can be tokenised and integrated with settlement with traditional certificate registries and, over time, Blockchain registries as well.

Powerledger has recently launched its Layer 1 Powerledger Blockchain based on the Solana project. Powerledger Blockchain is an open network that operates with proof of stake and proof of history consensus, boasts extremely low transaction fees, high energy efficiency, and is capable of processing tens of thousands of transactions per second.

The Powerledger Blockchain was initially developed as a private consortium chain used for Powerledger's own applications. This Blockchain was made public in July 2023 for companies that are looking to add a Blockchain element to their product offerings. In doing so, third-party software applications can access Blockchain technology without investing in the complex in-house infrastructure.



SMART CONTRACT AGNOSTIC BLOCK-CHAIN WITH LIMITLESS INTEROPERA-**BLE VIRTUAL MACHINES**

Laver-1

PWR Chain is a new Blockchain that just went testnet live and plans to go mainnet in 2024. It breaks away from the principle of the limited, individual Blockchain ecosystem and offers a completely new solution to onboard users and developers, regardless of their preferred framework, coding language or even the preferences in terms of privacy.

FACTS & FIGURES

Upcoming Foundation PWR Labs



TECHNICALS

Consensus Mechanism	Delegated Proof-of- Power
Transaction Finality Time	Instant
Stated Capacity	300K+TPS
Average Transaction-Fee	USD 0.00001
Total number of Transactions since inceptio	n on Mainnet N/A



ADDITIONAL PROTOCOLS Ĩ QTUM (QTUM)

Qtum, launched in 2017, is a hybrid Blockchain platform that combines elements of Bitcoin's UTXO transaction model with Ethereum's smart contract capabilities. It utilises a proof-of-stake consensus mechanism, focusing on providing a secure and stable environment for Decentralised applications (dApps) and smart contracts. Qtum aims to bridge the gap between the robust security of the Bitcoin Blockchain and the versatility of Ethereum, making it a practical choice for businesses and developers seeking to leverage the strengths of both platforms.

FACTS & FIGURES

Qtum Foundation, 2016, Singapore Qtum (Company), 2016, Singapore



TECHNICALS

Consensus Mechanism	Delegated Proof-of-Stake (DPoS)
Transaction Finality Time	180s
Stated Capacity	1,100TPS
Average Transaction-Fee	USD <0.01
Total number of Transactions since	nception on Mainnet N/A

INACTA.

Stacked of %

Circulating Suppl

TGE tba.

Testnet live

Circulating Supply

TGE tba,

Testnet live

Max Supply

1Bn

This combination of features - support for diverse EVMs, specialized side

chains, and the integration of direct software applications - positions the

PWR Chain as a uniquely flexible and developer-friendly platform. It not

only caters to a wide array of development preferences but also marks a

significant stride in fostering innovation within the blockchain space.

TOKENOMICS

Total Supply

1Bn

DAPPS PLATFORM Laver-1

GLOBAL PROTOCOL REPORT 2024





PROTOCOL CHARACTERISTICS

Qtum, introduced in 2017, represents an innovative blend in the Blockchain world, merging Bitcoin's Unspent Transaction Output (UTXO) model with Ethereum's smart contract functionality. The core innovation of Qtum is its Account Abstraction Layer (AAL), which enables the execution of smart contracts and dApps on top of a Bitcoin-like UTXO (Unspent Transaction Output) model. This hybrid approach aims to offer the reliability and security inherent in Bitcoin's transaction model, along with the flexibility and adaptability of Ethereum's smart contracts.

Qtum operates on a Delegated-Proof-of-Stake (DPoS) consensus mechanism, making it more energy-efficient compared to networks using proofof-work (PoW) systems. The native Cryptocurrency of the Qtum network is QTUM, used for transaction fees, staking, and participating in the network's governance.

Qtum's architecture is uniquely positioned to support a wide range of Decentralised applications and services. Its compatibility with Ethereum's development environment (EVM) allows for seamless migration of Ethereum-based applications onto Qtum, providing developers with a broader range of options and flexibility.

In practical applications, Qtum has been utilised in various sectors, including finance, social media, and supply chain management. Its ability to combine security with functional versatility makes it well-suited for projects that require robust Blockchain solutions with complex smart contract capabilities.

In summary, Qtum stands out for its hybrid Blockchain model that aims to merge the best aspects of Bitcoin and Ethereum. Its focus on security, sustainability, and adaptability, combined with its smart contract capabilities, positions it as a versatile and efficient platform in the Blockchain ecosystem. Qtum's approach caters to a diverse range of applications, offering a practical solution for businesses and developers seeking to leverage Blockchain technology's evolving potential.



ADDITIONAL PROTOCOLS RSK Rootstock (RBTC)

BITCOIN SMART CONTRACT SOLUTION

Layer-2, Bitcoin, EVM-compatible smart contract extension Sidechain

Rootstock (RSK), launched in 2018, is a Blockchain platform that extends the functionality of Bitcoin by enabling smart contracts and Decentralised applications (dApps) on its network. It operates as a sidechain to the Bitcoin Blockchain, combining the robust security of Bitcoin with the advanced capabilities of smart contract technology. RSK aims to foster innovation and expand the use cases of Bitcoin, positioning itself as a bridge between the security of Bitcoin and the versatility of smart contract platforms.

FACTS & FIGURES

IOVLabs, 2016, Gibraltar



TECHNICALS

Consensus Mechanism	Proof-of-Work (PoW)
Transaction Finality Time	3,600s
Stated Capacity	10TPS
Average Transaction-Fee	USD 0.0500
Total number of Transactions since inception on Ma	ainnet 11.4M



PROTOCOL CHARACTERISTICS

Rootstock (RSK), introduced in 2018, is a pioneering Blockchain platform that enhances the Bitcoin ecosystem by enabling smart contract functionality and Decentralised applications (dApps) on its network. As a sidechain to Bitcoin, RSK leverages the unparalleled security of the Bitcoin Blockchain while introducing the flexibility and advanced features of smart contracts.

RSK's unique approach involves using a two-way peg to Bitcoin, allowing users to lock their Bitcoins on the main chain and receive an equivalent amount of RSK's native token, RBTC, on the RSK sidechain. This mechanism ensures that RSK inherits the security properties of Bitcoin while extending its capabilities beyond simple transactions to more complex and programmable operations.

The platform's consensus mechanism, merge-mining with Bitcoin, contributes to its security and decentralisation. This process allows Bitcoin miners to simultaneously mine on both the Bitcoin and RSK Blockchain without additional resource consumption, enhancing the security of the RSK network.

RSK's introduction of smart contracts to the Bitcoin network opens up a multitude of possibilities, including Decentralised finance (DeFi) applications, token issuance, and various other dApp functionalities. This expansion significantly broadens the scope of Bitcoin's utility, making it a more versatile and comprehensive Blockchain ecosystem.

However, as RSK operates as a sidechain, it faces challenges in terms of achieving the same level of network effect and adoption as primary Blockchain platforms. Despite this, RSK continues to grow and evolve, contributing to the broader Blockchain landscape by bridging the gap between Bitcoin's robust security and the adaptive nature of smart contract technology.

In summary, RSK presents an innovative solution within the Blockchain space, extending Bitcoin's capabilities to include smart contracts and Decentralised applications. Its unique approach of combining the security of Bitcoin with the versatility of smart contracts positions it as a notable platform in the Blockchain industry, offering new opportunities for innovation and development on the Bitcoin network.





ADDITIONAL PROTOCOLS SEI (SEI)

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SPECIALIZED FOR EXCHANGE OF DIGITAL ASSETS

Layer-1

Launched recently, Sei is a Blockchain protocol that prioritises speed, scalability, and security. It utilises the innovative Twin-Turbo Consensus mechanism, ensuring rapid transaction finality and high throughput. Sei is designed for modern applications that demand high performance and scalability. Its security-first approach, bolstered by institutional backing, and user-centric features, like native frontrunning protection and seamless interoperability, make it a compelling choice for various Blockchain applications.

FACTS & FIGURES

Sei Foundation, 2022, Singapore



TECHNICALS

Consensus Mechanism	Proof of Stake (PoS) with Twin Tur- bo Consensus Mechanism	
Transaction Finality Time		<1s
Stated Capacity		22,000TPS
Average Transaction-Fee		N/A
Total number of Transactions sin	ace inception on Mainnet	New Protocol





PROTOCOL CHARACTERISTICS

Sei, a recent addition to the Blockchain landscape, distinguishes itself with its Twin-Turbo Consensus mechanism, setting a new benchmark in industry speed and efficiency. This innovative consensus model allows Sei to offer the fastest Blockchain finality in the industry, coupled with high throughput. Such capabilities position Sei as an optimal choice for modern, performance-intensive applications.

The platform emphasises a security-first approach, being secured by some of the largest institutions in the world. This foundational focus on security ensures robustness and trustworthiness, crucial for any Blockchain technology. Additionally, Sei's commitment to user-centricity is evident in its open-source nature and provisions for native frontrunning protection, which add layers of fairness and transparency to the platform.

Sei architecture is geared towards high scalability, a critical requirement for Decentralised applications that need to support large user bases and complex operations. Furthermore, Sei is engineered to evolve, built with interoperability and language compatibility in mind. Its modularity allows the technology stack to incorporate new innovations, governed by the community's consensus. Sei's speed and scalability are underpinned by its commitment to being carbon-neutral. By leveraging innovations, it maintains a minimal environmental impact, aligning with the growing need for sustainable technology solutions.

In conclusion, Sei represents a significant advancement in Blockchain technology, offering speed, scalability, and security. Its design enables new applications in the Web3 space, empowering a new generation of developers and creators, and setting the stage for the future of Decentralised digital assets.

159



ADDITIONAL PROTOCOLS SKALE NETWORK (SKL)

SMART CONTRACT PLATFORM

Layer-2, Ethereum, Sidechain

SKALE Network, launched as a scalable Blockchain solution, is designed to augment Ethereum's capabilities. The network is distinctive for its ability to support dApp-specific chains, providing high-throughput, fast finality, and zero gas fee transactions. SKALE's architecture, focusing on expandability and Ethereum compatibility, aims to facilitate a more efficient and cost-effective environment for Decentralised applications (dApps) and Web3 cloud computing.

FACTS & FIGURES

SKALE DAO, 2023 N.O.D.E. Foundation, 2019, Vaduz, Liechtenstein SKALE Labs, 2018, San Francisco, USA



TECHNICALS

Consensus Mechanism	Delegated Proof-of-Stake (DPoS)
Transaction Finality Time	Sub-Second
Stated Capacity	700TPS
Average Transaction-Fee	Cost-Free Approach
Total number of Transactions since	inception on Mainnet 137.7M

TOKENOMICS



PROTOCOL CHARACTERISTICS

The SKALE Network, introduced as an Ethereum-native multichain network, stands out for its innovative approach to Blockchain scalability. It is built to scale Ethereum dApps, focusing on attributes like high-throughput, rapid finality, and the elimination of gas fees through its native gas token, sFuel. This design positions SKALE as a unique solution for developers and end-users seeking efficient transaction processes without the burden of transaction fees.

A defining feature of the SKALE Network is its support for dapp-specific chains, termed SKALE Chains. These are Web3 Ethereum-compatible elastic Blockchain designed to simplify Web3 cloud computing for dApp developers. They provide not only Ethereum Virtual Machine (EVM) compute power but also Decentralised database storage and other functionalities to support and scale dApps cost-effectively. This focus on developer-centric solutions is indicative of SKALE's commitment to facilitating the growth and scalability of Decentralised applications.

In addition to these core features, SKALE Networks offer expanded storage capabilities, embedded connectivity, and interchain messaging with the Ethereum mainnet, ensuring seamless integration and communication. These features, combined with high-throughput and low-latency transactions, create an environment conducive to a wide range of applications, from simple dApps to complex, data-intensive platforms.

Moreover, SKALE chains are equipped with additional functionalities such as on-chain file storage, zero-cost minting, machine learning/artificial intelligence (ML/AI) smart contracts, and enhanced security features. These capabilities further empower developers, enabling them to deploy EVM-compatible Blockchain swiftly without compromising on speed, security, or decentralisation.

In summary, the SKALE Network represents a significant advancement in Blockchain technology, particularly for Ethereum-based applications. Its unique combination of dapp-specific chains, and zero gas fee transactions, along with extended storage and interoperability features, positions it as a formidable and innovative solution in the evolving landscape of Blockchain and Web3.



INACTA



DATA STORAGE AND COMPUTING PLATFORM

Layer-1

Storj is a Decentralised cloud storage platform leveraging Blockchain technology to offer secure and private data storage solutions. It utilises a distributed network of nodes, enabling users to store data across a vast array of devices globally. This approach ensures high redundancy, security, and affordability. Storj is designed for anyone seeking a Decentralised alternative to traditional cloud storage services, emphasising data privacy, security, and user control over their digital assets.

FACTS & FIGURES

Storj Labs, 2014, Atlanta, Georgia, USA



TECHNICALS

Consensus Mechanism	Proof of Storage
Transaction Finality Time	840s
Stated Capacity	N/A
Average Transaction-Fee	N/A
Total number of Transactions since inception on Mainne	et 2.1M





PROTOCOL CHARACTERISTICS

Storj, established in 2014, represents a pioneering approach in the Blockchain space, focusing on Decentralised cloud storage. It operates by creating a network of nodes, where users can rent out their unused disk space to others, effectively creating a distributed and secure storage solution. This peer-to-peer model not only enhances data security and privacy but also reduces costs compared to traditional cloud storage services.

The platform utilises encryption and sharding techniques to store files securely. Each file uploaded to Storj is encrypted and split into smaller pieces, known as shards, which are then distributed across multiple nodes in the network. This method ensures that no single node has a complete file, enhancing data security and privacy. Additionally, it offers redundancy, as the distributed nature of storage means that the loss of a single node does not result in data loss.

Storj operates using its native Cryptocurrency, STORJ tokens, to facilitate transactions within the network. Users pay for storage space using these tokens, and node operators are compensated in STORJ for offering their disk space. This token-based economy underpins the platform's Decentralised nature, providing incentives for participation and ensuring the smooth operation of the network.

In summary, Storj offers a unique solution in the Blockchain ecosystem, focusing on Decentralised cloud storage. Its use of encryption, sharding, and a distributed network of nodes provides a secure, private, and costeffective alternative to traditional cloud storage, with scalability that caters to a diverse set of storage needs.





DAPPS PLATFORM

Layer-1

The Venom Network is a Blockchain protocol with its Mainnet to be launched, distinguishing itself with its dynamic sharding and asynchronous architecture. Capable of handling up to 100'000 transactions per second, It aims to address scalability and interoperability challenges in the Blockchain sector by relying on its multiple chains consisting of the a Masterchain with additional Work- and Shardchains. Its diverse applications range across DeFi, DAOs, and GameFi, showcasing its versatility in the digital economy.

FACTS & FIGURES

Venom Foundation, 2022, Abu Dhabi, UAE



TECHNICALS

Consensus Mechanism	Proof-of-Stake (PoS)
Transaction Finality Time	0.2-0.3s
Stated Capacity	100,000TPS
Average Transaction-Fee	USD 0.0002

Total number of Transactions since inception on Mainnet Not Launched yet

INACTA.



TOKENOMICS



PROTOCOL CHARACTERISTICS

Venom is distinguished by its innovative approach to scalability and interoperability within the Blockchain landscape. Developed by the Venom Foundation, it is the first Blockchain entity registered under the Abu Dhabi Global Market, highlighting its compliance with regulatory frameworks.

Its architecture, designed for scalability and interoperability, is grounded in a masterchain which coordinates communication among various workchains and shard chains. This allows Venom to process a high volume of transactions per second, effectively addressing scalability issues common in traditional Blockchain networks.

At its core, Venom utilises dynamic sharding - a method that allows the network to adjust the number and size of shard chains based on the volume of transactions. This ensures efficient handling of network load. promoting scalability. The asynchronous architecture of Venom enables different components of the network to operate independently, further enhancing transaction speed and reducing bottlenecks. Additionally to scalability-enhancing techniques like off-chain processing and sharding, the Blockchain's support for smart contracts, employing a Turing-complete programming language, automates processes efficiently. Interoperability is another standout feature, facilitating communication between different Blockchain networks

The network's versatility is evident in its wide range of applications, from Decentralised finance (DeFi) and Decentralised autonomous organisations (DAOs) to Game Finance (GameFi). As it continues to evolve. Venom aims to position itself as a viable alternative to traditional financial systems, leveraging Blockchain technology to offer transparent, secure, and efficient solutions.

In conclusion, the Venom Network, still in its developmental phase with its Mainnet yet to be launched, presents significant potential in the Blockchain industry. Its innovative architecture and capacity for high transaction throughput position it as a noteworthy contender, pending real-world application and performance post-launch



ADDITIONAL PROTOCOLS 2 ZILLIQA (ZIL)

DAPPS PLATFORM Laver-2

Zilliqa, launched in 2019, is a scalable Blockchain platform designed for large

scale applications, utilising sharding technology to enhance transaction speed and efficiency. Zilliga's architecture makes it well-suited for data-driven and transaction-intensive applications, including digital advertising, finance. and gaming. With its emphasis on scalability and security, Zilliga aims to address the limitations of older Blockchain systems, offering a robust platform for developers and businesses seeking to leverage Blockchain's potential in various industries.

FACTS & FIGURES

Zilliga Research Pte. Ltd., 2017, Singapore



TECHNICALS

Consensus Mechanism	Hybrid Consensus Mechanism (Proof of Work ensus Mechanism with Practical Byzantine Fault Tolerance pBFT)	
Transaction Finality Time		35s
Stated Capacity		2,800TPS
Average Transaction-Fee		USD 0.001
Total number of Transactio	ns since inception on Mainnet	54M





PROTOCOL CHARACTERISTICS

Zilliqa stands out in the Blockchain world for its early adoption and implementation of sharding technology. This approach allows Zilliqa to scale in response to increasing network demand, significantly enhancing transaction throughput. Sharding involves dividing the network into smaller, more manageable groups of nodes, each capable of processing transactions in parallel, leading to higher overall network capacity and efficiency.

Zilliga's primary focus is on scalability and security, two critical aspects that often challenge Blockchain networks. Its unique protocol increases transaction rates as the network expands, a feature that is particularly beneficial for applications requiring high throughput, such as digital advertising, Decentralised finance (DeFi), and gaming. The platform's ability to handle a large number of transactions swiftly and securely makes it an attractive choice for developers and businesses in these sectors.

The platform also features a smart contract language, Scilla, designed to ensure contract safety and to prevent security vulnerabilities. Scilla's formal verification capabilities offer an added layer of security, making it suitable for creating complex Decentralised applications that require robust security measures.

In addition to its technological advancements, Zilliga has a strong focus on fostering a vibrant ecosystem. It encourages the development of various applications and projects on its platform, ranging from digital tokens and Decentralised apps to entire Blockchain infrastructures. This emphasis on community and ecosystem development is integral to Zilliqa's strategy to drive widespread adoption and use of its Blockchain technology.

In conclusion, Zilliga's innovative use of sharding technology, combined with its secure smart contract language and commitment to ecosystem growth, positions it as a leading Blockchain platform. Its focus on scalability, security, and community engagement makes it well-suited for a wide range of applications, marking it as a significant player in the evolving landscape of Blockchain technology.





DATA PARTNERS

We are proud to present our data partners, CoinDesk Indices, and Aisot Technologies, who have played a pivotal role in the creation of our "Global Protocol Report." These esteemed partners have provided valuable data that has significantly enhanced two key components of our report:

Protocol One-Pagers: Their data contributions have enriched the individual protocol pages, offering detailed insights that add depth and clarity.

Protocol Characteristics Framework: While the results of this framework are based on calculations by Inacta Ventures Research, our data partners have supplied crucial data inputs that have helped shape our understanding and assessment of various protocol characteristics.

Their collective contributions have been instrumental in the depth and accuracy of our report, underscoring the collaborative effort behind this comprehensive analysis.



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Aisot Technologies

Aisot Technologies, an innovative spin-off from ETH Zürich – one of the world's leading technology institutes, represents an exciting new entrant in the field of artificial intelligence for market analytics. With a fresh and innovative approach, they are beginning to make their mark by integrating AI with advanced data analysis techniques. This approach aims to reveal new perspectives and insights in financial markets, especially in digital assets. As a burgeoning player in the fintech world, Aisot Technologies is dedicated to exploring and developing novel predictive analytics tools, showing promise in their contributions to data-driven decision-making.

Aisot Technologies contributed important market cap data for selected protocols and additionally offer valuable insights into the field of valuation of Cryptocurrencies with their article "Valuing Crypto Coins and Tokens with Artificial Intelligence and Quant Tools".

Disclaimer

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GLOBAL PROTOCOL PROTOCOL 24

