



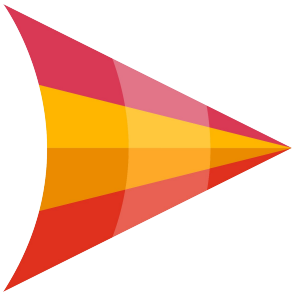
Insights Report: Blockchain Network Performance, Financing, and Key Metrics

Prepared by the Emerging Technology Research Group



Table of Contents

3	Executive Summary
5	Company Data & Analysis
	Algorand
	Avalanche
	Cardano
	Celo
	Consensys Quorum
	Ethereum
	Hyperledger (Fabric)
	R3 Corda
	Ripple
	Solana
	Stellar (scoring analysis)
25	Comparative Analysis
	Measures & Metrics
	Scoring
27	Investor Summary



About the Analysis

Analysis Components

Areas under research and analysis include but are not limited to:

- Funding information
- Protocol/platform mission and primary use cases
- Consensus and validation mechanisms
- Protocol performance
- Privacy, information security, and decentralization
- Development ecosystem (key partnerships and collaborations)

Scoring Overview

Our analysis is intended to be holistic, and compares each protocol against several metrics. Note that a rating of one (1) or two (2) indicates a weak capability for the metric, three (3) indicates an average capability, four (4) indicates a strong capability, and five (5) indicates that the protocol is a leader in that metric. The metrics are shown below:

1. Investments:

- Number of unique investors and the caliber of investors
- Total dollar value of investments
- Number and size of funding rounds

2. Ecosystem:

- Number of applications built on the blockchain protocol and number of developers working on the protocol
- Usefulness, robustness, and level of application adoption
- Community outreach initiatives
- Number and type of available coding languages
- Number and caliber of partnerships with the platform

3. Composability:

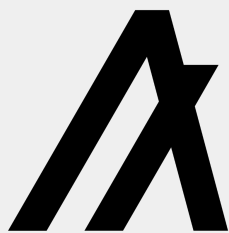
- Smart contract programmability and ease of application development
- Interoperability with other blockchains and layer 2 solutions (if applicable)

4. Performance: speed, cost, scalability, security, and decentralization

5. Maturity: number of years the company has been in existence, when the protocol was launched and how long its use cases have been active, market capitalization, number of employees

- (this definition does **not** include how far along the platform is in reaching its stated goals, the maturity of its investors or how long it has held its investors, or the amount of subjective “work” that has gone into maturing the company through governance, security checks, third party reviews, etc.)

Scoring is on the second page of each company feature and summarized on page 26.



Analyst Report

Algorand

Updated: September 2021

Overview

Designed to address blockchain's scaling challenge and to enable developers to create new applications built on cryptocurrency, Algorand's goal is to eliminate barriers to prosperity for all. The platform, founded by Turing Award winning MIT professor Silvio Micali, uses a permissionless, secure, and decentralized user consensus to enable rapid, non-forkable transactions.



Boston - 2017



Use cases: DeFi, digital assets, identity mgmt.



145 employees



Silvio Micali, Ph.D
Founder & Principal



Funding: \$66M



No. Unique Investors: 33

Company & Protocol Differentiators:

Pure Proof-of-Stake (POS): Finalize blocks in seconds without forking through cryptographic sortition

Cryptographic Sortition: Randomly selected users propose blocks and vote on consensus; adversaries do not know who to attack until the block is already committed to the chain

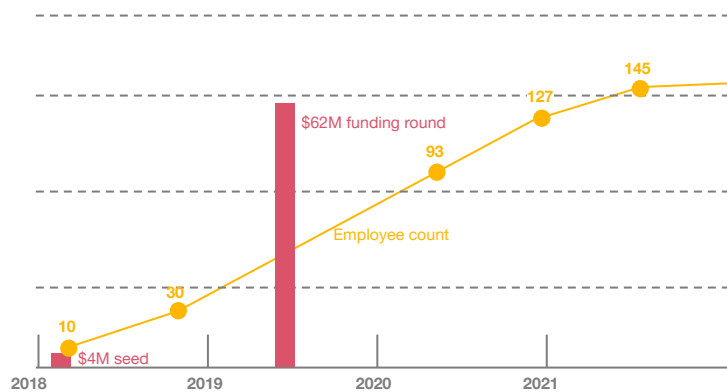
Soft Vote: Committee can vote until one block is left

Certify Vote: Separate committee votes to verify soft vote

Carbon Credits: Algorand regularly pays enough carbon credits to be net carbon negative

Key Financials

The non-profit Algorand Foundation's initial seed funding was provided by Pillar and Union Square Ventures in February 2018, which was followed up in 2019 by a \$62 million investment by the same investors in addition to Eterna Capital, China Merchants Bank, and Slow Ventures. Additionally, blockchain-focused venture capital (VC) firm Algo Capital raised \$200 million for its Algo VC fund to invest in businesses building on top of Algorand. Algorand recently launched the Viridis DeFi Program, a \$300M fund to support DeFi innovation on the Algorand network. According to Arrington Capital (founded by Crunchbase founder Michael Arrington), Algorand has received more than \$500 million in strategic investments.



Source: Pitchbook

Ecosystem Analysis

Founded by an MIT professor, Algorand features a strong university backing, developer tools, and a partnership program to accelerate blockchain growth and adoption. The vast partnership network has led to use cases and decentralized applications (dApps) spanning supply chain, public sector, gaming, decentralized finance (DeFi), identity management, and more.

Notable Platform Development

Marshall Islands: Algorand was selected to power the first national digital currency

SIAE: Ecosystem for copyright management using NFTs on Algorand's platform

VeriTX: Digital commerce marketplace for Aerospace & Medical parts industries

ClimateTrade: Offset of CO2 emissions and **PlanetWatch:** Planet tokens on Algorand

Opulous: Decentralized financial solution for artists; increases artists' access to capital

Yieldly: DeFi platform on Algorand; allows users to stake, pool, and swap assets

Notable Partnerships

Instamatch: Partnership to enhance payments, Islamic banking, and RegTech offerings

BridgeTower Capital: PE firm using Algorand to issue BridgeTower Capital digital security

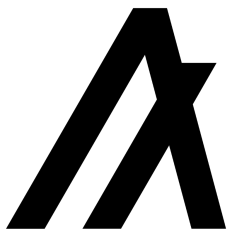
Marketing Claims

Algorand claims to solve the trilemma of blockchains (decentralization, security, scalability) and to be the world's first pure proof-of-stake blockchain. It also claims to be a carbon negative chain by purchasing carbon credits for each transaction.

Specs

Details

Public / Private	Public
Consensus Mechanism	Pure Proof-of-Stake
Validation Method	Cryptographic Sortition
Native Token	ALGO
Throughput	10,000 TPS
Latency	5 seconds
Transaction Fee	\$0.001 / .00088 ALGO
Smart Contract Support	Yes
Programming Languages	JavaScript, Java, Python, Go
Supported Stablecoins	ASA Token, USDC, USDT, others
Security	Built into consensus (see above); \$2M bounty program



Analysis

Algorand

Updated: September 2021

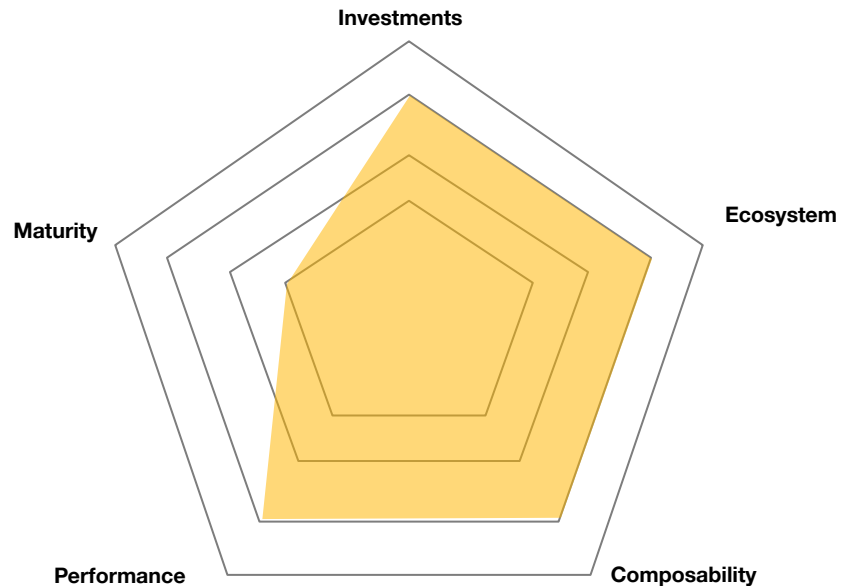
Investments (4): A large number of investors have invested in the Algorand ecosystem over the past 3 years.

Ecosystem (4): There 700 organizations building on Algorand and 500+ projects being built on top of it, with more than 11 million users. In addition, the platform has the significant university support as it was founded by members of established academic institutions.

Composability (4): Algorand works well with a plethora of use cases as a layer 1 protocol, and is being actively being built on by developers of multiple use cases. Algorand is actively working on multiple initiatives to improve operability, such as Stacks and pNetwork ([source](#)).

Performance (4): Algorand is very unique in that it provides a high level of performance and scalability through a layer 1 solution. However, it does not compare to a protocol such as Solana which has a much higher capacity for transaction throughput and latency.

Maturity (2): Given that Algorand was not founded until 2017 and its mainnet was not live until 2019, it is relatively new in the market.



PwC's Take

Algorand is often associated with its founder, Silvio Micali, the Italian computer scientist who won the Turing Award in 2012 for his work in cryptography. Algorand, similar to other blockchains in this analysis, claims to be sufficiently decentralized, secured, scalable, and to provide quick transaction finality - to this point, we do not have any evidence to the contrary. Algorand's innovative Pure Proof-of-Stake consensus uses randomized committees to vote on the state of the blockchain, ensuring that bad actors cannot easily attack the chain. This provides a level of security and decentralization unique to the Algorand blockchain. One other unique aspect of Algorand is that it has net zero carbon emissions, as it purchases carbon credits to offset the blockchain's emissions.

Having just announced the Viridis DeFi Program, a \$300M fund to support DeFi innovation on the Algorand network, and re-allocating 50 million ALGO from the AlgoGrant fund to exclusively support the development of DeFi infrastructure and applications (Dapps), Algorand is focusing intently on supporting development of the DeFi ecosystem going forward. This will include decentralized exchanges, money markets, options markets, synthetic asset applications and NFT platforms.

USDC Information: Total Supply: \$18T, Circulating Supply: \$195M



Analyst Report

Avalanche

Updated: September 2021

Overview

Ava Labs, a for-profit organization founded by Cornell researcher Emin Gün Sirer in 2018 and supported by pseudonymous Team Rocket, created the Avalanche platform which is powered by Avalanche Consensus. The aim of Avalanche is to provide a unifying platform for the creation, transfer, and trade of digital assets.



San Francisco - 2017



Use cases: digital assets, transfer software, DeFi



42



Founder: Emin Gün Sirer



Funding: \$60M



Unique Investors: 15

Key Financials

Avalanche (the blockchain platform, not Ava Labs) raised \$42 million from an ICO. Avalanche closed on a \$12m private sale of AVAX. AVA labs completed a \$6m Series A in February 2019. Ava Labs also raised funding from Andreessen Horowitz (a16z), Initialized Capital and Polychain Capital, in addition to angel investments from Balaji Srinivasan and Naval Ravikant.

Deal Type	Date	Amount
Early Stage VC	02/2019	\$6M
Early Stage VC	05/2020	\$54M

Source: Pitchbook

Company & Protocol Differentiators:

Snow consensus protocols: Slush, Snowflake, Snowball, Avalanche

Heterogeneity: Separate blockchains protocols tailored to specific use cases, but able to interact with each other

Unlimited participants: increases scalability of network

Avalanche Bridge: a cross-chain bridging technology

Metastable mechanism: repeated random subsampling of the network to steer nodes toward the same outcome

Parallel consensus model: each client interacts independently with its own replicated state machine (RSM), rather than a single RSM

Ecosystem Analysis

The Avalanche team has a wide ecosystem consisting mainly of financial and DeFi use cases. The "Avalanche Rush" liquidity mining program is a \$180M initiative intended to bring top DeFi apps to Avalanche.

Notable Platform Development

ChainSafe: Used to develop a cross-chain Ethereum bridge

Pangolin: Community-driven decentralized exchange for Avalanche and Ethereum assets with "fast settlement, low fees, & democratic distribution"

SushiSwap: DeFi platform to swap, earn, stack yields, lend, & borrow

Aave: Allows users to borrow, supply, and earn interest on crypto assets

Curve: Enables Avalanche users to exchange stablecoins with low fees

Notable Partnerships

Reef Finance: A cryptocurrency platform for DeFi, allowing access to applications in the Avalanche ecosystem directly through Reef's platform.

UNION: Brings cross-chain DeFi protection to the platform by deploying collateral optimization instruments and bundled insurance coverage

Marketing Claims

Claims to have the most validators securing its activity of any proof-of-stake protocol. Avalanche also claims that it is the fastest smart contract platform as measured by time-to-finality

Specs

Details

Public / Private	Public (with option for private)
Consensus Mechanism	Leaderless BFT
Validation Method	Validator Nodes
Native Token	\$AVAX
Throughput	5,000 TPS per subnet, up to 10,000+
Latency	1 second
Transaction Fee	75 - 225 nAVAX (GWei) / \$.000268 - \$.000805
Smart Contract Support	Yes, custom smart contracts
Programming Languages	Solidity, Go, Javascript, claims to use others
Supported Stablecoins	USDT, FRAX, trueUSD, e-money partnership
Security	Enforces regulatory requirements to join a subnet; Upholds safety when attacker exceeds 51%



Analysis

Avalanche

Updated: September 2021

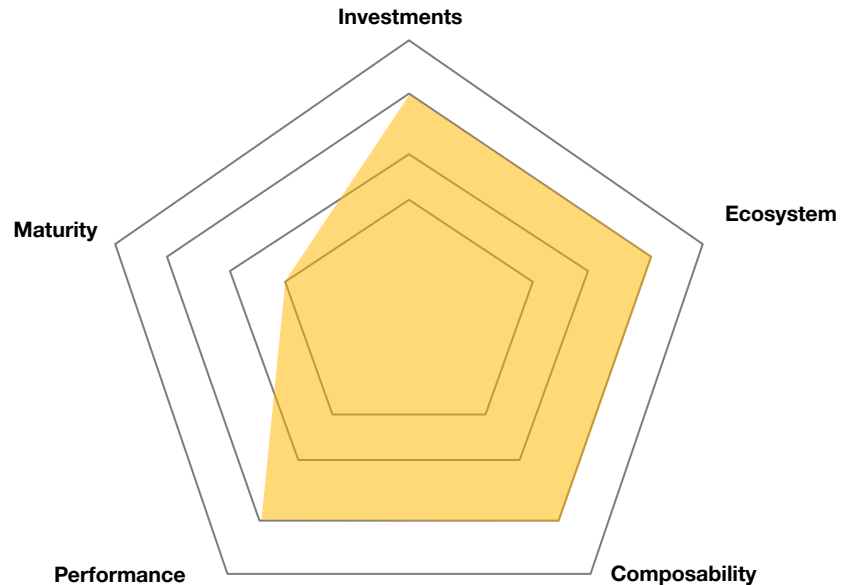
Investments (4): Between the AVAX token and Ava Labs, Avalanche has received a significant amount of investment from leading venture capitalists.

Ecosystem (4): Avalanche has developed a large ecosystem of applications and participants, as it is sometimes referred to as the chain that other blockchains can build upon.

Composability (4): As Avalanche can act as the fundamental building block for nearly any blockchain or application, it is extremely modular. It works across use cases and emphasizes interoperability across chains.

Performance (4): Avalanche has extremely fast throughput and low latency, and keeps an eye on future scalability with the Apricot upgrade.

Maturity (2): Ava labs was not founded until 2017, and the mainnet has only been live since 2020. Similar to Algorand, Avalanche is a very nascent blockchain protocol.



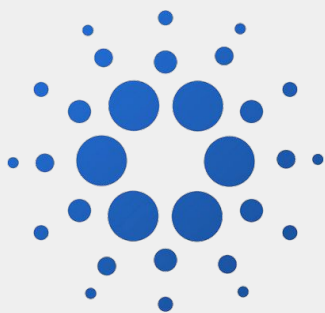
PwC's Take

The Avalanche blockchain is relatively unique in that it was first proposed in the Avalanche whitepaper by a pseudonymous group of developers named Team Rocket, assisted by Cornell professor Emin Gun Sirer. This makes it the only anonymous blockchain protocol in this analysis, something that may appeal to those who are concerned about a centralized team of developers.

Avalanche claims to have the fastest smart contract platform, which we have not found to be true in this analysis (see Solana). It also claims to have the most validators of any proof of stake blockchain - we cannot validate that this is true, as other blockchains such as Cardano appear to actually have more validators ([source](#)).

Similar to Algorand, Avalanche is betting on the future of DeFi via its "Avalanche Rush" liquidity mining program, a \$180M initiative intended to bring top DeFi apps to Avalanche. Most of the platform's current use cases are financial-focused or are intended to build more interoperability with the Ethereum ecosystem in order to allow for more DeFi development.

USDC Information: USDC adoption was announced to be coming soon



Analyst Report

Cardano

Updated: September 2021

Overview

The Cardano Foundation, a non-profit organization supported by IOHK (blockchain infrastructure partner) and EMURGO (for-profit arm of the network). Founded by Ethereum co-founder Charles Hoskinson, it prides itself on providing peer-reviewed blockchain technology. Cardano focuses on a foundational use cases such as supply chain tracking and identity management.



Zug, Switzerland - 2015



Use Cases: Identity Management, traceability



15-30 employees



Founder: Charles Hoskinson



Funding: Undisclosed



Ken Kodama
Global CEO, EMURGO

Company & Protocol Differentiators:

Epochs/Slots: Chains are divided into epochs, which are further divided into slots; slot leaders are selected for each "time slot", and they add blocks to the chain based on the last few blocks of the chain

Stake pools: Run by node operators with the infrastructure required to ensure a consistent and reliable connection to the network; users can operate a stake pool or delegate a stake in ADA to receive rewards

Hydra: Layer 2 protocol to increase throughput; uses sharding of stake space rather than sharding the ledger itself

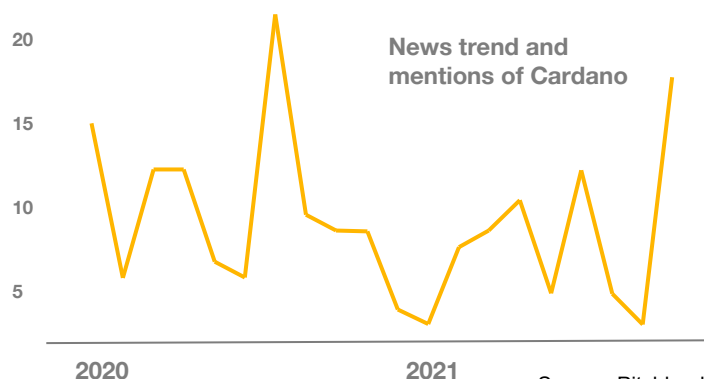
Cardano Settlement and Computational Layers: Used to improve transaction efficiency and reduce fees

Key Financials

As a developer of blockchains intended for large corporations and governments, IOHK aims to increase education, awareness, and participation in the blockchain space by contributing to academic research via partnerships and programming.

IOHK, EMURGO, and the Cardano Foundation have very limited publicly available funding information. IOHK launched a fund in 2020 called the cFund that invests up to \$500k using Cardano or other IOHK tech initiatives. ([source](#))

EMURGO established the EMURGO Academy to establish learning pathways and support for builders on Cardano.



Ecosystem Analysis

Still in beginning stages of development, Cardano has focused on use cases for traditional blockchain applications such as supply chain management. Cardano will soon be able to implement DeFi and NFT services with its most recent upgrade with its upgrade to enable smart contracts on the platform.

Notable Platform Development

Atala PRISM (IOHK): Credential verification, digital identity, onboarding (KYC/AML)

Atala SCAN (EMURGO): Supply chain tracking, medicine authentication

Confirm: Increases the security of the blockchain and the ADA token

Notable Partnerships

Georgia: Cardano and Atala are being used to build credential verification system

New Balance: Pilot program using Cardano blockchain to track authenticity of shoes

Ethiopia: Working with IOHK to explore benefits of Cardano, including plans to launch an identity and record-keeping system for five million students

Tanzania: In partnership with World Mobile, Cardano is working to provide telecom customers a digital identity, as well as to provide ADA as a viable payment method

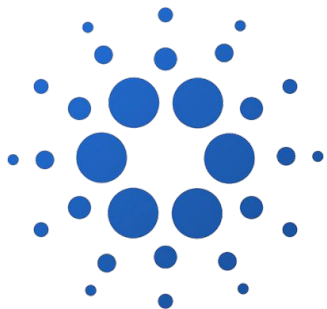
Marketing Claims

Cardano claims to be the first proof-of-stake blockchain founded on peer-reviewed research and that is verifiably secure.

Specs

Details

Public / Private	Public
Consensus Mechanism	Ouroboros: proof-of-stake
Validation Method	Stake Pool
Native Token	ADA
Throughput	250 TPS
Latency	20 seconds (per block), 5-10 minutes for irreversibility
Transaction Fee	0.16 ADA / \$0.466
Smart Contract Support	Just announced
Programming Languages	Plutus (Haskell), Marlowe
Supported Stablecoins	AgeUSD, Djed
Security	Peer-reviewed research



Analysis

Cardano

Updated: September 2021

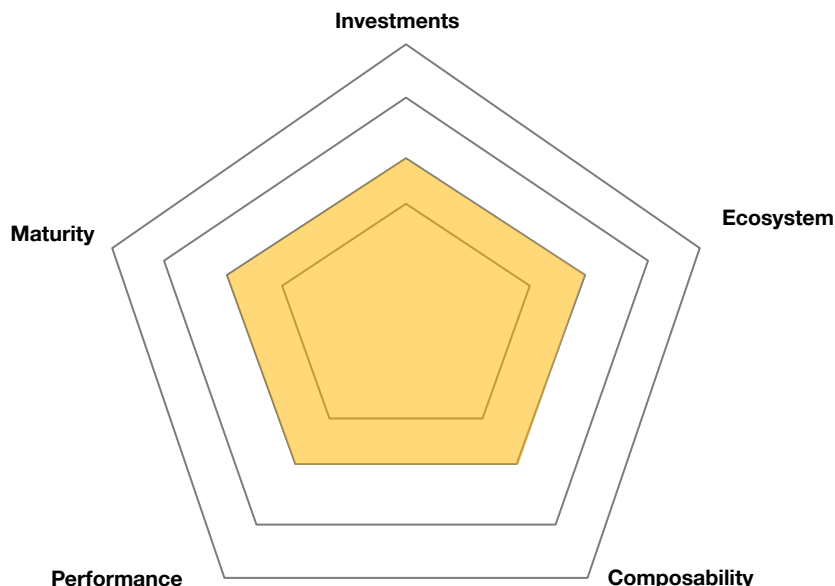
Investments (3): Given the limited availability of information related to Cardano's funding, it is ranked as average in this analysis.

Ecosystem (3): Between Emurgo, IOHK, the Cardano Foundation, the Cardano Ambassadors program, and other industry participants, Cardano has a very robust support system. However, without smart contracts or a significant number of DApps, development is limited.

Composability (3): As Cardano completes more updates (Goguen release is ongoing as of this writing), it should become more smart-contract compatible, DeFi-friendly, and be interoperable with other chains; however, it has much room for growth.

Performance (3): Cardano has relatively average performance capabilities compared to the other protocols in this analysis.

Maturity (3): Cardano was founded in 2015, and the blockchain was officially launched in 2017, leaving it to be somewhat average in terms of its length of history.

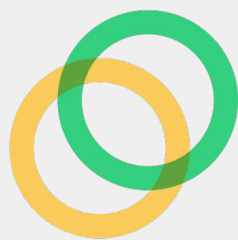


PwC's Take

Cardano, similar to other blockchains in this analysis, has been surrounded by quite a bit of hype as it relates to ADA's market value. This may be due to its claim that it's the first proof-of-stake blockchain founded on peer-reviewed research and that it is verifiably secure (and that it verifiably chooses validators at random). This is a bold claim in the crypto space, as nearly all cryptocurrencies are open-source, and are reviewable by any peers at any time; however, Cardano has 100+ of peer-reviewed papers that tackle each aspect of the cryptocurrency space. These papers are reviewed not only by developers or community members, but also at conferences by scientists and and programmers in academia. Given that other cryptocurrencies in this analysis were founded by university professors or researchers (i.e., Avalanche and Algorand), we are not completely convinced that the technology underlying Cardano is more or less "peer reviewed" than any others, especially as Bitcoin has been rigorously analyzed (and more importantly, tested in practice) for a much longer period of time.

Cardano has just launched a smart contract capability with the completion of its most recent phase of development, opening up new use cases and market opportunities to current and prospective users of the platform. We expect the variety of use cases to increase with these new capabilities, capturing DeFi applications and exchanges, and for additional features in established use cases such as transaction exchanges, digital identity, and supply chain tracking.

There is no evidence that Cardano has USDC adoption at this point.



Analyst Report

Celo

Updated: September 2021

Overview

Built based on a fork of the Ethereum blockchain, Celo, supporting by the non-profit Celo Foundation, is a mobile-first platform designed to make financial dApps and crypto payments accessible to anyone with a smartphone - what Celo calls an "ultra-light client". Founded on the premise that emerging markets need access to stable currencies, the Celo Foundation focuses its initiatives on serving these developing countries.



San Francisco - 2017



Use Cases: Mobile transactions, stablecoins



56 employees



Rene Reinsberg
Co-Founder & CEO



Funding: \$57.17M



Unique Investors: 45

Company & Protocol Differentiators:

BFT Proof of Stake (POS): Use of active validators and registered validators

Locked Gold: Smart contracts to hold balances before voting

EVM-ERC20: Smart contracts are fully compatible with EVM; native support for multiple ERC20-like stable currencies

Gas & Tip: Price based on EIP-1559 with last block setting next price, payment above base gas fee is a tip reward to validators.

Address-Based Encryption: Phone number tied to Celo address

EigenTrust: Reputational score system for each phone number

Key Financials

In June of 2018, the the Celo Foundation received its initial seed funding in the amount of \$6.5 million from 24 different investors. Nearly one year later, it received \$30 million from a16z (Andreessen Horowitz) and Polychain Capital. It conducted an ICO in 2020 and received several more rounds of venture funding since that point, \$20 million of which came from multiple institutional backers such as a16z, Greenfield One, and Electric Capital.

Deal Type	Date	Amount
Early Stage VC	6/22/18	\$6.5M
Accelerator	6/1/21	
Later Stage VC	01/22/21	\$30.67
Later Stage VC	02/10/21	\$20.0M
Later Stage VC	04/20/21	

Source: Pitchbook

Ecosystem Analysis

Celo has a strong focus on mobile devices and provides a platform for developers to build dApps. Celo's user base is growing with recent investments by Polychain Capital and Andreessen Horowitz. It has widespread support from public sector institutions, financial companies, tech firms, and members of academic institutions.

Notable Platform Development

PayU: Stablecoin payments for more than 450,000 merchants in 50 markets

FinClusive: Partnership announced which aims to bring a fully compliant (AML/KYC, etc.) USD leveraging Valora (native wallet to Celo)

DuniaPay: West African banking app, announced support for in-app crypto transactions using cUSD and cXOF (a stablecoin that tracks the value of the CFA franc)

Notable Partnerships

Alliance for Prosperity Program: A cryptocurrency network of 100+ members that supports developers building dApps on Celo, notable members include Coinbase Ventures and Andreessen Horowitz

Celo Foundation Grants Program: Designed to support initiatives committed to building financial systems for shared prosperity

Marketing Claims

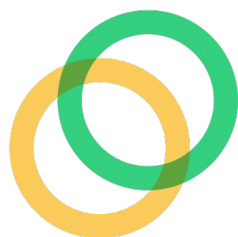
Claims to have been carbon negative for 480+ days, that it provides a social good and empowers unbanked communities, and that it allows for conditions of financial prosperity for everyone.

PwC | AI & Emerging Technology

Specs

Details

Public / Private Protocol	Public
Consensus Mechanism	BFT Proof of Stake
Validation Method	Validator Nodes
Native Token	CELO, cUSD
Throughput	1,000 TPS
Latency	6 seconds
Transaction Fee	Variable
Smart Contract Support	Yes, uses EVM - ERC20
Programming Languages	Python, Java, JavaScript
Supported Stablecoins	cUSD, cEUR, USDC announced
Security	Smart contract audit by OpenZeppelin, verification of gov. protocols by Certora Other audits here



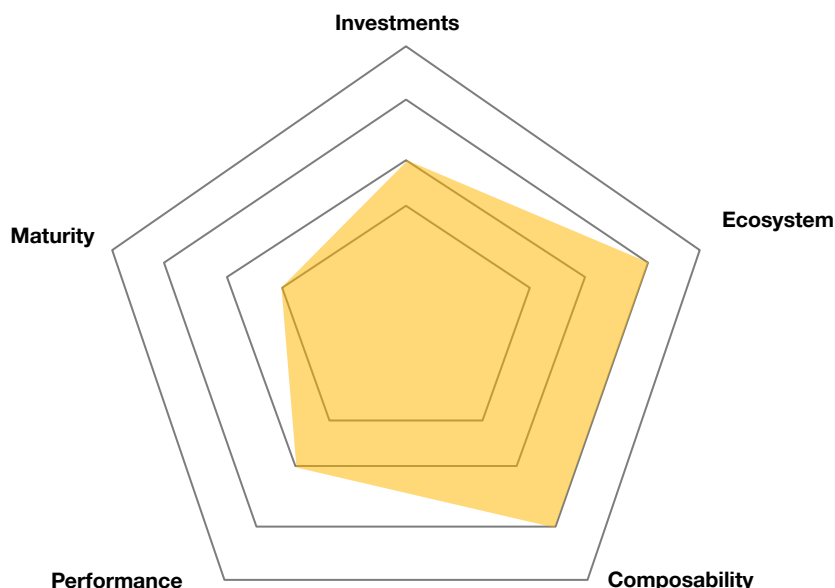
Investments (3): With a mix of investors and partnerships, Celo can continue to grow. It does not yet have the large amount of absolute funding relative to others in this comparison.

Ecosystem (4): Celo has a strong ecosystem with funds and grant programs to support builders; there is a solid following and large support for Celo's mission of better economic conditions for all.

Composability (4): Given that Celo is a fork of Ethereum, it has a shared history with the predecessor chain as well as interoperability with Ethereum Virtual Machine (EVM) and is ERC-20 compatible.

Performance (3): Celo's throughput is low relative to peers, which brings into question scalability for the ecosystem.

Maturity (2): Founded in 2017 and with its mainnet not live until 2020, Celo is still a new company in later-stage VC rounds and has a relatively low market capitalization.



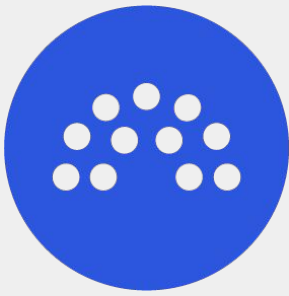
PwC's Take

Celo is most well-known for the fact that it is a mobile-first platform, meaning that its intention is to make the power of blockchain accessible to anyone with a smartphone. It was built for use cases involving international payment transfers and appears to be fulfilling that goal. Having received funding from az16 as well as Polychain Capital, CELO is repeatedly backed financially by strong supporters who will ensure that it has the resources to become a large player in the crypto payments space.

Celo claims to have been carbon negative for at least a year now, and it does this through contributing daily carbon offsets through the network protocol (by funding community tree planting on [Wren](#)). It also claims to power unbanked communities. At this point in time, there is no substantial evidence that Celo is not fulfilling its marketing claims, and it continues to push marketing in support of these key messages.

Celo has and continues to focus on use cases involving international remittance payments and money transfer, stablecoins, and the like. Celo appears to be doubling down on this foundational decentralized financial use case.

USDC Information: USDC adoption was announced to be coming soon



Analyst Report

ConsenSys Quorum

Updated: September 2021

Overview

Originally built by J.P. Morgan to leverage the Ethereum network, Quorum is an open source protocol layer on which to build applications, most of which are finance-sector focused. Consensys since acquired Quorum, and offers services including consulting, development, issuing of turn-key blockchain-based projects, token sale advisory, and smart contract audits.



New York - 2014



Use Cases: Trade finance, banking, enterprise focus



500+ employees



Joseph Lubin
Co-Founder & CEO



Funding: \$83M



Unique Investors: 23

Company & Protocol Differentiators:

ConsenSys QuorumChain: Majority voting protocol

Permissioned: Only implemented between approved participants

Quorum Node: A command-line tool which is a lightweight fork of Geth

Supports public/private: Public transactions occur in Ethereum, private enabled through "private transaction manager" (Constellation or Tessera)

Enclave: Independently manages cryptography operations (a "virtual hardware security module")

No gas fees: Behavior is influenced by a known authority, rather than economic incentives such as gas fees

Key Financials

ConsenSys raised \$65 million from J.P. Morgan, Mastercard and UBS AG, as well as blockchain companies Protocol Labs, the Maker Foundation, Fenbushi, The LAO and Alameda Research. Additional investors include CMT Digital and the Greater Bay Area Homeland Development Fund. In August 2020, ConsenSys acquired the Quorum open-source codebase.

Financing for ConsenSys is below:

Deal Type	Date	Amount
Seed	11/2018	\$8M
Early Stage VC	07/2019	\$10M
Debt - PPP	04/2020	\$10M
Later Stage VC	04/2021	\$65M

Source: Pitchbook

Ecosystem Analysis

ConsenSys Quorum consists of two open-source projects: Hyperledger Besu and GoQuorum. Many of the ConsenSys use cases are supported by ConsenSys Codefi, a suite of nine product modules for commerce and finance, and ConsenSys Diligence, a service for security and smart contract audits.

Notable Platform Development

Covantis Initiative: Trade finance company chose ConsenSys to develop new platform

Project Khokha: South African Reserve Bank, in consortium with 7 commercial banks, used Quorum to create a blockchain-based interbank system

Project Ubin: Real-time gross settlement system for the Monetary Authority of Singapore

Kaleido: Used by AWS and many others to stand up a production-ready blockchain

Metamask: Widely-used software cryptocurrency wallet to interact with Ethereum

Notable Partnerships

JPMorgan: ConsenSys acquired the Quorum platform from J.P. Morgan in 2020, and the two organizations continue to collaborate via the Enterprise Ethereum Alliance

Microsoft: ConsenSys is working with Microsoft to provide customers an easy way to deploy and manage blockchain pilots and production use cases on Microsoft Azure

Blockchain-based Service Network (Mainland China): Partnership to make blockchain more accessible - ConsenSys Quorum to serve as protocol layer for businesses

Marketing Claims

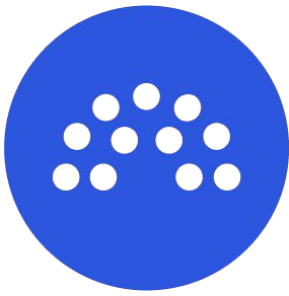
ConsenSys claims to provide the most trusted Ethereum blockchain solutions.

Specs

Details

Public / Private	Private or Public
Consensus Mechanism	QuorumChain, RAFT, PoA, or Istanbul BFT, PoW
Validation Method	Proof of Authority
Native Token	Ether
Throughput	100-2,000 TPS
Latency	463ms - 4.5 seconds
Transaction Fee ^o	0
Smart Contract Support	Yes
Programming Languages	Java, Solidity
Supported Stablecoins	JPM Coin
Security	Private ledger

^ono fee per transaction



Analysis

ConsenSys Quorum

Updated: September 2021

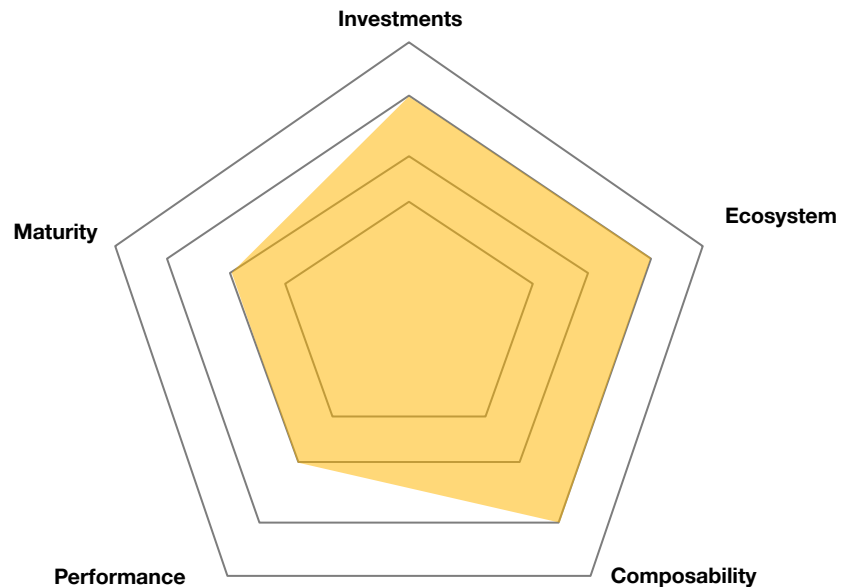
Investments (4): ConsenSys has raised close to \$100M from several large and influential investors, and appears to be running a relatively successful business.

Ecosystem (4): As there is much overlap between the Ethereum and ConsenSys Quorum ecosystem, and based on the number and caliber of its partnerships, the protocol ecosystem ranks high in this regard.

Composability (4): Quorum offers options with existing tools such as MetaMask or OpenZeppelin, and retains compatibility with the Ethereum Mainnet. Quorum has much the same functionality as Ethereum, but as a private ledger, it can be foundational for financial use cases.

Performance (3): Similar to Ripple, Quorum has a very high level of performance relative to Bitcoin or Ethereum; its efficiency varies based on whether the transactions are private or public.

Maturity (3): ConsenSys was founded in 2014; however, Quorum was not created by JPMorgan until 2016. Quorum is a relatively established blockchain protocol originally developed by J.P. Morgan, a very established company; however, it is still young as a technology.



PwC's Take

Having been created by JP Morgan, Quorum is extremely focused on the finance-sector. Even more, its investors are often banks or other financial institutions. Even though Quorum is known for enterprise financial use cases, Quorum is moving more towards compatibility with the Ethereum ecosystem and decentralized finance use cases (the ConsenSys founder, Joseph Lubin, was a co-founder of Ethereum). This includes applications in areas such as identity management (uPort), wallet services (MetaMask), and media (Civil) among other decentralized applications.

ConsenSys claims to provide the most trusted Ethereum blockchain solutions. We cannot validate this claim, but at this point, there are few reasons to distrust the company or the protocol. J.P. Morgan is a very established bank that continues to support the initiative, a fact which provides an enhanced level of trust that financial institutions often seek in service providers.

There is no evidence that Quorum has USDC adoption at this point.



Analyst Report

Ethereum

Updated: September 2021

Overview

Ethereum is a public blockchain network supported by the non-profit Ethereum Foundation. The first of its type, Ethereum provides a platform to deploy permanent and decentralized applications with smart contract capabilities. Several blockchains in this analysis are simply “forks” of Ethereum.



Founded: 2013



Use Cases: DeFi, NFTs, anything w/ smart contracts



125 employees



Founder: Vitalik Buterin



Funding: \$15M



N/A

Company & Protocol Differentiators:

Universality: Turing-complete scripting language can be used to create any number of applications on top of it

Accounts: Make up the state of the blockchain, state transitions are direct transfers of value/information between accounts.

Ethereum 2.0: Set to roll-out in late 2021, switch from proof-of-work to proof-of-stake as well as the addition of sharding

Sharding: Break up verification to sets of nodes rather than every node, allows for parallel processing to increase capacity

Rollups: Perform transaction *execution* outside the main Ethereum chain, but post transaction *data* on layer 1; improves scalability

Key Financials

The Ethereum foundation raised \$15 million of venture funding via an undisclosed crowdfunding platform on September 10, 2014 - Yushan Ventures participated in the round. It also raised an undisclosed amount of venture funding from Atopia Capital and 24 other investors via BnkToTheFuture in 2019. The Ethereum Foundation raised an undisclosed amount of venture funding from FD7 Ventures in February 2021; Decentral Park Capital, Synapse Capital, Kintsugi Ventures, Codex Venture Partners and Panda Capital (Hong Kong) also participated in it the funding round.

Deal Type	Date	Amount
Early Stage VC	09/2014	\$15M
Early Stage VC	1/2019	
Secondary Transaction	01/2021	
Later Stage VC	02/2021	

Source: Pitchbook

Coinbase posted on August 24th, 2021, that the Ethereum Foundation secured \$1.5M in donations to support technical upgrades for “Ethereum 2.0”. ([source](#))

Ecosystem Analysis

The Ethereum Foundation has an Ecosystem Support Program which is a large-scale effort aimed at ensuring teams have financial support and guidance for projects. Ethereum is also supported by the Enterprise Ethereum Alliance which boasts 100+ members. Ethereum has the most developer activity of the platforms in this analysis, and its applications are diverse, spanning from financial, games, identity-based, NFTs, among many others.

Notable Platform Development

DeFi: Aave, Compound, Oasis, Uniswap Augur, Nexus Mutual, Zapper, Tornado cash

NFTs: ERC-721 and ERC-1155 standards - CryptoKitties, Sorare, Rarible, SuperRare

Decentralized Autonomous Organizations (DAOs): MakerDAO, MolochDAO, LexDAO

Notable Partnerships

Enterprise Ethereum Alliance: Corporate partnerships with 100+ organizations including ConsenSys, Hyperledger, JP Morgan, Microsoft, SAP, and others

Amazon Web Services (AWS): Made Ethereum the open-blockchain standard after adding it as an option for its Amazon Managed Blockchain.

Marketing Claims

Ethereum claims that Ethereum DeFi applications can send, receive, borrow, earn interest, and stream funds anywhere in the world; it claims to provide free and open services, and to be a simple platform for developers to build applications.

Specs

Details

Public / Private	Public / private
Consensus Mechanism	PoW (soon to be PoS)
Validation Method	Validator nodes
Native Token	ETH
Throughput	16.5 TPS
Latency	Variable (15 seconds - 6 minutes)
Transaction Fee	Varies: ~\$2 - \$68
Smart Contract Support	Yes
Programming Languages	Solidity, Go, C++, Python, Java, others
Supported Stablecoins	Dai, USDC, etc.
Security	Secured by ETH and the PoS consensus mechanisms (in Ethereum 2.0)



Analysis

Ethereum

Updated: September 2021

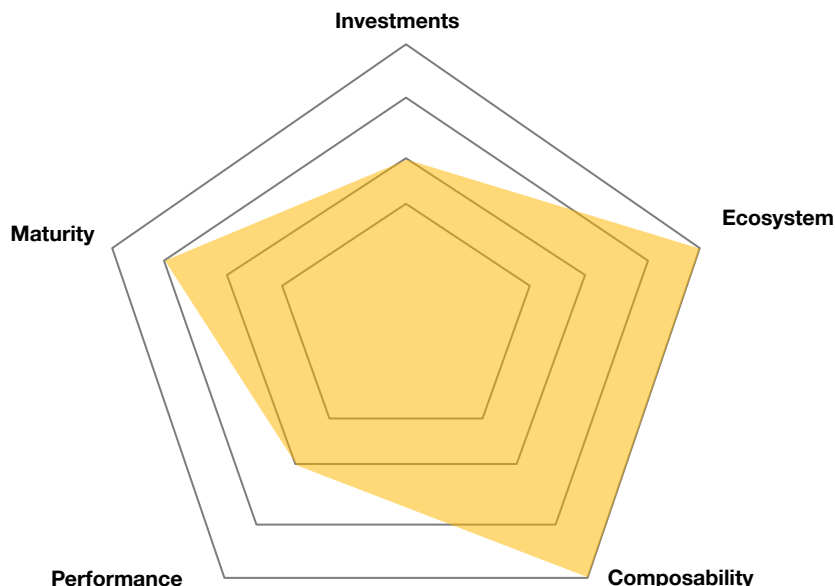
Investments (3): Ethereum does not have a private company that can receive financial investments; however, the ecosystem and the Ethereum Foundation does receive donations as well as tangential investments into the ecosystem. Given that direct investments are unclear or unknown, this is rated as average.

Ecosystem (5): Ethereum has the most robust ecosystem of all the protocols analyzed, especially as many of them are simply different iterations of Ethereum.

Composability (5): Given that Ethereum is essentially the de-facto leader in composability in the blockchain space, and that it has a large ecosystem constantly attempting to remain Ethereum and ERC-20 compatible, it can be considered extremely robust in this regard.

Performance (3): Although Ethereum can be considered fast compared to traditional financial processes and Bitcoin, it lacks the robustness of some of the other protocols in this analysis.

Maturity (4): Being founded relatively shortly after the Bitcoin network started to gain traction, Ethereum is one of the first blockchains, and has the second largest market capitalization behind Bitcoin.



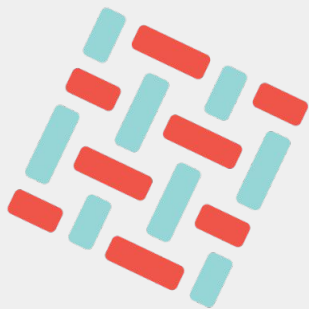
PwC's Take

As one of the first blockchain protocols created after Bitcoin, Ethereum has acted as the first platform where smart contracts and decentralized finance (DeFi) have become commonplace. Even more interesting is that several of the blockchain protocols in this analysis were either founded by Ethereum founders (Cardano) or are forks of the Ethereum blockchain (Celo, Quorum), and if they aren't, they are often working to ensure compatibility with Ethereum standards. This early-mover advantage has made Ethereum the market leader in terms of ecosystem participation and innovation for nearly all use cases that require smart contracts.

We found that Ethereum's market claims are modest relative to the other platforms: it claims to be open-source, easy to build on, and a place to perform financial operations - all of which are true statements. The platform acts as the building blocks to more innovation, validating why most DeFi applications are built on its protocol.

USDC Information: Total Supply: \$26B, Circulating Supply: \$25M, Holders: 1.1M wallets

PwC | AI & Emerging Technology



Analyst Report

Hyperledger Fabric

Updated: September 2021

Overview

Hyperledger is an open-source community established by the Linux Foundation whose mission is to support cross-industry, enterprise-grade blockchain development. It is a global collaboration project and Hyperledger Fabric serves use cases that require identity management, efficient processing, and privacy/confidentiality.



San Francisco - 2015



Use Cases: Supply chain, financial applications



95 employees



Brian Behlendorf
Executive Director



Unknown



Daniel O'Prey
Co-Founder & CEO

Company & Protocol Differentiators: (Hyperledger 2.0)

Simultaneous transactions: Rather than sequential transactions, many transactions are executed simultaneously for enhanced performance

Decentralized chain code management: Post-order execution model where chain code is installed on every peer to approve transactions

Pluggable Architecture: Hyperledger is highly modular and configurable, meaning it can enable innovation across use cases.

No native cryptocurrency: As a permissioned blockchain, it does not need a native cryptocurrency to incentivize mining or to fuel smart contracts, avoiding risk/attack vectors and reducing environmental costs

Key Financials

Hyperledger, created by the not-for-profit Linux Foundation, is an organization which has received contributions from IBM, Intel, and SAP Ariba to support the collaborative development of blockchain-based distributed ledgers. Hyperledger receives its funding through its members, whose contribution is based on their membership tier and can be as large as \$250,000 a year. The Hyperledger protocol is free and open-source.

Deal Type	Date	Amount
Biz Plan Competition	10/2015	\$50K
Acquired	01/2019	
Secondary Transaction	01/2021	
Later Stage VC	02/2021	

Source: CBI

Ecosystem Analysis

Attracting enterprise customers who require privacy and efficiency across use cases, Hyperledger has accumulated more than 150 customers on its platform. It provides a variety of distributed ledger technology platforms; however, Hyperledger Fabric can support many industry use cases including those in pharma, healthcare, supply chain, financial, internet of things, manufacturing, government, and more.

Notable Platform Development

Walmart: Using Hyperledger Fabric to improve supply chain transparency

Sony: Deploying a next-generation credentials platform using Hyperledger Fabric

IBM and Chainyard: Using Hyperledger Fabric to simplify and reduce risk for new vendor onboarding process

Change Healthcare: Using Fabric to improve the healthcare insurance claim life-cycle

Notable Partnerships

Premier members of the Hyperledger ecosystem include Accenture, Consensys, DTCC, Fujitsu, Hitachi, IBM, and JPM; there are 180+ total members

Monetary Authority of Singapore (MAS): Hyperledger is to be a Technical Partner for the Global CBDC Challenge launched by the MAS

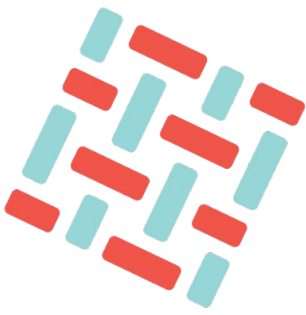
Marketing Claims

Hyperledger claims that Fabric provides a modular architecture that delivers “high degrees of confidentiality, flexibility, resiliency, and scalability” across all industries.

Specs

Details

Public / Private	Private
Consensus Mechanism	KAFKA, RAFT, BFT, crash fault-tolerant (CFT), transaction level consensus
Validation Method	3 phase commit
Native Token	N/A
Throughput	Up to 15,000 TPS
Latency	0.5 - 2 seconds
Transaction Fee ^o	0 (private ledger, nodes owned by owners)
Smart Contract Support	Yes, Chaincode
Total Transaction Volume	Unknown (private)
Programming Languages	Golang, NodeJS, Java, Javascript, RERT, Python, Go
Supported Stablecoins	N/A
Security	X.509 digital certificate for each actor issued by CA PKCS11 standard for hardware security modules



Analysis

Hyperledger Fabric

Updated: September 2021

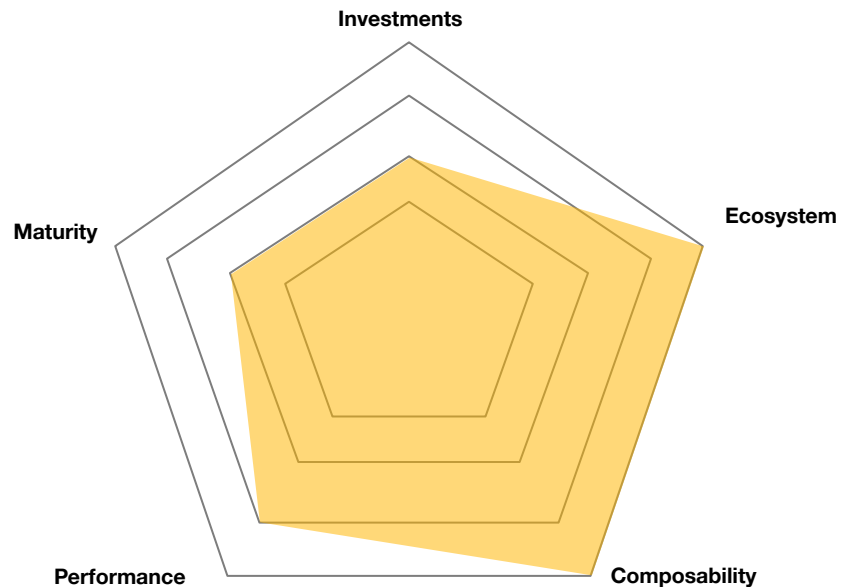
Investments (3): As Hyperledger is a consortium as opposed to a company, it does not receive traditional investments; however, companies such as IBM have invested significant intellectual capital into the protocols built through Hyperledger.

Ecosystem (5): Hyperledger has an extremely robust ecosystem of highly respected participants; companies that use the platform include Walmart, Honeywell, American Express, IBM, and Microsoft.

Composability (5): Hyperledger Fabric was built to be a modular, permissioned blockchain infrastructure; however, for whatever problems Fabric cannot solve, Hyperledger has multiple other innovative blockchain solutions

Performance (4): Hyperledger Fabric has very strong performance capabilities, which can be modified by using different consensus mechanisms, as needed.

Maturity (3): Having been founded and the protocol created in 2015, Hyperledger Fabric has a relatively established history of use in the industry as an open-source, enterprise blockchain option.



PwC's Take

Hyperledger has crowdsourced the development of several blockchain protocols which each serve distinct purposes. This has allowed Hyperledger to ensure an extremely high level of modularity and composability with Hyperledger Fabric, along with its other offerings. On this note, Hyperledger Fabric's use cases are one the most varied in this analysis - they include pharma, healthcare, supply chain, financial, internet of things, manufacturing, government, and more. Since Hyperledger receives such large donations of time from software developers from IBM and other established institutions, it's supported by some of the most capable engineers available in the market.

As Hyperledger Fabric supports various consensus protocols, multiple general programming languages, and provides the ability to create channels for security, we do not see any evidence of falsity in its claims to be confidential, flexible, resilient, and scalable. Hyperledger can likely service most of today's enterprise blockchain needs, and remains to be the protocol of choice for many large, established institutions.

There is no evidence that Hyperledger Fabric has USDC adoption at this point.



Analyst Report

R3 Corda

Updated: September 2021

Overview

Designed specifically to serve highly regulated financial institutions, R3 Corda provides an efficient distributed ledger technology platform for enterprises, and the R3 consortium offers services that support or augment the Corda platform.



London - 2014



Use Cases: Intercompany transactions, CBDCs



315-450 employees



Rene Reinsberg
Co-Founder & CEO



Funding: \$122M



Unique Investors: 52

Key Financials

R3 raised \$122 million of Series A venture funding from Nomura, Bank Bradesco, and HSBC Strategic Innovation Investments on May 31, 2018, putting the company's pre-money valuation at \$100 million. 49 other investors also participated in the round. Additional venture funding was raised from Alberto Chalon on an undisclosed date.

Deal Type	Date	Amount
Early Stage VC	05/2018	\$122M
Later Stage VC		

Source: Pitchbook

Company & Protocol Differentiators:

State: A specific agreement or contract, the state of a specific object

Flow: Small, multi-party sub-protocols used to share transaction data

Notary: provides transaction ordering and timestamping services for a particular piece of the network

Legally enforceable: Corda smart contracts are built in legal prose

Professional Services/Enterprise Licenses: R3 can develop applications and solutions and subsequently provide 24/7 support

Conclave Platform: R3's confidential computing platform that allows users to send data and verify use; it is *not* the same as Corda

Ecosystem Analysis

Primarily serving large corporations in finance, insurance, capital markets, and organizations that value privacy and security, Corda has a vast network of clients and partners building on their network. R3 has over 300 members, and its Partner Connect Program is a specific platform for tools and resources to build on Corda.

Notable Platform Development

R3 Sandbox for Digital Currencies: Through guided learning and a ready-made global payments network, it enables the issuance, management, and distribution of CBDCs

Training: Corda bootcamp, certification program for developers, and Udemy course

GuildOne: Energy Block Exchange, a blockchain network for high speed transactions

CorDapps: Open-source applications built by the Corda community

Notable Partnerships

Partner Connect Program: Created to provide an extensive framework to support other businesses building on Corda, partners include Accenture, BBChain, Capgemini, Cognizant, Deon Digital, and Nasdaq.

Marketing Claims

Corda claims to be the largest blockchain ecosystem in the world and to have more than 400+ applications built on Corda and 400+ ecosystem participants. R3 Corda also claims to be the first enterprise blockchain platform to meet the National Institute of Standards and Technology's exacting standards on compliance.

Specs	Details
Public / Private	Private
Consensus Mechanism	Multiple options; transaction level consensus
Validation Method	Notaries
Native Token	Token software development kit (SDK)
Throughput	170 TPS
Latency	2.6 seconds
Transaction Fee°	0
Smart Contract Support	Yes, Ricardian Contract
Programming Languages	Java, Kotlin, Scala
Supported Stablecoins	XDC
Security	ISO/NIST Compliant

°no fee per transaction



R3 Corda

Updated: September 2021

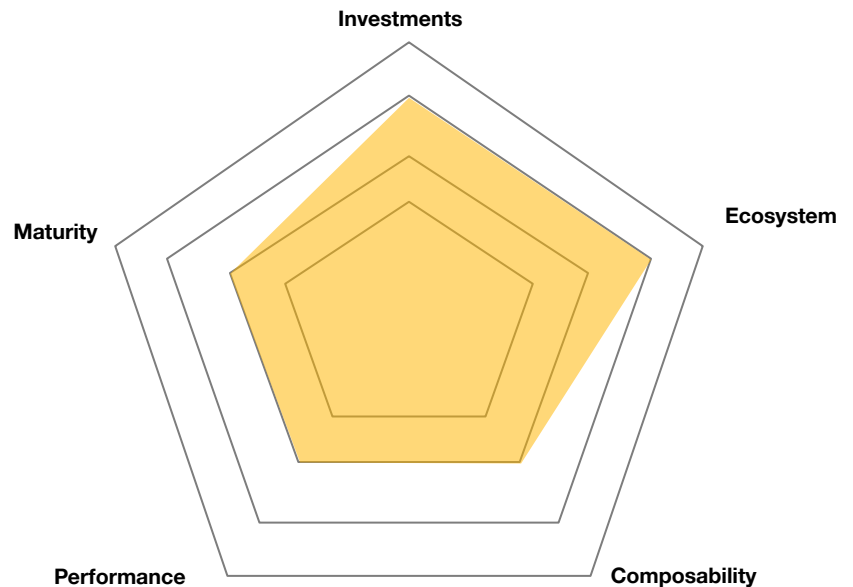
Investments (4): Although largely unknown to the public, R3 raised \$122M in Series A venture capital.

Ecosystem (4): R3 boasts a sizeable portfolio of enterprise clients who use Corda to power their business. The Partner Connect Program offers support via frameworks and most are using enterprise solutions with enterprise-level servicing and support.

Composability (3): There are few examples of Corda applications extending beyond specific Corda financial use cases, and even fewer examples of DeFi use cases or multi-chain interoperability.

Performance (3): Corda performs well for the specific design and use cases it was developed for: highly confidential and secure transactions; it does not have an differentiating level of throughput or latency.

Maturity (3): R3 was founded in 2014 and Corda wasn't introduced until 2016 which is early relative to other cryptocurrencies, but still very recent as a technology.



PwC's Take

Corda is a compelling enterprise solution with a history and client list to support R3's claims of secure transactions and ample support in building a solution to fit a range of use cases. It is difficult to validate R3's other claim of having the largest blockchain ecosystem in the world, as the definition of "ecosystem" can vary widely. One of R3's differentiators from the other organizations in this analysis is its comprehensive level of consulting support for companies that choose to use their blockchain. Corda also differentiates itself by the level of importance it places on security and regulatory compliance.

Corda primarily services organizations who are interested in transacting with highly regulated or private data. One common application for Corda appears to be international or intercompany transactions, along with CBDC-type use cases. There is little evidence to suggest that R3 Corda will move into the market of decentralized finance using the Corda or Conclave platforms.

There is no evidence that Corda has USDC adoption at this point.



Analyst Report

Ripple

Updated: September 2021

Overview

The Ripple blockchain platform, supported by the for-profit company Ripple Labs, is designed to help financial institutions send money across borders instantly, reliably, and at a low cost. The company's platform provides an open-source payment system to allow for low-cost payments to merchants, consumers, and developers, enabling customers to pay in any currency with no chargebacks and with instant global payments options.



San Francisco - 2012



Use Cases: Remittances, inter-bank transactions



~500 employees



Founders: Jed McCaleb / Chris Larsen



Funding: \$318.5M



No. Unique Investors: 64

Company & Protocol Differentiators:

XRP Ledger Consensus Protocol: Guarantees consistency with only partial agreement on who participates

Ripplenet: A network of banks, payment providers, and others; it provides real-time, low-cost, fully trackable payments globally

PayString: A payment identifier protocol which provides a single ID for anyone needing to send or receive money

Interledger: Used by Ripple to connect banks across borders

RippleX: Infrastructure for building apps on the XRP ledger

Key Financials

Ripple Labs is reportedly in the process of raising Series B venture funding from Pre IPO Club and Cloud Toronto as of June 2021. Previously, the company raised \$200 million of Series C venture funding in a deal led by Tetragon Financial Group on October 1, 2020, putting the company's pre-money valuation at \$9.8 billion. CME Ventures and 9 other investors also participated in the round.

Deal Type	Date	Amount	Pre-Val	Post-Val
Seed Round	11/12/13	\$6.5M		
Later Stage VC	4/1/15	\$38.5M	\$89.83M	\$128.33M
Later Stage VC (Series B)	9/15/16	\$55M	\$355M	\$410M
Later Stage VC	12/1/17	\$25M		
Private Transaction	5/1/18	\$0.5M		
Later Stage VC	12/1/18			
Private Transaction	1/1/19			
Later Stage VC (Series C)	10/1/20	\$200M	\$9.8B	\$10B
Later Stage VC	6/1/21			

Source: Pitchbook

Ecosystem Analysis

Primarily used for cross-border payments, the [XRP ledger](#) can serve as an exchange for cross-currency payments. The platform has also been used for credit and derivatives settlement, asset management and custody, escrow, identity verification, NFTs, gaming, wallets and apps, music, decentralized exchanges, multi-signing, security, among other use cases.

Notable Platform Development

[Coil](#): Coil uses Interledger to stream micropayments as users consume web content

[Forte](#): Uses Interledger to facilitate cross-chain transactions for online gaming

[Gatehub](#): Wallet for sending, receiving, trading, and managing assets on XRP protocol

[Raised in Space](#): Music platform integrating with blockchain and XRP through [Xpring](#)

Notable Partnerships

Ripple has relationships with 300+ financial institutions. Notable partners include:

[American Express](#): AMEX FXIP platform payments will be routed through RippleNet

[Bank of America](#): RippleNet provides technological infrastructure for BOA use case

[SBI Holdings](#): Uses Ripple to streamline remittances and uses XRP as intermediary; SBI

Remit uses RippleNet's On-Demand Liquidity (ODL) service in Japan

Marketing Claims

Ripple's primary differentiating claim is instant liquidity of accounts and low/no minimum balances for collateral. It also claims to be quick, low cost, and scalable.

Specs

Details

Public / Private	Private
Consensus Mechanism	Proof of Stake / History
Validation Method	Distributed Polling
Native Token	XRP
Throughput	1,500 TPS
Latency	3-5 seconds
Transaction Fee	\$.0000125 / .00001 XRP
Smart Contract Support	No, proposed
Programming Languages	Go, C#, JavaScript, C, C++, Java, JavaScript, Python
Supported Stablecoins	None
Security	SOC 2 certified



Analyst Report

Ripple

Updated: September 2021

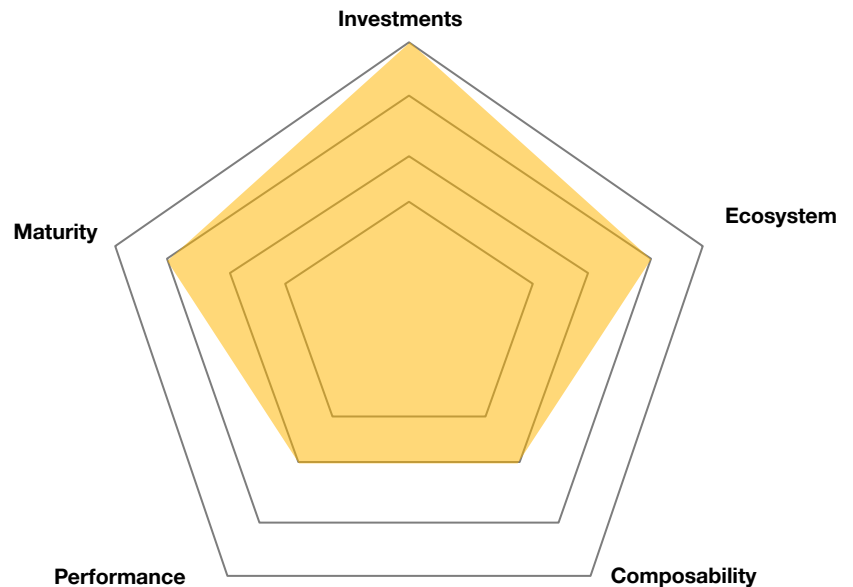
Investments (5): Numerous investors have invested in Ripple Labs which now has more than a \$10B post valuation after Series B funding in late 2020.

Ecosystem (4): Ripple has many high-caliber partnerships with established institutions; however, there is still room for growth as it relates to developer ecosystem activity.

Composability (3): Ripple has several use cases of companies building on their chain; however, most are specific to the intercompany payments use case, or are companies that are simply integrating XRP onto their platform.

Performance (3): From a strict performance capacity perspective, Ripple's throughput and latency are average compared to its competitors; its ability to scale and remain interoperable across borders has proven to be valuable.

Maturity (4): Having been founded in 2012, Ripple is one of the most mature and established of the protocols evaluated. Unfortunately, with that maturity has come increased regulatory scrutiny by the SEC.



PwC's Take

Having been founded in 2012, Ripple is one of the most established platforms in this analysis. It is probably most well-known for cross-border payments, but has been used for other use cases as well. It's primary claim is that it is quick, low cost, and scalable. This has generally proven to be true; however, its increased size has caused increased scrutiny from regulators. The SEC has accused Ripple Labs of raising over \$1.3 billion through an unregistered, ongoing digital asset securities offering - essentially claiming that XRP is a security subject to regulation by the SEC. This increased interest by the SEC demonstrates that the scalability of a token and thus the platform and company supporting the token can be severely hampered if it is not in regulatory compliance with the jurisdictions in which it operates.

Ripple differentiates itself by its close relationships with large, established institutions such as Bank of America or American Express. It has also raised more publicly verifiable funds than any other platform in this analysis. Although Ripple is compatible with decentralized finance use cases, it is mostly focused on remittance payments and related applications.

There is no evidence that Ripple has USDC adoption at this point.



Analyst Report

Solana

Updated: September 2021

Overview and Mission

With a goal to enable the crypto economy to scale to a global audience and to democratize the world's financial systems, Solana is built to support high-growth and high-frequency blockchain applications. Solana Labs is the for-profit entity based in San Francisco and Solana Foundation is a not-for-profit based in Switzerland. Solana has developed a layer 1 blockchain solution which is intended to provide layer 2 performance.



San Francisco - 2017



Use cases: High speed transacting, exchanges



69 employees



CEO: Anatoly Yakovenko



Funding: \$60.15M



No. Unique Investors: 38

Key Financials

Having successfully sold \$314.15M SOL via a private token sale, Solana Labs has attracted several serious investments from companies focused on scaling the Decentralized Finance (DeFi) industry, and a16z now owns a controlling stake in Solana Labs. Traditional funding rounds have come from MXC Pro Capital, Evangelion Capital, and Genblock Capital in March 2021 (\$40M), as well as K300 Ventures, Insignius Capital, Kosmos Ventures, Kintsugi Ventures, and Block Dream Fund.

Deal Type	Date	Amount	Pre-Val	Post-Val
Accelerator	04/18/2018	\$0.15M	\$2.35M	\$2.5M
Early Stage VC	6/15/2018			
Series A	7/30/2019	\$20M		
Early Stage VC	03/25/2021	\$40M		

Source: Pitchbook

Company & Protocol Differentiators:

Proof of History (POH): Cryptographic clock to agree on timing
Power BFT: Byzantine fault tolerance consensus optimized for PoH
Turbine: A block propagation protocol to increase overall speed
Gulf Stream: Protocol that forwards caching to edge of network
Sealevel: Allows ability to run concurrent parallel smart contracts
Pipeline: A transaction processing unit for validation optimization
Cloudbreak: A horizontally-scaled accounts database
Archivers: Distributed ledger storage

Ecosystem Analysis

Solana has a robust ecosystem of builders that include use cases from DeFi applications (98 use cases), decentralized exchanges (30) and exchanges (27), infrastructure (26), wallets (25), non-fungible tokens (NFTs) (22), among others. Solana also has its own podcast, Discord channel, and blog.

Notable Platform Development

Project Serum: Decentralized exchange that allows cross-chain trading at high speeds
Degenerate Ape Academy: NFT which contributed to large price increases in SOL
Mango Markets: A DAO-governed market for trading, lending, etc. powered by Serum
SolStarter: An upcoming Initial Decentralized Exchange for projects building on Solana
Arweave: A decentralized data storage protocol that offers permanent, massively redundant file storage
DeFi Land: Agricultural simulation game for DeFi; raised \$4.1M in Sept 2021

Notable Partnerships

Circle & Tether: Solana is partnering with Circle and Tether to adopt their stablecoins
Math Global: \$20M strategic investment partnership to support Solana ecosystem

Marketing Claims

Solana claims to be:

1. Fast; 2. Secure; 3. Censorship resistant; 4. Decentralized; 5. Low cost; 6. Scalable

Specs

Details

Public / Private	Public
Consensus Mechanism	Proof-of-stake / proof-of-history
Validation Method	Validator Nodes
Native Token	SOL
Throughput	50,000 - 60,000 TPS
Latency	.4 seconds
Transaction Fee	\$0.00043 / .001775 SOL
Smart Contract Support	Yes, uses SPL
Programming Languages	C, C++, Move, Rust
Supported Stablecoins	USDC-SPL & USDT
Security	Audited by Kudelski Security; Bug bounty programs



Analysis

Solana

Updated: September 2021

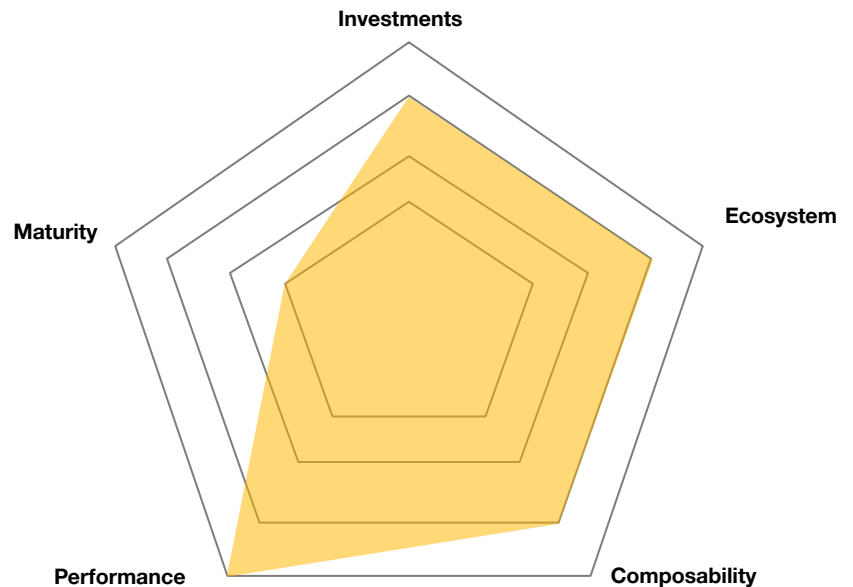
Investments (4): Recent funding has come from token sales, but Solana still boasts strong traditional funding rounds with varied investors.

Ecosystem (4): Solana has a robust ecosystem of participants as well as a blog, Discord channel, podcast, a grant budget, and partners.

Composability (4): Solana is built for compatibility with dApps, smart contracts, DeFi, and the like.

Performance (5): Solana ranks high in terms of performance, as it has the highest transaction throughput and lowest latency of all the protocols evaluated.

Maturity (2): Solana's first testnet was released in early 2018, and it launched its mainnet beta in March 2020, meaning it is a relatively young blockchain platform.

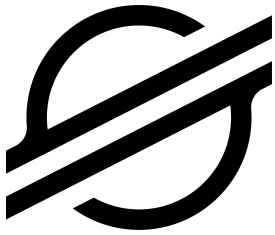


PwC's Take

Solana's Proof-of-History consensus combined with other unique features allows it to transact as fast as the internet and computer processor speed can operate. Solana's superior performance in terms of throughput and latency makes it potentially the most scalable blockchain, and particularly interesting for use cases that require extremely high transaction speed (e.g., high frequency trading). Solana lends itself to be useful for decentralized exchanges or storage as well as for NFT use cases.

We cannot validate all of Solana's marketing claims, which are that it is fast, secure, censorship resistant, decentralized, low cost, and scalable. Based on our review, it does appear to be fast, low cost, and censorship resistant, and relatively scalable; however, only a detailed security review, and time, will reveal the true level of platform security, as well as scalability. Similar to other blockchain protocols in this analysis, Solana is extremely nascent, as its mainnet was just launched in 2020.

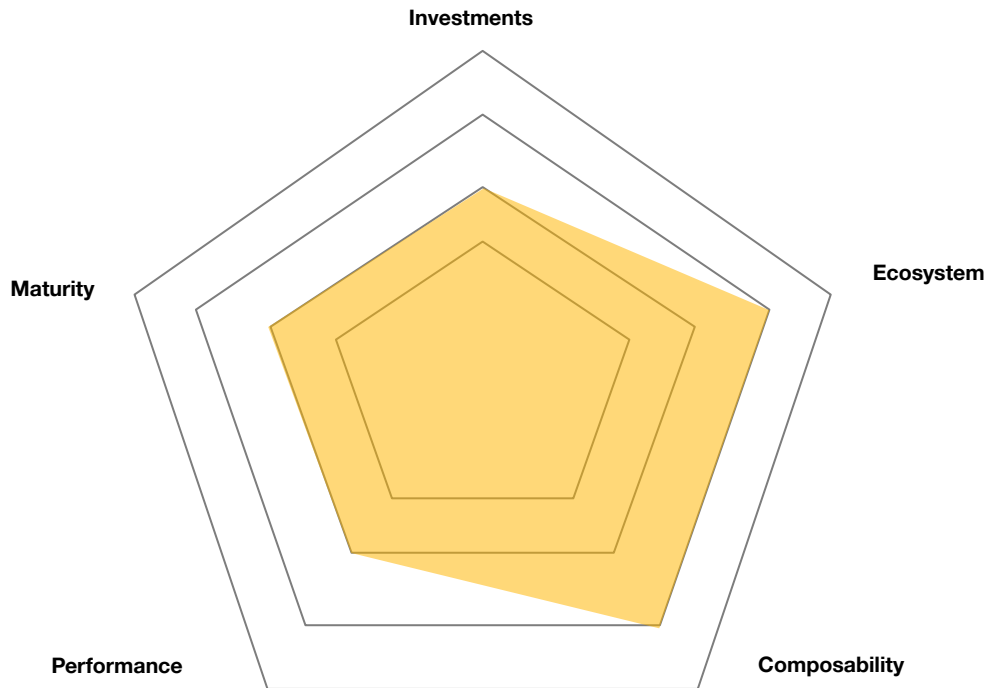
USDC Info: Total Supply: \$29B, Circulating Supply: \$2.5B



Analysis

Stellar

Updated: September 2021



Investments (3): Stellar has received \$5 million of direct funding (\$3.3 million noted on Pitchbook), which is relatively low compared to the others in this analysis; however, Stellar has not needed large amounts of funding as it has been able to fund operations by using Lumens.

Ecosystem (4): Stellar has a robust ecosystem which includes community events, a developer and SDF blog, Stellar Quest (a game to learn Stellar tech), the Community Stellar Fund, and grants, among other initiatives. Stellar does not have an ecosystem sized as large as that of Ethereum.

Composability (4): Stellar can be easily built on as it is compatible with a variety of programming languages and provides ample support for developers. However, Stellar was not designed to be a turing-complete, smart contract development platform for all use cases. As such, it optimizes more for tasks like transaction efficiency.

Performance (3): Stellar has a similar performance capacity as Ripple or Celo, which means it is fast compared to earlier blockchains or traditional financial systems, but relatively average compared to the other platforms in this analysis.

Maturity (3): Stellar has a similar length of history as both Corda and Quorum, and has slightly less than 100 employees.

USDC Info: Circulating supply of 12M.

Measures & Metrics

















Note: All numbers are approximations and may vary after the time of input

	Year Company Founded	Market Capitalization (of native token)	Direct funding ¹	No. Investors	Est. No. Employees	Throughput (TPS)	Latency (seconds)	USDC in circulation
Algorand	2017	\$4B	\$66M	33	145	10,000	5	195M
Avalanche	2017	\$9B	\$60M	15	42	5,000	1	Coming Soon
Cardano	2015	\$82B	Undisclosed	Undisclosed	15-30	250	20	n/a
Celo	2017	\$892k	\$57.17M	45	56	1,000	6	Coming soon
ConsenSys Quorum	2014	N/A	\$83M	23	500+	100 - 2,000	.463 - 4.5	n/a
Ethereum	2013	\$400.6B	\$15M (mostly undisclosed)	N/A	125	16.5	15-300	25B
Hyperledger Fabric	2015	N/A	Undisclosed	N/A	95	15,000	.5-2	n/a
R3 Corda	2014	N/A	\$122M	52	450	170	2.6	n/a
Ripple	2012	\$58B	\$318.5M	64	500	1,500	3-5	n/a
Solana	2017	\$22B	\$60.15M	38	69	50,000 - 60,000	.4	2.5B
Stellar	2014	\$17B	\$5M (3.3) ²	6	97	1,500	2-5	12M

¹ Pitchbook data

² Pitchbook notes that Stellar has \$3.3 Million on funding, \$5M is self-reported

Blockchain Networks

		 Investments	 Ecosystem	 Composability	 Performance	 Maturity
	Algorand	4	4	4	4	2
	Avalanche	4	4	4	4	2
	Cardano	3*	3	3	3	3
	Celo	3	4	4	3	2
	Consensus Quorum	4	4	4	3	3
	Ethereum	3*	5	5	3	4
	Hyperledger (Fabric)	3*	5	5	3	4
	R3 Corda	4*	4	3	3	3
	Ripple	5	4	3	3	4
	Solana	4	4	4	5	2
	Stellar	3	4	4	3	3

* There is limited funding information available for these platforms; as such, a ranking of 3 was chosen to avoid skewing the results with incomplete information.

Highlight

Investor Summary

Largest or most frequent investors into the companies analyzed



Andreessen Horowitz

Founded in 2009, Andreessen Horowitz is a venture capital investment firm headquartered in Menlo Park, California. The firm prefers to invest in seed to late-stage companies operating in the consumer, enterprise, biotechnology, healthcare, cryptocurrency, fintech and technology sectors.



Dragonfly Capital Partners

Venture Capital fund out of San Francisco that favors software, cryptocurrency, and financial services sectors. Has AUM of \$325M and Dry Powder of \$261.95M. It's median funding round amount is \$5.74M.



NGC Ventures

Founded in 2017, NGC Ventures is one of the largest and most active institutional investors of cryptocurrencies. NGC adopts best practices from traditional financial markets to invest in and incubate leading projects in the crypto industry worldwide. Both fund I and II have invested in over 70 projects, mostly in blockchain infrastructure and adoption technologies in areas such as De-Fi, Gaming and Decentralized Computing. NGC also incubated NGC StakeX, which is a node-operating division.



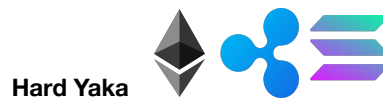
Electric Capital

Electric Capital has sought to invest in early-stage innovative technology companies focusing on cryptocurrencies, blockchain, fintech, and marketplaces sectors. Founded in 2014, it has averaged \$13.5M in rounds over 48 total investments.



2020 Ventures

Founded in 2010, 2020 Ventures is a hedge fund manager based in San Anselmo, California. The firm employs an equity long-short strategy. They favor software companies in early stage VC.



Hard Yaka

Founded in 2010, Hard Yaka is a venture capital firm based in San Francisco, California. The firm prefers to invest in portable identity, payments and marketplaces necessary for digital transformation. They have an active portfolio of 102 companies and a median round amount of \$4.2M



Digital Asset Capital Management

Digital Asset Fund is an investment firm that seeks to invest in the Bitcoin and blockchain sectors. The firm is managed by Digital Asset Capital Management. It was founded in 2017 and is based in Road Town, British Virgin Islands. It has 19 total investments with a median funding round amount of \$7.5M.



Multicoin Capital

Founded in 2017, Multicoin Capital is a venture capital firm based in Austin, Texas. The firm prefers to invest in early-stage, later-stage, and seed-stage companies. The firm seeks specialization in information technology sectors. It has an active portfolio of 48 against 54 total investments averaging a median round amount of \$6M.

Source: Pitchbook

Highlight

Investor Summary

Largest or most frequent investors into the companies analyzed

Pantera Capital



Founded in 2013, Pantera Capital is a hedge fund based in Menlo Park, California. The firm also focuses exclusively on ventures, tokens and projects related to blockchain tech, digital currency and crypto assets. Has an active portfolio of 94 with 149 total investments.

8 Decimal Capital



Founded in 2017, 8 Decimal Capital is a venture capital firm based in San Francisco, California. The firm seeks to make investments in the blockchain technology sector and prefers to make investments in the areas of security tokens, regtech, payment and stablecoins, institutional trading tools, dapps, protocol layers and infrastructure layers.

Polychain Capital



Provider of cryptocurrency-based investment management services intended to mobilize investor money into Crypto firms. The company's services offer a hedge fund committed to better returns for investors through an actively managed portfolio of blockchain assets and has also started venture investing in various sectors, enabling startups in various sectors including cryptocurrency to easily raise money for expansion and operations.

Abstract Ventures



Founded in 2016, Abstract Ventures is a venture capital firm based in San Francisco, California. The firm prefers to invest in seed-stage, early-stage, and later-stage companies. The firm also seeks to invest in information technology, financial services, consumer products, and consumer services sectors.

SBI Investment



SBI Investment is an investment arm of SBI Holdings that specializes in venture capital investment. The firm seeks to invest in the health tech, financial services and technology sectors. It was founded in 1996 and is based in Tokyo, Japan.

Blockchain Capital



Founded in 2013, Blockchain Capital is a venture capital firm that is based in San Francisco, California. The firm's mission is to help entrepreneurs build world-class companies and projects based on blockchain technology. It invests in both equity and crypto assets and is a multi-stage investor.

ValueNet Capital



ValueNet Capital is a venture fund focused on investing in blockchain technology companies. The firm was founded in 2017 and is based in Beijing, China.

CMT Digital



Founded in 2013, CMT Digital is a venture capital firm based in Chicago, Illinois. The firm seeks to invest in seed-stage, early-stage, and later-stage companies. The firm prefers to make investments in crypto-asset trading, blockchain, fin-tech, and legal tech sectors.

Source: Pitchbook



Thank you.

© 2022 PwC. All rights reserved. Not for further distribution without the permission of PwC. “PwC” refers to the network of member firms of PricewaterhouseCoopers International Limited (PwCIL), or, as the context requires, individual member firms of the PwC network. Each member firm is a separate legal entity and does not act as agent of PwCIL or any other member firm. PwCIL does not provide any services to clients. PwCIL is not responsible or liable for the acts or omissions of any of its member firms nor can it control the exercise of their professional judgment or bind them in any way. No member firm is responsible or liable for the acts or omissions of any other member firm nor can it control the exercise of another member firm’s professional judgment or bind another member firm or PwCIL in any way.

PwC is providing no opinion, attestation or other form of assurance and disclaims any contractual or other responsibility to others based on their access to or use of the Deliverable. Accordingly, the information in this Deliverable may not be relied upon by anyone other than Client.

PwC has exercised reasonable care in the collecting, processing, and reporting of this information but has not independently verified, validated, or audited the data to verify the accuracy or completeness of the information. PwC gives no express or implied warranties, including but not limited to any warranties of merchantability or fitness for a particular purpose or use and shall not be liable to any entity or person using this document, or have any liability with respect to this document. This report is intended for internal use only by the recipient and should not be provided in writing or otherwise to any other third party without PwC express written consent.