

Celer



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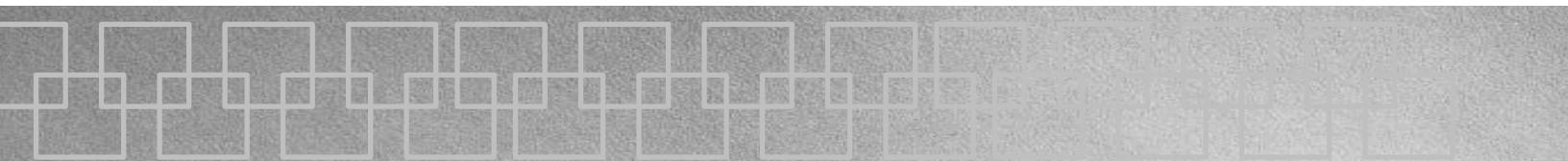
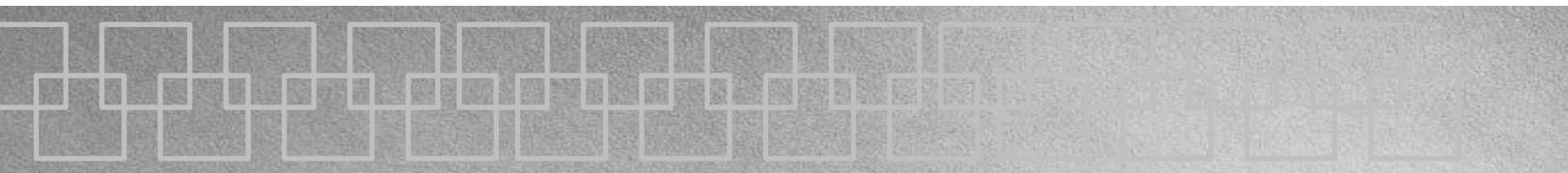


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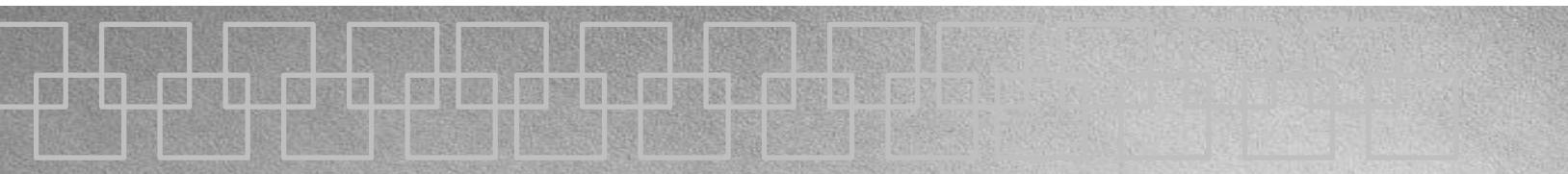


INTRODUCTION

Just as we're in the infancy of space travel, we are also in the beginning stages of blockchain technology. In the blockchain world, the technology is gaining mass adoption at a rate that has grown to a point where it has reached limits that cause slowdowns and barriers to get to the next level of growth. For this reason, Layer 2 protocols are created in order to provide better processing methods to alleviate costs, time, and increase throughput. Celer is providing infrastructure tooling and solutions on the Layer 2 level, which is needed for the next stage of growth in the blockchain applications, such as in app micro transactions that need to be instant and low cost.

BY THE NUMBERS

10,000x transaction latency reduction from Ethereum.	0 Off-chain smart contract transaction fees	0 Off-chain smart contract transaction fees
903+ Users on cBridge	\$220K+ Saved on Gas Fees	\$256M Current Market cap
10B Total Supply	5.75B Circulating Supply	#175 Market Rank



THE TEAM

Celer Network was founded in 2018 by a strong team of engineers with incredibly technical and specialized experience. All four co-founders of Celer Network hold PhDs in Computer Science from the following universities: UIUC, Princeton, MIT and UC Berkeley, and all have a work history with high-profile tech companies.



Dr. Mo Dong is a bonified expert in the application of algorithmic game theory and protocol development. He also teaches comprehensive courses on smart contracts. He previously worked as a development engineer and product manager at Veriflow.



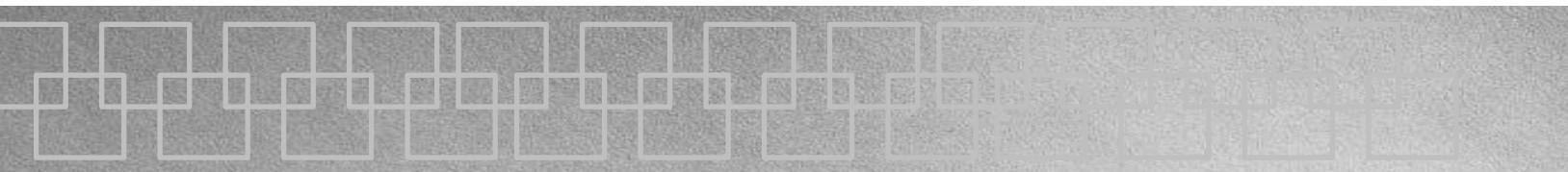
Dr. Junda Liu graduated from UC Berkeley and worked with Google in 2011 to create the infrastructure for their data center. In 2014, he became one of the founders of the Project Fi mobile service. After that, he took the position of technical manager at Android Tech.



Dr. Xiaozhou Li received his education at Princeton. Li interned at Microsoft before working at Barefoot Networks as a software engineer. Today, his published and widely-read academic works span distributed systems, networks, storage, and data management.



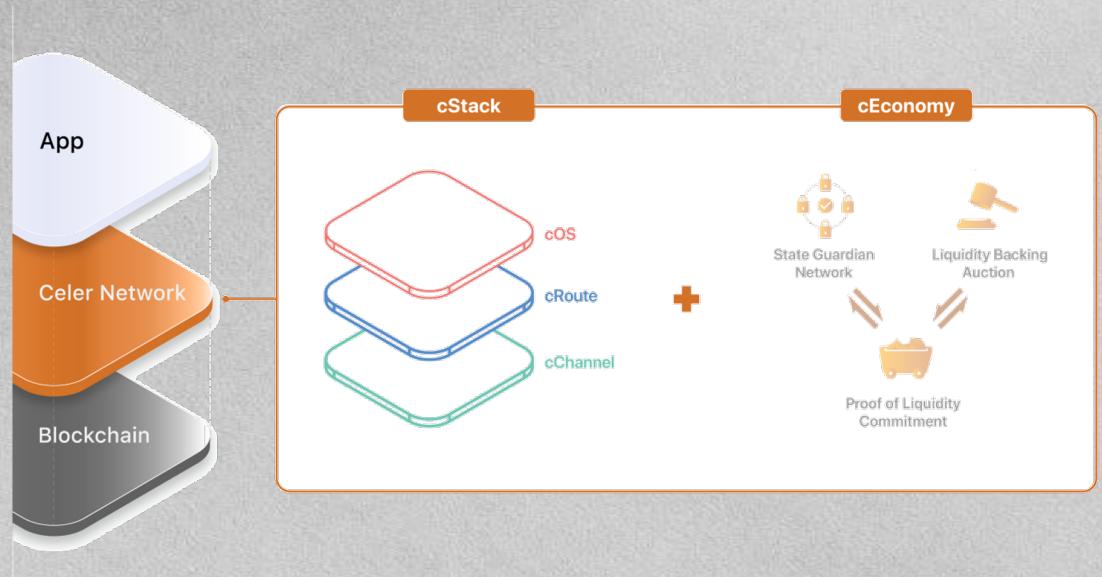
Dr. Qingkai Liang holds a degree from MIT. He has worked for the MIT Laboratory for Information and Decision Systems (LIDS), Bell Labs, and Google as a software engineering intern. His research focuses on learning and controlling problems in networked systems, namely online learning algorithms in adversarial networks.



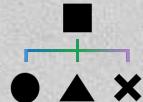
THE TECH



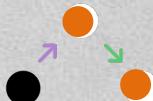
The Celer Network rests above the blockchain technology as a Layer-2 solution that allows developers to quickly build, operate and use scalable off-chain dApps. Below is a quick breakdown on Celer's two key components and how they work to ensure viable solutions for creators.



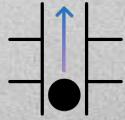
cStack: Unique benefits include reduced transaction delays, decreased commission for micropayments, zero commission in working off-chain smart contract, and horizontal scaling in joining new nodes



cOS – Celer's development framework and runtime for State Channel enabled applications. Provides common design patterns, and handles the operation, storage, tracking, and dispute of off-chain states.



cRoute – Generalized conditional value routing across a network consists of multiple chains and layers. Fully decentralized with high failure resilience.



cChannel – Generalized State Channel's foundational layer. Supports fast state and value transfer with generic and arbitrary conditional dependency on layer2 and layer1 states.

cEconomy: The availability of an off-chain model of crypto economics; an optimal routing algorithm for transactions; and support for various blockchains.

1. PoLC: Proof of Liquidity Commitment

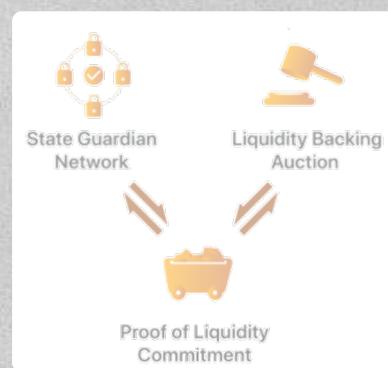
- Virtual mining process that acquires abundant liquidity for the off-chain ecosystem.
- Individual members call NLB Network Liquidity Backers.
- Helps the liquidity of assets within the network.

2. LiBA: Liquidity Backing Auction

- Crowd lending.
- Initiate a LiBA to borrow liquidity for a certain period of time.
- NLB submits a bid which includes interest rate, amount of liquidity and stake.
- Amount is sent to CCC.
- Borrowed liquidity will be used as a fraud proof bond.

3. SGN: State Guardian Network

- It is much more secure and collusion resistant.
- Sidechain to guard off-chain states when offline.
- Guards the state of a user for a certain amount of time.
- A user can submit their state to guardians for a fee.
- Guardians are selected by the state hash rate and responsibility score which is income flow generated by the users SGN.
- Enables an entirely new and flexible state guarding economic design.



When you break it down systematically, cEconomy covers the full life-cycle of off-chain operating networks. LiBA and PoLC mining is about how to bring intermediary transactions off-chain in a low-barrier fashion. SGN is about how to secure the capability to bring most up-to-date states back on-chain whenever needed.

Celer Network also supports using CELR token as liquidity lending fraud-proof bond collaterals, which is a medium of payment for channel subscription fee, transaction fee, and other possible service fees.

cApps: Celer has created the following 3 apps in order to allow users to explore and create breakthrough applications on the Celer Network:



Layer2.Finance – The potential of a financial ecosystem without a middle man is starting to be a dream come true. With this adoption it will help low cost and provide a trust-free gateway that will be home for wide-ranging audiences that already exist within DeFi ecosystem.



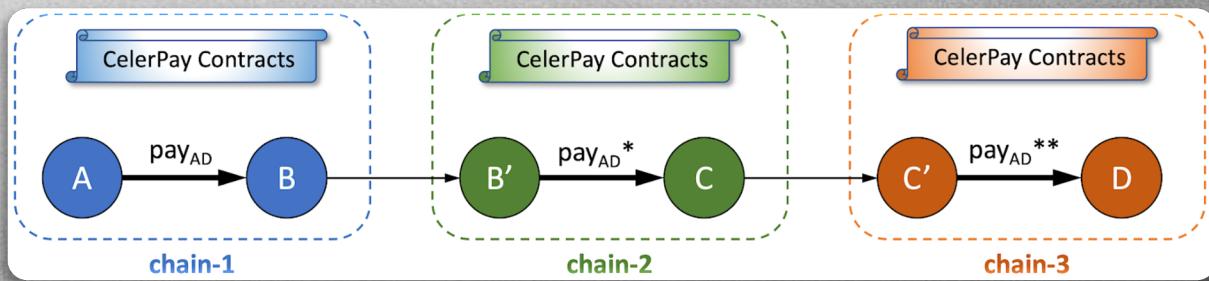
cBridge – A multi-chain network will help users instantly transfer tokens across different platforms with low costs and latency. This will help solve many of the existing challenges preventing the full integration of layer-two scaling solutions.

“As an open-source platform with the mission to bring blockchain adoption to mainstream, our goal with cBridge is to deliver a high-performance and cost-efficient interoperable value transfer network with no compromise on the security or trust-free guarantee.”

-Mo Dong



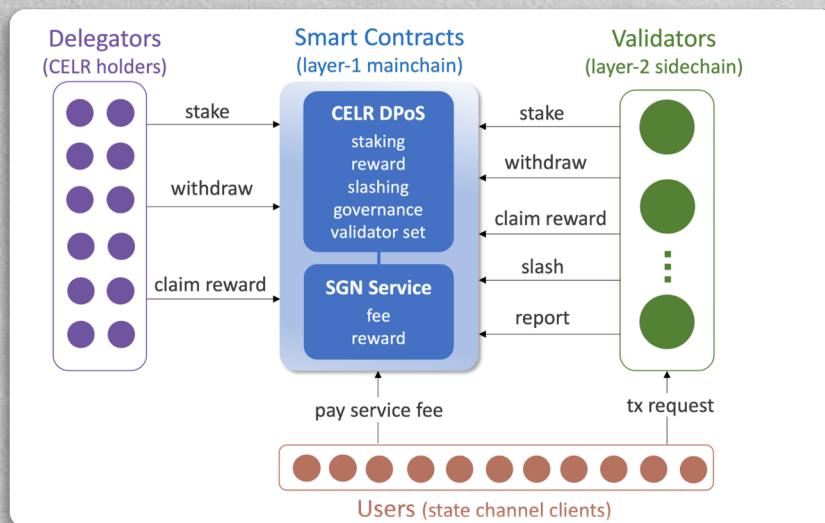
Celer SDK – With Celer SDK developers looking to help expand DeFi, gaming, small payments and cross-chain interaction will be provided with a full JavaScript library to interact with a local Celer node. It will also help bring CelerX gaming experience into browsers.



GOVERNANCE

SGN is operated by a decentralized organization which consists of all CELR holders. It requires a well-defined governance mechanism to coordinate any system changes, including contract upgrade, parameter update, new service launch, and more.

A mainchain contract governance process starts with a transaction to create a proposal. Any validator can vote with yes, no, or abstain. A two-thirds staking majority yes vote is required for the proposal to pass. Each proposal requires a deposit to prevent spamming. The proposer can only get back the deposit if the proposal passed. Otherwise, the deposit goes to the reward pool.



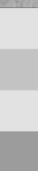
Celer layer-2 platform uses delegated proof of stake (DPoS) to reward every shareholder on mainchain and enable fast transactions on sidechain.

DPoS is a common consensus mechanism that uses a token staking and election process to achieve both decentralization and high performance in a blockchain system. It provides the opportunity for shareholders (who are the delegators) to vote on potential sidechain validators by staking tokens on them so that every shareholder can make some influence on the network behavior and benefit from it.

While SGN is a layer-2 sidechain, the staking process happens on the layer-1 mainchain. CELR shareholders interact with the mainchain contract to stake and withdraw their tokens, and to claim rewards. The validators elected on the mainchain produce, broadcast, and validate blocks for the sidechain.

The mainchain DPoS will be shared by all Celer layer-2 systems, including SGN and the upcoming hybrid rollup sidechain.

SLASHING



Phase	Timeline	Validator Set	Staking	Reward	Slashing	Channel Guardian
0	now – Nov 29, 2020	Whitelisted: Celer Foundation	Public	No	Disabled	Public
1	Nov 30, 2020 – early Jan 2021	Whitelisted: Celer Foundation	Public	Yes	Disabled	Public
2	Start from early Jan, 2021	Whitelisted: Celer Foundation and Staking Partners	Public	Yes	Disabled	Public
3	Upon satisfying phase 2 results	Whitelisted: Celer Foundation and Staking Partners	Public	Yes	Enabled	Public
4	Upon satisfying phase 3 results	All Public Staking Partners	Public	Yes	Enabled	Public

SGN sidechain validators reach consensus through Tendermint.

It is built with DPoS support, as the consensus is not based on two-thirds of the machines, but on proportions of the voting power of the machines.

Validators run the SGN service as a Tendermint application so that all nodes have the same request execution logic and a consistent view of current states. The application consists of a set of modules for reward, slashing, state channel guard, sidechain governance, etc.

The sidechain does not use a traditional gas model to charge fees for each transaction. Instead, it performs access control for users to request according to the user service fee balance on the mainchain contract.

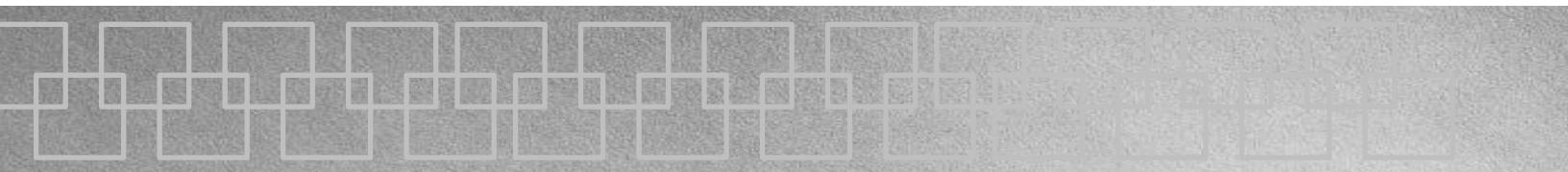
Penalties for Misbehavior

The sidechain punishes misbehaving validator and its delegators by slashing a portion of the tokens from their staking pool on the mainchain contract.

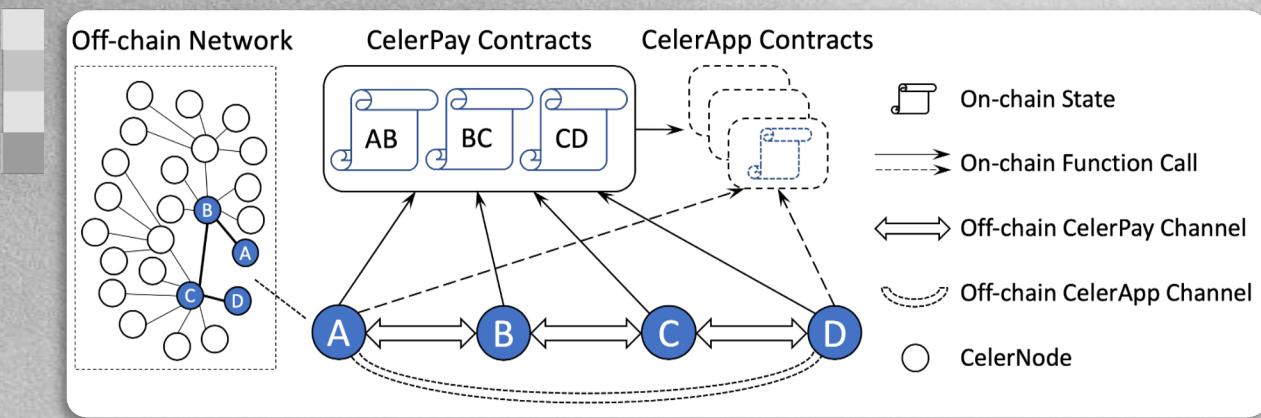
1. Double sign blocks. If a validator signs two conflicting blocks at the same height, it will get slashed by $X\%$. The slashed tokens go to the reward pool.

2. Miss blocks. If a validator misses more than 95% of the last N blocks, it will get slashed by $X\%$. The slashed tokens go to the reward pool.

3. Break service agreement. If a validator fails to finish a service task during its assigned time slot, it will get slashed by $X\%$. Half of the slashed tokens go to the reward pool; the other half are rewarded to the validator who finished the same task at a later assigned time slot.

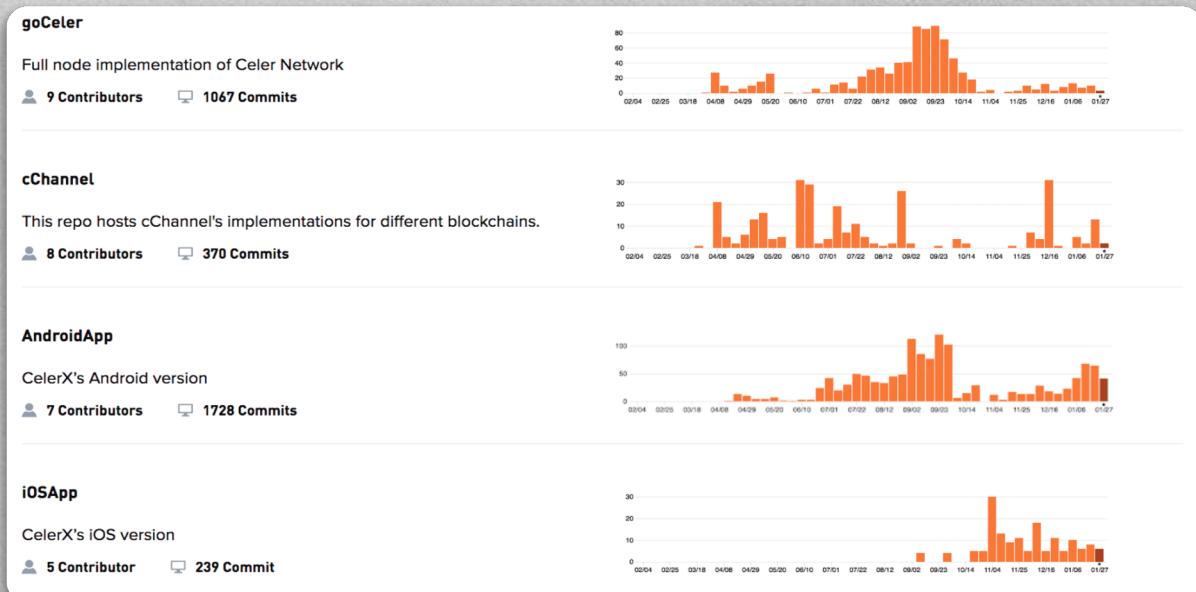


NODES / VALIDATORS

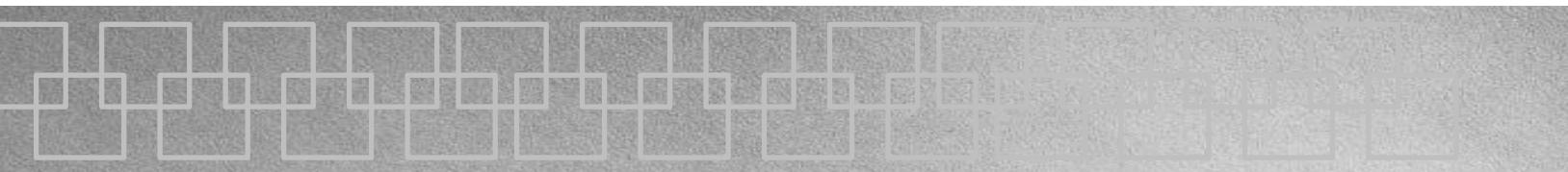


CelerNodes are the endpoints that run the state channel protocol of CelerPay and CelerApps. A node can join the state channel network by setting up a CelerPay channel with another node in the network. Once the CelerNode joins the network, it can send off-chain payments to any other nodes in the network. Though the Celer state channel technical architecture supports a homogeneous P2P network, we envision in real-world cases there will be two types of CelerNodes (running the same protocol) with different goals and characteristics.

Off-chain Service Provider is always online to relay payments for their peers. An OSP usually has more capital reserve to open CelerPay channels with many peers, and strong technical capability to maintain a highly available and reliable service.



As their repository shows, they've already made over 1,000 commits for the full node implementation of Celer Network, over 1,000 commits for the Android app, and 239 commits for their iOS App.



MARKET CAP / FUNDING



Total Supply: 10,000,000,000 CELR
Circulating Supply: 5,748,480,629 CELR
Market Cap: \$262,974,835
24 Hour Volume: \$18,058,934
Celer Network Price: \$0.045691

\$ Funding Rounds

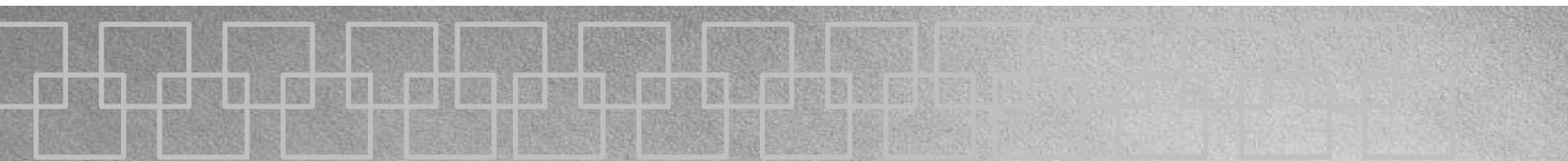
Number of Funding Rounds	Total Funding Amount			
4	\$6.1M			
Celer Network has raised a total of \$6.1M in funding over 4 rounds. Their latest funding was raised on Mar 10, 2021 from a Venture - Series Unknown round.				
Which funding types raised the most money? SHOW				
How much funding has this organization raised over time? SHOW				
Announced Date	Transaction Name	Number of Investors	Money Raised	
Mar 10, 2021	Venture Round - Celer Network	1	—	—
Mar 24, 2019	Seed Round - Celer Network	1	\$2.1M	—
Mar 19, 2019	Initial Coin Offering - Celer Network	—	\$4M	—
Jul 1, 2018	Venture Round - Celer Network	5	—	—

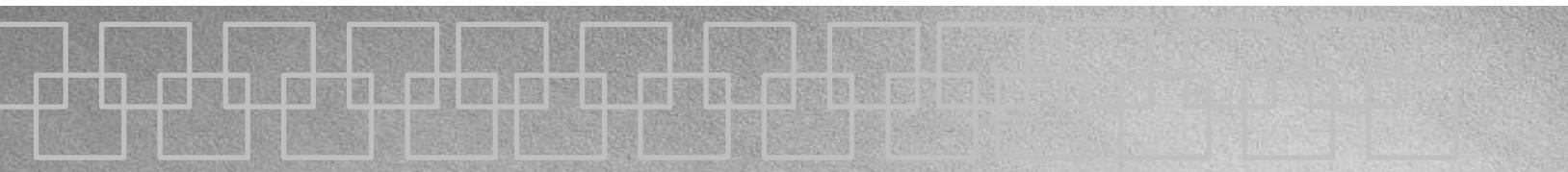
Investors

Number of Investors			
7			
Celer Network is funded by 7 investors. IOSG Ventures and Papership Capital are the most recent investors.			
Which investors participated in the most funding rounds? SHOW			
Investor Name	Lead Investor	Funding Round	Partners
IOSG Ventures	—	Venture Round - Celer Network	—
Papership Capital	—	Seed Round - Celer Network	—
Elysium Venture Capital	—	Venture Round - Celer Network	—
BlockVC	—	Venture Round - Celer Network	—
Consensus Lab	—	Venture Round - Celer Network	—
Chain Capital	—	Venture Round - Celer Network	—
MW Partners Group	—	Venture Round - Celer Network	—



- CelerX and Layer2.Finance are projects the Celer team has built on their middleware. They not only serve as use cases, but also creates revenue streams to allows the team to move forward as a sustainable business while adoption of their middleware increases over time.
- Celer Network has succeeded in creating very impressive partnerships with some of the most influential institutions in the crypto market: Pantera, DHVC, FBG Capital, Fenbushi Capital, 500 Startups, NGC, Waves, and more.
- Multi Blockchain Support:
 - Supports Ethereum, Dfinity, Optimism, Nervos, Polygon with ZK-Rollups and Polkadot.
- Payment Support:
 - Provides support for not only payments, but also off-chain smart contracts.
- cEconomy:
 - First and only cryptoeconomic model to provide connectivity and liquidity for off-chain scaling platforms.
- Celer Network is the first comprehensive off-chain operating network crypto economics that brings new value and enables otherwise impossible dynamics.
- Celer Network provides development teams with tools to quickly build and launch offerings with Layer 2 capability which includes solutions for smart contracts, dApps while allowing for quicker and sustainable monetization.
- As the worlds first multi blockchain layer 2 offering that works with Ethereum, Binance Smart Chain and Polkadot. Celer Network also supports other L2 solutions such as Matic sidechain, optimistic and soon zk-rollups and provide more utility for everyday users

- 
- ## CHALLENGES
- 
- Any off-chain solution while gaining scalability needs to make trade offs with liquidity and availability.
 - The most significant progress that has occurred in the last year is the emergence and adoption of off-chain solutions (Lightning Network, Raiden, Plasma, etc.). These solutions solve one of the main pain points suffered by distributed ledger technologies, scalability.
 - Scalability is a subject that has been observed for a long time in the crypto industry, so there are some serious competitors in the current market. The most famous one is the Lightning Network. LN provides an off-chain solution to the Bitcoin network. It currently has almost 4K nodes, 32.3K channels, and a daily capacity of more than 3.1M USD. However, unlike LN, Celer's multichain support will prove to be a worthy adversary in the off-chain solutions market and get mass adoption is happening as one can see the number of developers moving to the platform.



COMPETITION

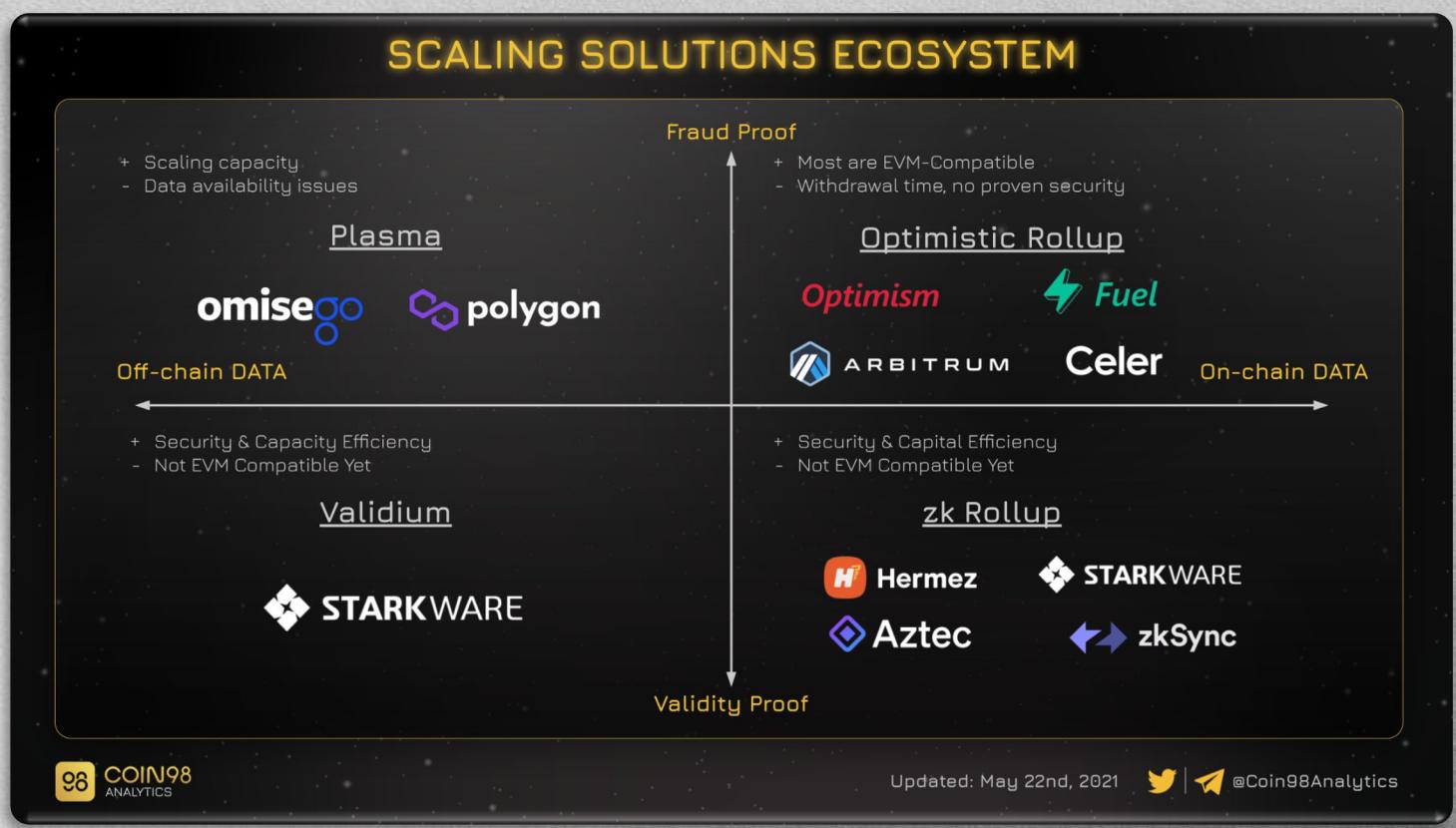


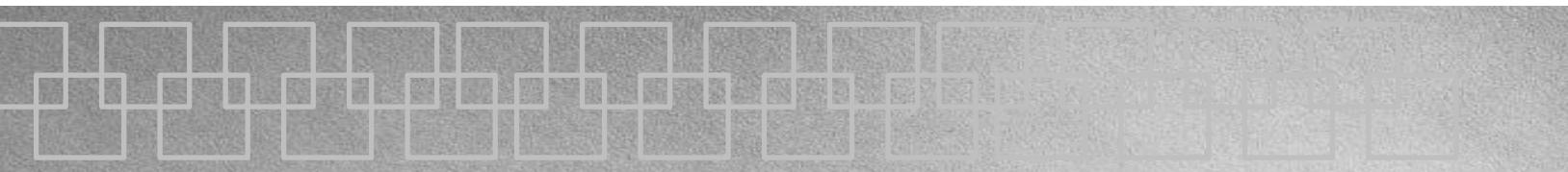
Celer Networks competition consists of three main competitors:

Optimism: To enhance and enshrine fair access to public goods on the internet through the development of open source software.

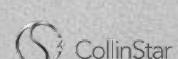
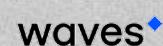
Fuel: Permissionless and trustless layer-2 protocol for Ethereum, targeted at low cost and high throughput value transfer transactions.

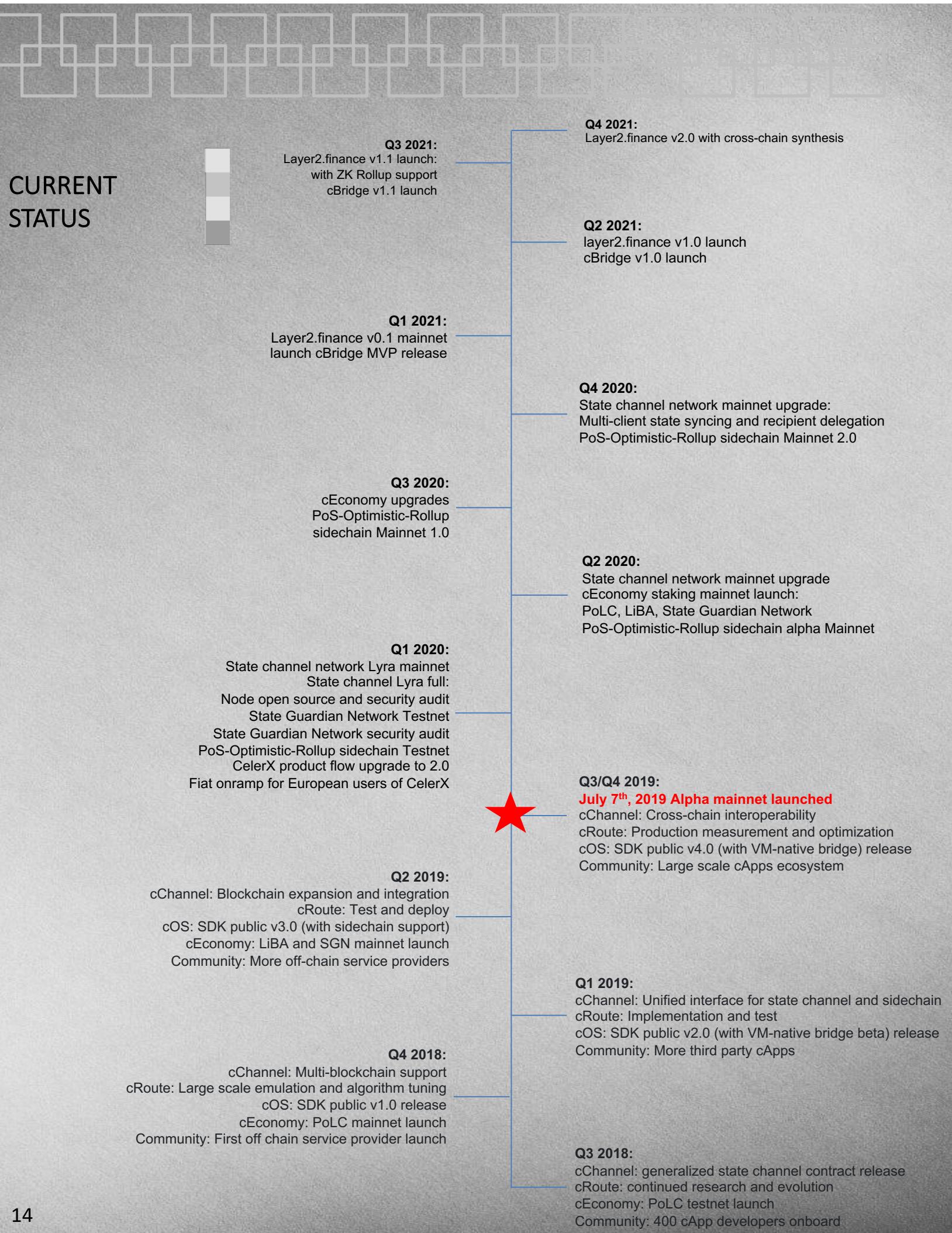
Arbitrum: The ideal scaling solution for many DeFi apps Arbitrum Rollup can scale any Ethereum contract, with the fully trustless security of the underlying blockchain.

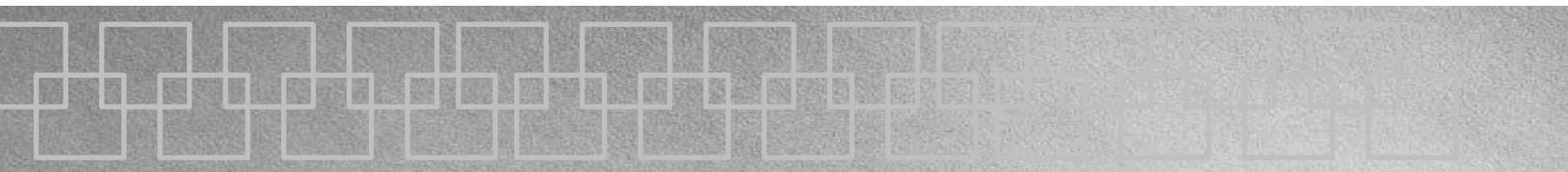




STRATEGIC PARTNERS







COMMUNICATION



Celer Network communicates all information through the following online resources below. With continuous updates and Q&A's Celer Network strives to get all the information out to the public.

Celer Network has a 68 page whitepaper report that goes into depth about the most advanced blockchain layer 2 scaling platform.

Dr. Mo Dong does monthly "Ask Me Anything" to help keep the public informed of current projects and make sure to clear up any confusion people may have. This is very rare and great to see a company doing to get the information out to the public.

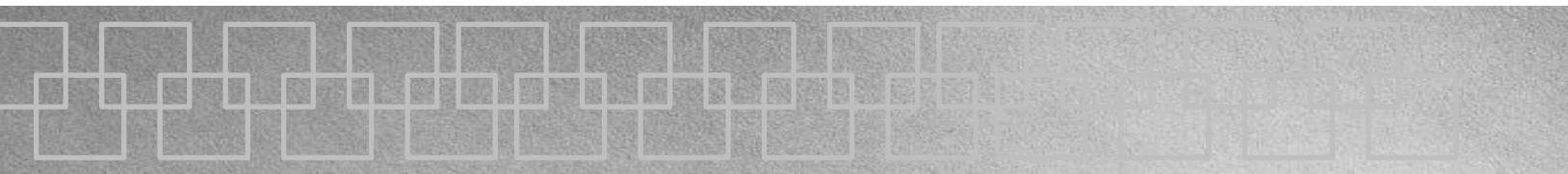
Celer Networks Twitter page constantly tweeting information, over 2,200 tweets ranges from company information to industry updates to all of its 60,000+ followers.

Celer Networks medium page with over 1,300 followers' updates with technology, partnership and community information.

The Celer Networks blog which is located on their website is where the team posts articles about Celer Network company news, partnerships they have teamed up with, updated technology and monthly community reports.

Celer Network also uses GitHub which currently has 49 repositories.

Social Media	URL
Official Website	https://www.celer.network/
Twitter	https://twitter.com/CelerNetwork
Telegram	https://t.me/celernetwork
Medium	https://medium.com/celer-network
Discord	https://discord.com/invite/Trhab5w
GitHub	https://github.com/celer-network
Meetup	https://www.meetup.com/en-AU/Celer-Network-Meetup/



CONCLUSION



It's initiable that blockchain technology is here to stay and grow. This is why we are here, to find the best solutions and provide them to the masses on the platform. Between their Layer2 solutions, supporting community, and extremely genius team, Celer Network is already proving to be a powerhouse in Layer2 technology, even though they are smaller and more in infancy compared to the competition. After exceeding metrics of success, I am confidently proposing to include Celer in your portfolio.

The crypto space is already a journey to navigate, let alone to program an application well for use to the masses. Celer's focus in being an easy to use product compared to its competitors has already been bringing in new developers at a fast rate that it shows in the growth of its community. The team's above and beyond support through media channels, meet ups, and direct AMAs to core team allows people to engage more in the platform and create success that will ripple through a long time as growth.

By bringing Layer2 hybrid solutions to multiple blockchains that allow for mass scale and speed at less of the cost, Celer will be a key player in the field!

I strongly believe that these hardworking geniuses at the Celer Network, along with their technology and community, will achieve their vision and surpass the competition. Blockchain technology is here to stay and will replace many of the technologies we use today, and Celer will be at the forefront of the innovation.

THE END

