ColdStack

Decentralized Cloud Storage Aggregator
(Uber for Cloud Storages)

1. Problem

Decentralized Data Storage Platforms such as Filecoin, SIA, Arewave, Lambda, Storj etc or peer-to-peer hypermedia protocols like IPFS, BTFS and Swarm means more security and privacy, lower costs and much higher redundancy. Thus it is natural that more and more projects (especially dApps and blockchain-based services) consider Decentralized Storages as a better option to store their data.

Traditional (centralized) Cloud Storages, on the other hand, have a well-established standard for data exchange interface: Amazon S3 Compatible API. Decentralized Clouds have no such a standard and it has the following effects:

1. No unified billing mechanism
2. dApps must implement a different API for any Decentralized Cloud
3. Developers cannot reuse existing tools, SDK clients etc
4. No easy way exists to combine multiple Decentralized Clouds in one dApp
5. Migration from one Cloud Storage to another is a very hard task
6. No familiar and intuitive paradigm of a filesystem with filenames and folders

2. Solution

ColdStack is a Decentralized Cloud Storage Aggregator, which supplies its users with cloud storage space cheaper than anybody. We provide a unified Amazon S3 API compatible interface that allows users to store and retrieve data with any Decentralized Cloud.

3. How we do that?

ColdStack is an aggregator of the Cloud Storages, which uses *Uber's* business model:

- We buy the cheap storage space from *all* the Decentralized Storage Networks (DSNs);
- That makes our buying prices 3-10x lower than *Amazon* or *Google* clouds;
- We optimize further the final costs with our AI-based pipeline;
- We offer a single entry point to any affordable Cloud.

That's how we supply end users with the world's most affordable storage space from any Cloud, just like Uber supplies it's clients with cost-effective rides and deliveries from a lot of drivers and taxi services.

> *Decentralized Storage Networks* (DSNs) are the blockchain-based Cloud Storage Platforms. They store clients' files in shards on the storage space provided by the crowd of independent suppliers. Like an Internet, they have no central authority and use advanced decentralized technologies to deal with the data.
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> Current total capitalization of top DSNs like *Filecoin*, *SIA*, *Arweave*, *Lambda* and *Stroj* is over $2bn. Each DSN has its own crypto currency to carry out transactions between the clients and other ecosystem participants. Main features of DSNs:

● Low cost	cutting all the overhead costs like taxes, banking and management costs make DSNs really cheap;
● High latency	due to its blockchain-based technology, DSNs data access speed is relatively slow;
● Reliability	DSNs are decentralized: i.e. truly distributed and high secured;
● Privacy	all the data in DSNs is fully encrypted and all the clients are 100% anonymous.

4. How it works?

ColdStack is a decentralized platform so we'll issue a *CLS* token (ERC20) to receive payments for our services. It's circulation volume will be pegged to the volume of the currently purchased storage space. The space is auditable and verifiable because all the storage/retrieve transactions will be logged in the blockchain.

We are going to use *NEAR* blockchain (10,000 lower cost per transaction than *Ethereum*) and cross-chain *Rainbow Bridge* that will allow users to deposit / withdraw their ERC20 *CLS* tokens.

Upload

Easiest way to upload files to a Cloud is Amazon Simple Cloud Storage (S3) API, which becomes the de-facto standard for the Cloud Storage industry. We have implemented the AWS S3 API to allow the users to move and manage data with no or minimal coding and makes it extremely easy to migrate data from Amazon to *ColdStack* and save up to 80% of the monthly storage bill.

PUT (data) → UUID

ColdStack stores data under a Universally Unique Identifier (UUID) key. Client stores his data by paying to the System in *CLS* tokens: smart contract will bill him once per every Data Storage Block (every 10 minutes).

Storage price is **$2.4** per Terabyte / month (56% lower than closest competitor).
Minimum charge time of the data storage is 30 days.
Incoming traffic is free of charge.

Store

We offer our clients two ways to store data in *ColdStack*:

- Choose the DSN, which we aggregate (*Filecoin*, *SIA*, *Arweave*, *Lambda*, *Storj* etc) and use our engine to purchase space and our unified APIto store the file using. We will charge in CLS tokens at DSN prices + traffic costs + 0.5% service fee. (we expect it will be max 10% of overall storage volume)

- Let our AI choose the best option using our Ai-based pipeline and save more than 50%.
  (we expect it will be min 90% of overall storage volume).
  The savings would be achieved through:

    ○ AI-based purchasing system that will make smart bids on DSN internal auctions, saving 10-35% from average DSNs' selling prices;

    ○ Stack of advanced lossless AI-based compression algorithms, saving 7-18% storage space and thus storage price;

    ○ We constantly search for new opportunities to buy reliable and affordable storage space beyond existing sources like Decentralized Storages.

Retrieve

Clients can retrieve the previously stored file via S3 REST API or via URL (Amazon virtual hosting of buckets engine).

GET (UUID) → data
Client retrieves his data by specifying UUID key and paying to the System in *CLS* tokens via smart contract. He can also specify the time of file caching (if necessary). In this case all the requests to the data will be cached during the specified time.

Retrieval time may vary from 2 to 200 seconds (if the file is not yet cached).
Retrieval price is **$1.2** per Terabyte (53x lower than Amazon).

5. Market Analysis

Total Available Market (TAM) for Cloud Storages is $50.1Bn in 2020 and will be $137.3Bn in 2025, at a Compound Annual Growth Rate (CAGR) of 22.3% during the forecast period.

ColdStack is an aggregator of Decentralized Storage Networks (DSNs). Their distinctive features are low cost, high latency and quite slow access speed. And the same is true for the market niche of Cold Data Storages like *Amazon Glacier*, *Google Coldline Storage* and the same services of *Microsoft*, *IBM* and *Oracle*.

> Cold Data Storage is used to store the inactive data that is rarely used or accessed. However, that "cold" data but must be stored for a long time or even forever for business or compliance purposes. That data is like the books on the very top or bottom shelf of a bookcase in your office. Advantages of cold data storage:
>
> - Prevent primary storage from becoming overloaded with inactive data;
> - Reduce overall storage costs;
> - Simplify storage and data management.

Serviceable Available Market (SAM) for Cold Data Storages is $12.5Bn in 2020 (20% of the whole Cloud Storages market), at a current CAGR of 60%.

We have most competitive prices but there is also a whole bunch of very strong competitors like *Amazon* and *Google*, so we can estimate our Serviceable Obtainable Market (SOM) in 2021 as 2% of the available market with the prospective growth to 10% in 2025: that will be approx $300M in 2021 and up to $3.5Bn in 2025.

6. Competitive analysis

Storages / Features	Low price	Access speed	Privacy	User service
ColdStack Service	+++	+++	+++	++
Decentralized Storage Networks (Filecoin, SIA, Storj etc)	++	+++	+++	+
Cold Cloud Data Storages (Amazon, Google, Microsoft etc)	+	+	+	+++

Actually most of the existing Decentralized Storage Networks are more Software Development Kit or a Platform than the service that can be successfully used as a SaaS. They do not provide good utilization statistics or billing services, they are hard to integrate and their overall user experience is relatively poor. On the other hand, similar services of Amazon and Google are really good concerning the user experience but their storage prices are 2-5x higher (retrieve prices are up to 50x higher). They are also quite bad in privacy, because they can be punished by their local authorities for the improper content.

We provide good user experience and excellent privacy for the lowest price ever.

7. Current Stage

ColdStack project is an early stage project.

However, a lot of R&D work had been performed before the start of the project. We already have mature integration solutions (inherited from our previous projects) with most of DSNs: *SIA*, *Arweave*, *Lambda* and partially *Filecoin*. We need about a month of development from the seed funding to the start of the sales.

Now we are finishing an MVP, that will allow us to upload / store / retrieve files via AWS S3 compatible REST API.

Web demo with UI will be available soon in Rinkbey testnet. It will allow users to upload and store files, download stored files, explore the blockchains and charge users in testnet *CLS* tokens.

8. Financial Projections and Key Metrics

Current clients commitments: 15,000 Terabytes of storage space ($37.8K per month revenue).

Project turnover growth: from approx $40k to $2.1M in 10 months.
Total balance 10 months after the start of sales: $790K+
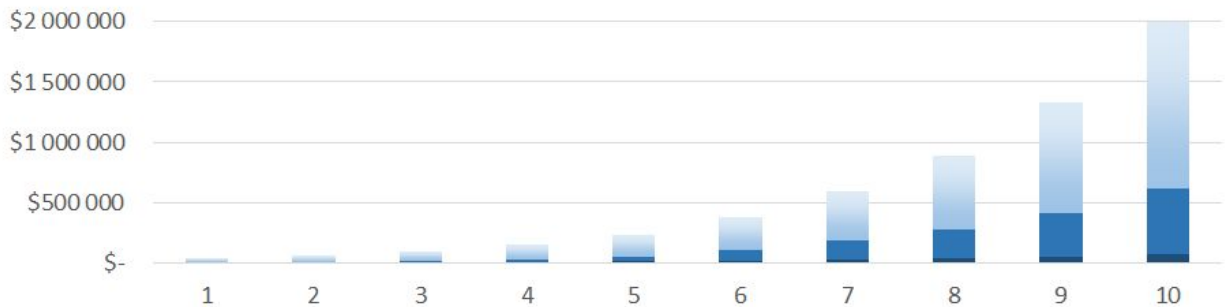
9. Project Road Map

1. **4th Quarter of 2020**
- Integration of Arweave / Lambda / SIA Decentralized Storages
- Proof of Concept (PoC) developed
- POC Live Demo deployed on Rinkeby testnet

2. **1st Quarter of 2021**
- Integration of Filecoin / Storj Decentralized Storages
- Launch a private beta of Minimum Viable Product (MVP)
- Implement blockchain integration to provide MVP for the marketplace and DeFi

3. **2nd Quarter of 2021**

- Integration of extended set of Decentralized Storages
- Launch a public beta of MVP (ETH main net)
- Extended data storage features for DeFi (PoC)

4. **3rd Quarter of 2021**
- Full launch of the product
- Implementation of Binance Smart Chain and EOS
- Launch of cross-chain bridges (EOS <-> BSC, ETH <-> EOS)

10. Token Metrics

Total token supply:	10,000,000*	
Initial token exchange rate:	1 USD	
Tokens for sale:	6,000,000 (60%)	demand-based smart contract unlock schedule is specified in the *Token economy Details*
Node incentive:	2,000,000 (20%)	6-12 months vesting - unlock schedule according the growth
Team:	1,150,000 (11.5%)	12 months vesting
Advisors:	200,000 (2%)	12 months vesting
Community grants:	350,000 (3.5%)	6 months vesting
Reserve fund:	200,000 (2%)	
Legal compliance fund:	100,000 (1%)	

* Tokens can be burned, but no cannot be minted.

11. Token Economy Details

The ColdStack CLS token is the unified medium of payment for ColdStack services. CLS will be issued as an ERC-20 token, which allows for decentralized trading and marking-to-market mechanisms available in the Ethereum ecosystem.

Current circulating volume is gradually unlocked by a smart contract. The service prices are stable, denominated in USD, and recalculated to variable CLS price tickers using an oracle for a floating CLS/USD market exchange rate.

CLS circulating volume will, as a general principle, be tied to the blockchain-verifiable amount of data stored and managed via ColdStack. This gives an equation for the CLS fair value in USD at time t:

$$F_t = (1+d) * P * V_t / M_t$$

P = storage price in USD per Tb

d = the ratio of retrieval costs to storage costs at time t

M_t = token circulation in time t,

V_t = the blockchain-verifiable amount of data stored

The CLS fair value is thus satisfyingly predictable and can remain stable or increase in time, which contributes to stability and can produce the fundamental upward trend of the market exchange rate. The exact form of the dynamic unlocking equation should take demand growth and market transaction costs into account.

Using the CLS token as an intermediary payment medium is a safeguard against short-term cash deficiency for the business. The exchange rates of decentralized storage network coins are expected to correlate positively in the long term. However, short-time appreciation of a single coin may require additional coin reserves. These may be maintained using both portfolio-based and market-based hedging. With a portfolio approach, part of the proceeds is used to accumulate a DSN coins portfolio with the structure equivalent to the data storage structure of the aggregator. With a market-based approach, a set of decentralized trading pools can be created to attract, via three-sided arbitrage possibilities, the additional inflow of a required coin in case of the cross-rate appreciation of the coin against the CLS.

The decentralized infrastructure of ColdStack warrants additional use of CLS as an incentive medium for node maintainers. Part of the CLS revenue will be used to incentivize the nodes later in the project life cycle.

12. How to Reach Us

For any questions please do not hesitate to reach us via email:

info@coldstack.io   general questions

ceo@coldstack.io   tokens and business partnership

cto@coldstack.io   integration and technical questions

support@coldstack.io   technical issues and bug reports

We will be thankful for any feedback.