ColdStack Litepaper: Decentralized Cloud Aggregator

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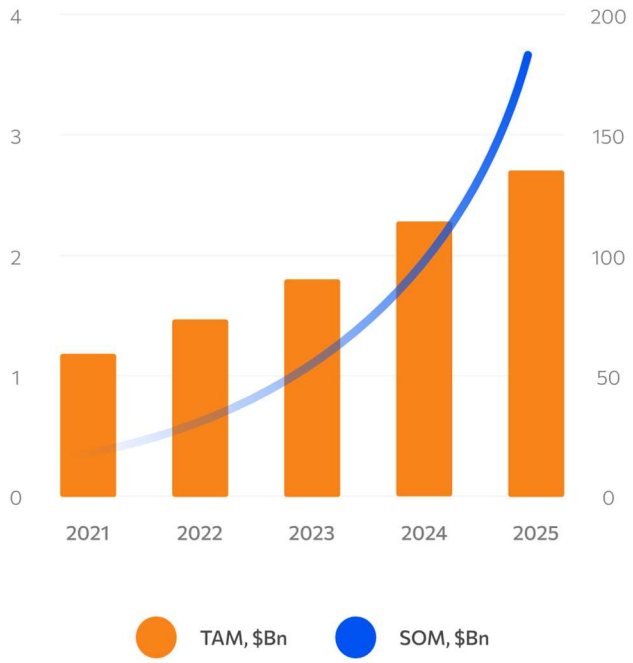
Introduction

ColdStack is a unified protocol, which allows to use the Decentralized Cloud Storage Platforms such as Filecoin, SIA, Arewave and Storj without significant integration efforts. Much like how Uber supplies its clients with convenient and cost-effective rides and deliveries from a huge pool of drivers, ColdStack supplies its users with convenient way to use the world's most affordable storage space from any cloud.

The main purpose of ColdStack is to store and retrieve user's data in a stack of Clouds via Unified Data Exchange API, which is 100% compatible with *Amazon S3 API*. That allows our customers to use any familiar AWS library or SDK and start to use the power of Decentralized Clouds quickly and easily.

As the first to market Decentralized Cloud Aggregator, ColdStack offers a single-entry point to any Cloud, optimizing the final costs for consumers with our AI-based pipeline. It selects the best storage option for your data, which is available on the market, allows to save up to 80% of the storage costs. If you want to choose Cloud on your own, you can use our S3-compatible API to most of Decentralized Clouds, that will be published as an open-source library. Beyond this, the platform also allows you to tokenize your data, turning it into a tradable ERC-721 or ERC-1155 Non-Fungible Token (NFT).

1. The Market



Market Growth in 2021 – 2025

The Total Available Market **(TAM)** for the whole market of the Cloud Storages was $50.1Bn in 2020 and is projected to grow up to $137.3Bn in 2025, at a *Compound Annual Growth Rate* (CAGR) of 22.3% during the forecast period.

The Cloud Storage market saw a rise mainly due to growing data volumes across enterprises, the rising need for providing the remote workforce with ubiquitous access to data and files, and cost-saving and low *Total Cost of Ownership* (TCO) benefits of Cloud Storage solutions.

Main features of Decentralized Clouds are very low cost, high latency and quite slow access speed. 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*. These services were specially designed to store and retrieve the "cold" data, which is rarely used or accessed, but must be stored for a long time or even forever for business or compliance purposes.

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%.

ColdStack estimates our Serviceable Obtainable Market **(SOM)** in 2021 to be 2% of the available market, with a prospective growth of 10% in 2025. The former would be approximately $300M in 2021, and $3.5Bn in 2025.

2. The Problem

Prior to the founding of ColdStack, the project's core team had been working with Prometeus Labs, for whom they developed projects. These various projects required the utilization of a great deal of decentralized storage, meaning the team is very familiar with the evolving Decentralized Cloud Storage ecosystem.

Through this process, the team realized that the same problems would always surface whenever it came to Decentralized Data Storage Networks. These problems include:

- Integration takes a lot of time and effort
- The lack of unified API or billing mechanism for Decentralized Clouds
- Developers cannot reuse existing tools or SDK clients
- The lack of a convenient way to combine multiple Decentralized Clouds into one dApp
- Migration from one cloud to another, in the event it is needed, tends to be a complex task

3. The Solution

Because of these many issues, the ColdStack team formed in order to properly address these issues they saw with DSN ecosystem. Most notably, ColdStack seeks to aggregate all DSN networks under one dApp platform, and allows for payment on all of these different platforms through a single, native token.

ColdStack's AI pipeline takes the guesswork out of DSN selection and always finds the most cost-effective storage solution based on a file's parameters, and makes movement between these DSNs easy should market conditions change.

ColdStack's AI also constantly scans the market, meaning it will always ensure users save a significant amount on storage costs. Through an easy-to-use interface which is compatible with Amazon S3 API, ColdStack aims to bring mass-adoption to decentralized storage, even for those outside the crypto-community.

4. Roadmap

ColdStack's ambitious plans focus upon critical tasks such as developing our AI pipeline, launching various degrees of demos, debuting our token, in addition to forming partnerships with various decentralized storages in order to better aggregate them into our system, and allow them to compete with centralized storages.

Quarter I 2021

- Integration of Arweave / Lambda / SIA Decentralized Storages
- Proof of Concept (PoC) developed
- POC Live Demo deployed on Rinkeby testnet

Quarter II 2021

- Integration of Filecoin/Storj Decentralized Storages
- Launch of a private beta of Minimum Viable Product (MVP)
- Implement blockchain integrations to provide MVP for the marketplace and DeFi

Quarter III 2021

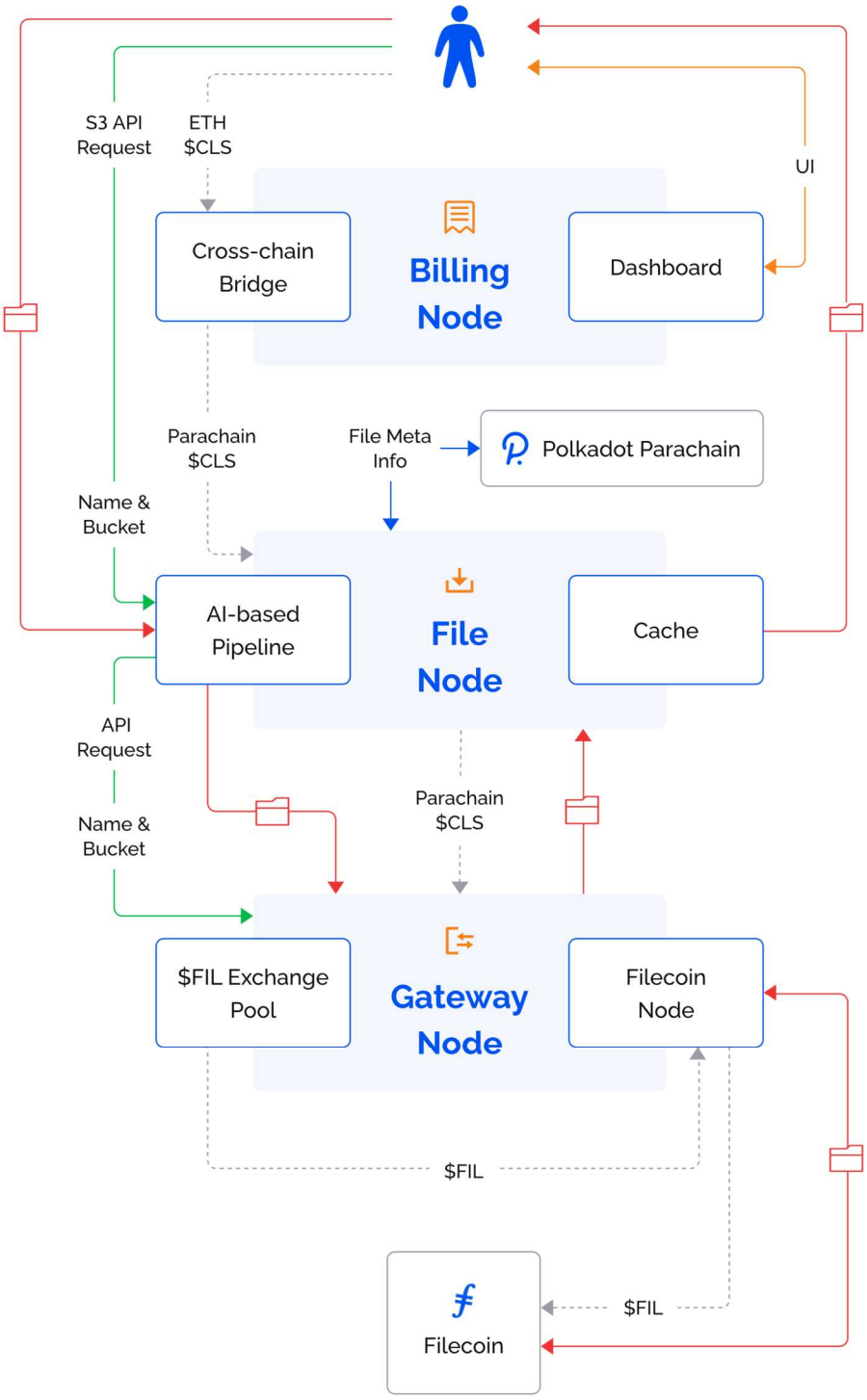
- Integration of extended set of Decentralized Storages
- Launch a public beta of MVP (ETH main net)
- Extended data storage features for DeFi (PoC)

Quarter IV 2021

- Full product launch
- Implementation of Binance Smart Chain and EOS
- Launch of cross-chain bridges (EOX <-> BSC, ETH <-> EOS)

5. How ColdStack Works

With all the above problems in mind, an explanation of how ColdStack works would perhaps better help users to see how the project aims to address the issue.



Generally, users will be using Coldstack to either store or retrieve data. Users will also have the choice to tokenize their data into an NFT if they wish to do so.

Before you start using Coldstack, you must ensure that you have your own ETH wallet and some $CLS tokens.

$CLS is the native token of ColdStack, which will enable you to interact with the file storage and retrieval system. $CLS can be obtained from Centralized or Decentralized Exchanges. More information on $CLS's tokenomics will be released shortly.

No KYC or other form of identity verification is required.

6. Getting Started

Billing Node

All the API authentication is the same as we used to see in AWS S3 protocol. We use an S3 access key that will be strictly pegged to the ETH wallet. That wallet will contain some ETH $CLS tokens to pay for ColdStack services. Web3 based dashboard will allow users to use their wallets like Metamask to sign up / sign in and issue their unique S3 access key in the dashboard.

Due to the ETH high transaction price and latency, we decided to use Polkadot parachain (or parathread) for transactional billing (per each data storage / retrieval operation). It is clear that we will have at least three records in our blockchain per each file stored in ColdStack so it will be literally millions of records. We cannot afford that amount in ETH mainnet but we still want to be a part of the ETH ecosystem including DeFi and crypto exchanges, so we decided to create a hybrid scheme where the $CLS tokens will be issued in ETH mainnet and can be transferred to users' Billing Accounts via our Cross-chain bridge.

File Node

Users call one of the AWS S3 API methods to upload a file to the File Node and it records it's metadata to the blockchain. Now it is a Substrate private net that will be upgraded to Polkadot parathread when they will be released to the mainnet by the Polkadot team (ETA: late summer 2021). Metadata contains the file size and hash (to

control it's integrity), user's wallet hash and a Gateway Node (see below). More details about the blockchains and parachains of ColdStack will be dealt with in a separate article.

It must be noted that we plan to implement a full-scale caching service that will take care about caching files during file retrieval operations. It can evolve to a decentralized Content Delivery Network (CDN) that could support media services like HTTP Live Streaming for videos. But most of the magic we do is built on our AI-based Pipeline that selects the best option for every uploaded file, choosing one of our available Storages to place it there.

Storage Node

Pipeline passes the file to the one of Gateway Nodes, which are actually the wrappers for the one of Decentralized Cloud Storages. Usually, Gateway Node has its own Storage Node (for instance, it's very own Filecoin Node), which is deployed in the same machine. Storage Node will deal with it's Storage Network using their own protocol, so our area of operations ends here.

Importantly, that Storage Network will charge the Gateway Node for its services in its own tokens. It means that each Gateway Node has got its own Exchange Pool with the tokens of its Storage Network. So, the owners of the Gateway Node do not let them go empty: they will sell the $CLS tokens they will get as the storage fees and purchase Storage Network tokens (such as $FIL, as shown in a figure above).

NFT Issuance

One of ColdStack's unique functions is that immediately after uploading your file or data, you have the option to be issued a NFT linked to the uploaded file. This opens up a range of possibilities for users who wish to trade and further monetize their data.

This NFT can either be an ERC-721 or ERC-1155 Standard token, per the user's choice. Upon minting, a token issuance cost will be charged from the user's $CLS funds. The NFT will then be transferred to that wallet.

7. Use Cases

Beyond personal storage of files, ColdStack has numerous potential use cases, especially in the cryptocurrency and blockchain ecosystem. Some examples of this are as follows.

Web3 Infrastructure Projects

ColdStack can provide the client's dApp with a Web3 based "all-in-one" experience for unified data management to deal with heterogeneous data of any size.

Defi and DEX Services

ColdStack can store and retrieve large hybrid datasets for these services, such as payout schedules and token bonding curves. Most of this data isn't frequently accessed, but must be stored for a very long time or even forever.

Blockchain-based Games

ColdStack can help game developers with cheap and reliable storage for tons of data concerning the players' activities. This data typically needs to be archived and stored for a long time for several purposes, mainly to create transparency and auditability for the game's mechanics, payments and reward systems.

NFT Marketplaces

Users can consider Coldstack as a very affordable Universal Digital Asset Storage for any NFT marketplace. This token is compatible with major NFT marketplaces such as OpenSea and SuperRare, and will seamlessly be tradable on these platforms.

8. Core Team

The ColdStack team has extensive experience dealing with data management, AI implementation, and cloud architecture. The project was incubated by Prometeus Labs, where much of the team has worked in the past.

Alexander Shishow

Alexander is the CEO of Coldstack and the Chief of Product at Prometeus Labs. He has over 15 years of experience as a product leader and business development expert. Over the course of his career, he has founded and ran three AI-based companies.

Victor Nagaitsev

Victor is the CTO of Coldstack and the Head of Decentralized Data Clouds Integration at Prometeus Labs. He is responsible for data mining and analysis. He has over 10 years of experience as a software development team leader, an Artificial Intelligence (AI) and Big Data expert, and as a blockchain architect.

Denis Vorobiev

Denis is the AI and Cloud Architect of Coldstack. He is currently also an AI developer at Scorch, where he works with hybrid clouds, multi-cloud clusters, and cross-platform neural network execution environments. He has over 7 years of experience as a cloud engineer, and is well-versed in AWS, Google Clouds, Azure, and the design and implementation of cloud solutions.

Our Story

Before our ColdStack project was founded, its core team had been working with Prometeus Labs. The team has participated in the development of two projects, both of which are parts of the Prometeus Ecosystem. These include Stoa, a data

monetization platform, and Ignite, a decentralized social network. These projects have been actively using Decentralized Data Storage Networks.

During the development of these projects, our team adopted and tested most of the popular Decentralized Clouds. These included Arweave, Filecoin and SIA, amongst others. Through the process, the team realized they faced the same problems again and again. This was what led them to the idea of creating an aggregation platform with a unified API, to make unnecessary such integration efforts. Months later, ColdStack was born.

Currently, some of our biggest backers currently include GBV Capital, Spark Digital Capital, X21 Digital, Ascencive Asset Management, Alpha Chain, Vendetta Capital and Solidity Ventures.

9. Conclusion

We believe that ColdStack will become the true Uber for Decentralized Clouds, supplying users with simple and reliable Cold Data Storage solutions at the lowest cost ever. This will encourage dApp developers and businesses beyond the cryptocurrency community to adopt Decentralized Clouds as their data storage providers. Though Decentralized Clouds provide a number of benefits in terms of cost and security, they have faced obstacles in adoption due to difficulties relating to interface integration, ease of use, a growing array of storage options, and changing storage market conditions.

ColdStack will solve all of these problems facing Decentralized Cloud Storage though our familiar A3 API interface, as well as our AI pipeline which takes the guesswork out of utilizing Decentralized Storage Networks.

Though our aggregation, our $CLS token provides a portal to access the entire DSN ecosystem, and allows for Decentralized Storages to properly compete with centralized sstorages. In turn, a strong and ever-growing demand will be created for $CLS rewarding purchasers and early adopters of the system to share in the success of Coldstack.

The decentralized future is here.

10. Contact us

If you have questions, please do not hesitate to reach out to us via email:

- info@coldstack.io (General Questions)
- ceo@coldstack.io (Tokens and Business Partnerships)
- cto@coldstack.io (Integration and Technical Questions)
- support@coldstack.io (Technical Issues and Bug Reports)

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