Tokenizing Total Cryptocurrency Market Capitalization For Real-Time Trade

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For

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Abstract

Next to the underlying price of Bitcoin itself, Total Cryptocurrency Market Capitalization is the most widely quoted and well-known cryptocurrency data metric in the world.

While referenced and quoted every day by millions of people within the investment community as one of the key metrics measuring the expansions and declines transpiring in the space, Total Cryptocurrency Market Capitalization currently has no means or ability to be traded in real-time form. This paper will provide insight into how Cryptex has successfully tokenized this key metric, in our commitment to providing industry participants nominalized exposure to the price movement of the entire Sector.

Introducing: Cryptex Total Market Capitalization Token (TCAP)

For cryptocurrency investors, traders, funds, DeFi users, and institutions, TCAP is an ERC-20 backed smart contract that tokenizes real-time Total Market Capitalization data from all cryptocurrencies and tokens listed on 5 of the most reputable crypto data providers in the world, through 9 node operators provided by Chainlink decentralized oracles, thus creating a new crypto asset that makes Total Market Capitalization available for trade in a single, secure, collateral backed solution.

The 366 Billion Dollar Opportunity In Data

Combining blockchain technology with the process of data aggregation, (366B as of 10/19/2020) of raw market capitalization data can be brought to market via cross-collateralized, asset nominal tokenization.

Asset nominal tokenization starts with the process of taking a data metric, such as Total Market Capitalization. This metric is then set to a divisor of 10,000,000,000. The new, nominal asset token value now trades in lockstep with the underlying data metric it tracks.

Collateralizing the new smart contract against multiple assets like ETH, WBTC, or DAI provides the security that this new tokenized asset is backed by a set of rules and collateral enforced by an Ethereum smart contract, thereby tokenizing total market capitalization.

TCAP Price Methodology

Step 1.

GET TOTAL MARKET CAPITALIZATION

Derived/aggregated by reputable crypto data providers in the world provided by a ChainLink node operator.

These are real values from October 12, 2020:

Provider	Total Market Price
Coingecko	366,945,648,560.0956
Coin Market Cap	358,488,544,442.52606
Nomics	366,149,586,385
Coin Paprika	365,122,527,908
Coin Lore	355,322,396,052.0165

Step 2.

CALCULATE THE AVERAGE VALUE

$$Average\ Total\ Market\ = \frac{(c_i + c_{i+1} + ... +\ cn_{i+n})}{n}$$

Where c_i is the Total Market Price of a Provider. Using the previous values:

$$Average\ Total\ Market\ =\ \$362,405,740,669.52$$

Step 3.

BRING DATA TO ETHEREUM

The average value of the Total Crypto Market Price is added to a Chainlink Aggregator Smart Contract which allows TCAP contracts to access this information on-chain. **The oracle data is updated on-chain each 1% price change**.

Step 4.

CALCULATE TCAP TOKEN PRICE

Once we get the average total crypto market price we add a divisor to that number, just like the S&P 500 or any major financial index would. The price calculation for TCAP is as follows:

$$t = 362,405,740,669.52$$
$$d = 10,000,000,000$$
$$P = \tfrac{t}{d} =\ 36.2405$$

Where t is the total cryptocurrency market cap, d is the divisor, and P is the TCAP token price.

Step 5.

CRYPTO-COLLATERALIZE

Below, we will provide a basis of our collateralization workflow which will be followed up with a yellow paper for technical Review.

TCAP is a synthetic asset that tracks in real-time an external and ever-moving metric, Total Market Capitalization.
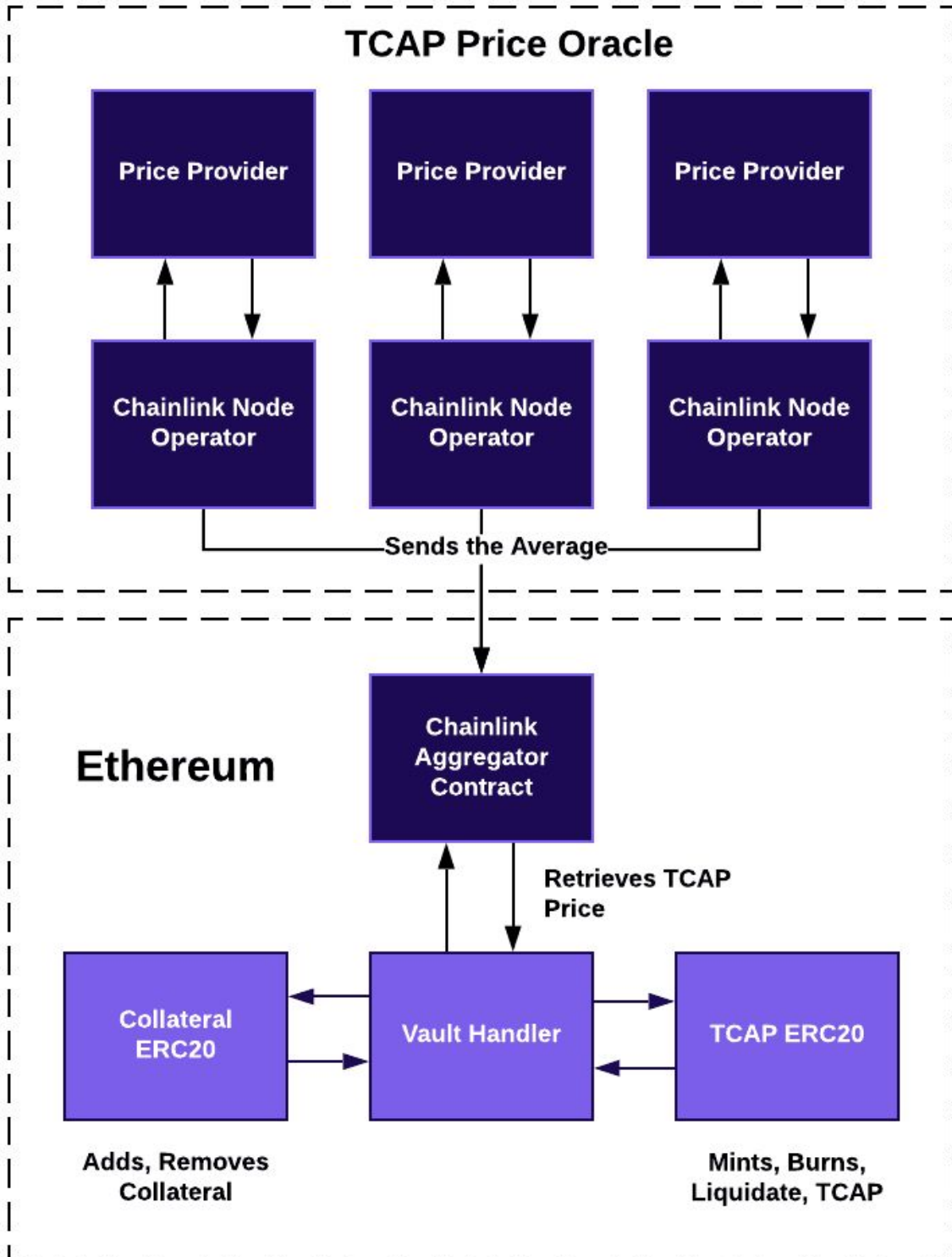
To do so without underlying collateral would have created a model where, while an aggregated Oracle Price/ divisor tracks the referenced metric correctly, there is no inherent value to a simple pricing mechanism and thus, no guarantee it would be traded at the price we quote it, just because we quote it. There must be backing assets behind the Oracle Price. Therefore, for a single TCAP token to be minted, there must be enough collateral staked first, via a smart contract on the Ethereum network. The underlying collateral price is tracked in USD using Chainlink DeFi Oracles which used to calculate the price the amount of collateralization per TCAP tokens. As long as the assets are adequately over-collateralized, then the system is safely backed. Cryptex tokens are synthetics that maintain a peg to their tracking asset(s). Collateral backed asset is one in which there exists at least 100% value to back each token. Cryptex tokens can grow their own corresponding market values based on the underlying collateral equivalents and holdings associated with collateralizing each token. Debt positions are opened by permission granted entities to lock collateral and therefore mint new tokens. The price of the token is always 1:1 within the contract according to a data set updated within the price feed on-chain, users can't create more TCAP tokens than their underlying asset value. To add collateral users first create a Vault which allows them to manage their collateral.

The required collateral for minting TCAP is calculated by the following formula:
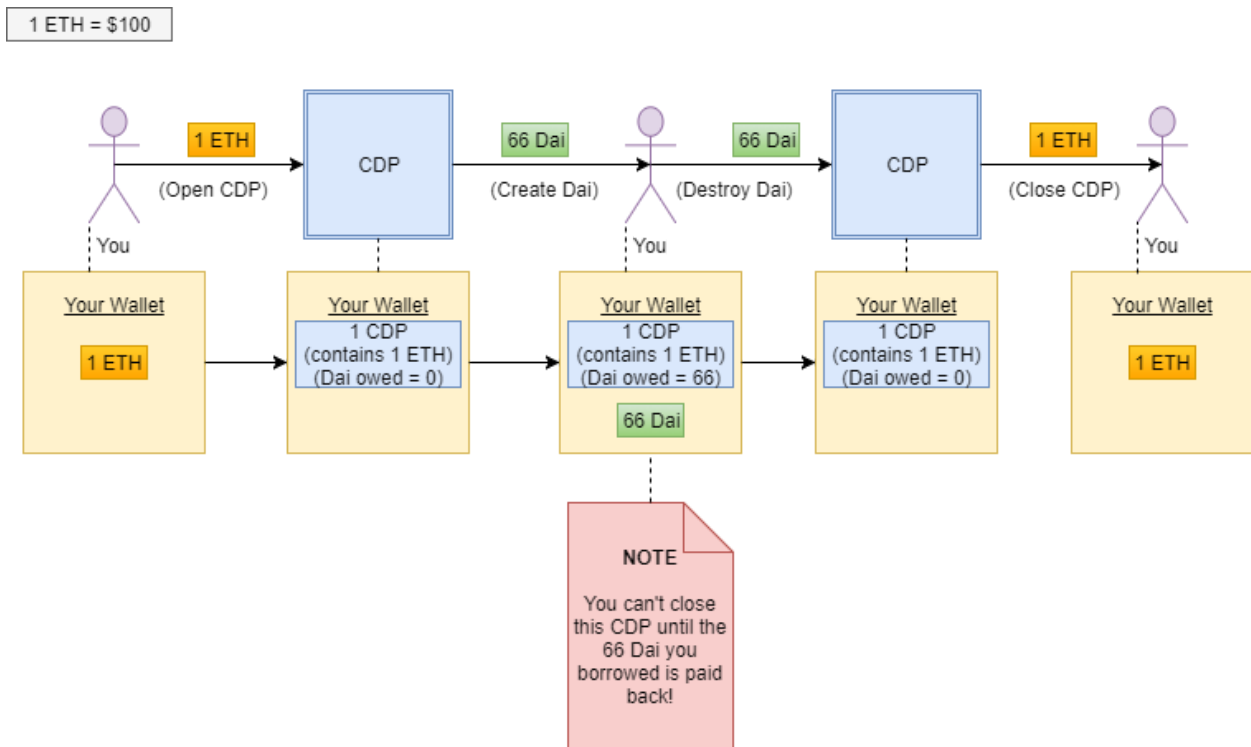
$$C = \frac{(P \times A \times r) \div 100}{cp}$$

Where C is Required Collateral, P is the TCAP Token Price, A is the Amount to Mint, r is the minimum vault ratio, and cp is Underlying Collateral Price

The following flowchart provides an overview of the Cryptex Total Market Capitalization (TCAP) tokenization/ smart contract process:

TCAP Price Oracle

Price Provider

Price Provider

Price Provider

Chainlink Node Operator

Chainlink Node Operator

Chainlink Node Operator

Sends the Average

Ethereum

Chainlink Aggregator Contract

Retrieves TCAP Price

Collateral ERC20

Vault Handler

TCAP ERC20

Adds, Removes Collateral

Mints, Burns, Liquidate, TCAP

The flowchart below provides an overview of the collateral Process:

1 ETH = $100

1 ETH (Open CDP) | CDP | 66 Dai (Create Dai) | 66 Dai (Destroy Dai) | CDP | 1 ETH (Close CDP)

You | You | You

Your Wallet
1 ETH

Your Wallet
1 CDP
(contains 1 ETH)
(Dai owed = 0)

Your Wallet
1 CDP
(contains 1 ETH)
(Dai owed = 66)
66 Dai

Your Wallet
1 CDP
(contains 1 ETH)
(Dai owed = 0)

Your Wallet
1 ETH

NOTE
You can't close this CDP until the 66 Dai you borrowed is paid back!

Source: Medium/ Opening and closing a CDP while minting/burning
DAI Author: Gregory DiPrisco (No affiliation to Cryptex Finance)

Liquidation Event

TCAP price moves according to the crypto market, this means that the required collateral needs to update accordingly, vault collateral must be always above the constant minimum radio r (Usually 150%). Vault Ratio, vr, is calculated solving for r on the collateral formula:

$$vr = \frac{cp \times C \times 100}{D \times P}$$

Where C is the Vault Collateral, cp is the Collateral Price, D is the Vault Debt, and P is the TCAP Token Price.

If the Vault Ratio is below the minimum ratio, any user can trigger a liquidation event, an action that will allow the event caller to burn TCAP tokens and get the delinquent Vault Collateral for a premium price, setting the Vault Ratio back at the minimum ratio value. A Liquidation Penalty and Burn Fee are added to the liquidation event to discourage the use of liquidation as an alternative to sell TCAP.

The Liquidation TCAP Amount, *LA*, required on TCAP to liquidate a Vault is calculated with the following formula:

$$LA = \frac{(((D \times r) \div 100) - cTCAP) \times 100}{r - p + 100}$$

$$cTCAP = \frac{C \div cp}{P}$$

Where *D* is Vault Debt, *cTCAP* is the value of the collateral on TCAP Tokens, *C* is the Vault Collateral, *P* is the TCAP Token Price, *cp* is the Collateral Price, *r* is the Minimum Vault Ratio, and *p* is the Liquidation Penalty.

The amount of reward, *R*, on the underlying collateral for liquidating a vault can be calculated with the following formula:

$$R = \frac{(LA \times (p + 100))}{100}$$

Where *LA* is the Liquidation TCAP Amount, and *p* is the liquidation penalty

The flowchart below provides an overview of the Liquidation Process:
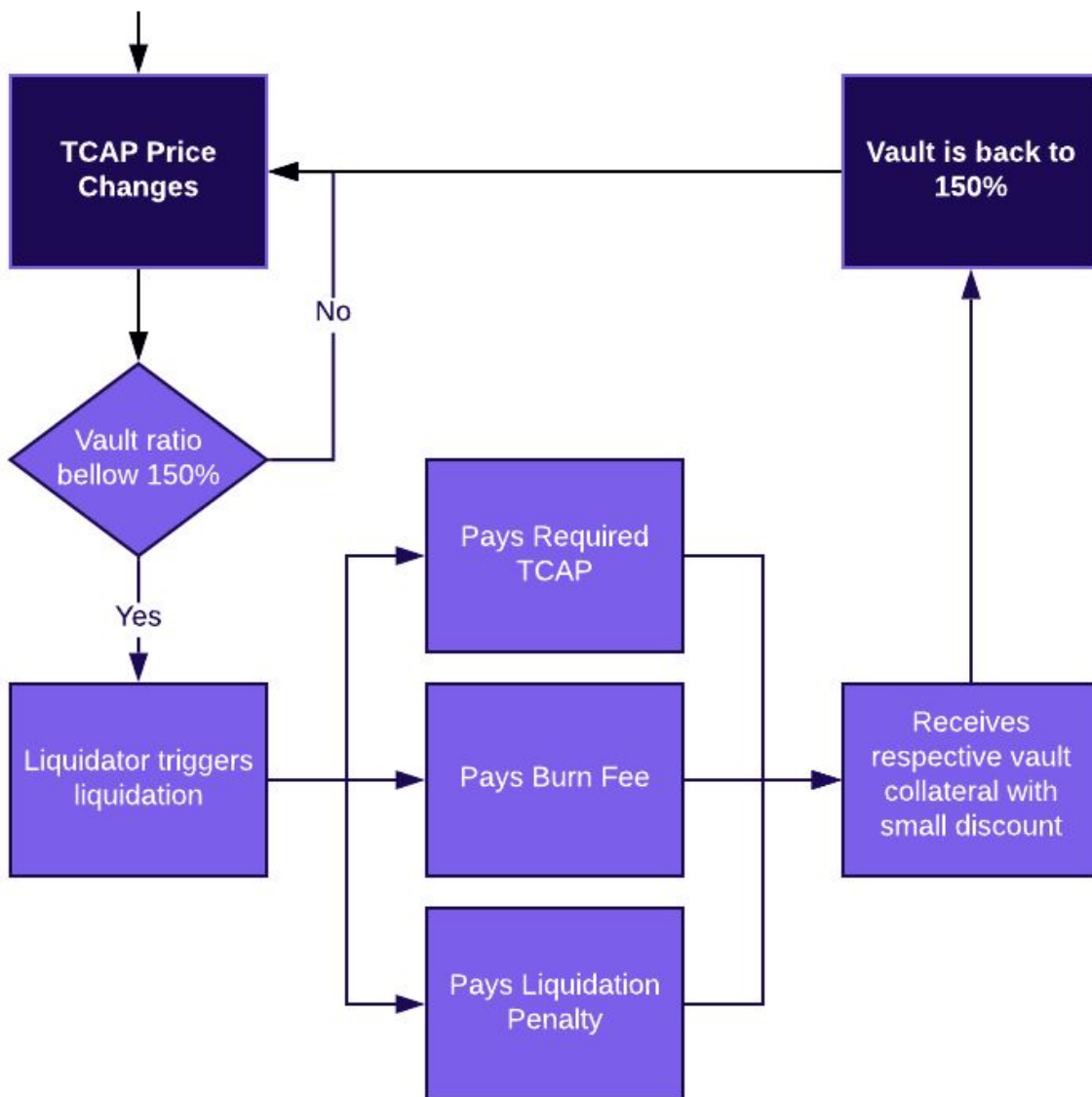
Competition and Market

Currently, several firms are rolling out traditional finance structured vehicles, such as OTC ETP's in accordance with Regulation D or Rule 144. These products purchase a small, underlying per share equivalent of Bitcoin or other Cryptocurrency. Then, the ETP share typically trades at a substantial premium to the underlying cryptocurrency asset, given the limited listed publicly traded solutions.

The Grayscale Bitcoin trust, GBTC, currently with 2.5 billion in assets under management, currently trades at a 45% premium to the underlying bitcoin a customer can simply purchase with a Coinbase account.

Their recently launched Ethereum Trust, ETHE, traded as high as a 2,000% premium to the underlying spot ETH equivalent.

These types of products charge annual fees of 2.5% while providing zero innovation to the market. They strangle investors and in our opinion, make the space less attractive to potential Investors.

In terms of bundled Crypto products, the choices for investors are only to purchase a bundle of coins, weighted on market cap, that trade solely on that specific exchange, for a fee. Again, another option lacking innovation, as nothing stops the investors from buying those coins outright themselves.

Companies like Bitwise offer similar options.

Source: Grayscale GBTC & ETHE
Source: Bitwise 10 private index fund
In the case of Bitwise, for a bundle of the top 10 coins, annual expenses average 2.5% in management fees, 3% early withdrawal fees, and offers WEEKLY redemptions after the first 12 months.

DeFi allows a new kind of token to be born, the Base Protocol is creating BASE is a synthetic elastic crypto-asset whose price is pegged to the total market cap of all cryptocurrencies at a ratio of 1:1 trillion. The problem with elastic rebase, it's that it takes time for the price to be pegged with the target price, also a rebase usually takes about 12 to 24 hours which might be slow for an index token.

sDEFI from Synthetix is a synthetic token that tracks a basket value of 9 DeFi Tokens, their iDEFI token tracks the inverse value of their DeFi Index. Pie DAO is an asset allocation decentralized autonomous organization that has DEFI++, DEFI+S, and DEFI+L, which are baskets of tokens. DeFi Pulse also has a similar offer with their DeFi Pulse Index (DPI), an index basket of tokens. The problem with these baskets it's that they only reflect the movement of a small piece of the market.

TCAP is not a fixed basket of tokens, an ICO, nor a rebased elastic. It's a new, 150% fully backed, a fully collateralized asset that's both audited and accurately representative of the entire cryptocurrency complex by total market capitalization with data aggregation of real-time Total Market Capitalization data from 5 major, data transparent providers allows for tracking

thousands of cryptocurrency pairs in one simple solution, providing investors with the alternative to having true exposure to the entire crypto space via one asset.

Total Market Capitalization (TCAP) tokens offer instantaneous settlement and carry no annual fees, other than a burning fee when TCAP is destroyed. There is also NO outlier detection included in the Cryptex Total Market Capitalization. Cryptocurrency markets are young, notoriously volatile, are subject to various flash crashes, low volume events, price swings, etc., Our goal is to capture the movement of the space as close as we possibly can.

Burn Fee

In order for TCAP to be a self-sustainable protocol, it implements a parameterizable Burn Fee which is paid on ETH every time TCAPs are burned. The total fee is usually is a percentage of the value of TCAP to be burned and needs to be sent as the *msg.value* of the contract call. The fee, f, can be calculated with the following formula:

$$f = \frac{P \times A \times b}{100}$$

Where P is the TCAP token Price, A is the Amount of TCAP to burn, and b is the Burn Fee percentage defined as Burn Fee on the contract.
A percentage of the burn fee it's used by the Cryptex team to incentivize further development of the protocol and pay fees incurred on the maintenance of TCAP, including the decentralized oracles. The rest of the fee it's used as insurance to secure some of the user's funds in case of a critical bug or hack.

Path to Decentralization

In order for Cryptex to create The World's First Total Cryptocurrency Market Capitalization, a semi-centralized approach was needed for two reasons.

1. While Cryptocurrency exchange data API's are public, to create a central source of Total Market Capitalization Data, this data must be aggregated by a central source, the price of TCAP and subsequent data aggregation from multiple exchanges in calculating it still must come from "Somewhere", the price feed provider. Given this set of circumstances, it is critical that this "somewhere" must be a trusted, verifiable source, with an accredited and trusted industry reputation.

After extensive due diligence, we determined the best source for this data, it's Chainlink decentralized oracles, which source it's Total Market Price from multiple feeds as Coin Lore, Coingecko, Coin Market Cap, Nomics, Coin Paprika. This allows us to further decentralize the price feed.

2. TCAP uses a multisign admin key to pause some actions in the contract to protect users in case of bugs or hacks while we test the resiliency of the contracts, the admin key is also used to change state variables using a timelock of three days, allowing users to see which value is going to change ahead of time.

Once a certain amount of time and more audits are placed, we plan to burn the admin keys and migrate to a Decentralized Autonomous Organization managed with a governance token in order to further decentralize the protocol.

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