

THE TETHER DEFI (USDD) STABLECOIN SYSTEM

WHITEPAPER V1.2



Tether DEFI

<https://cmskmining.com>

By the Tether DeFi Team

Overview of the Tether DeFi (USDD) Stablecoin System 3

Collateralized Debt Position Smart Contracts	3
The CTDF interaction process	4
Single-Collateral Tether DeFi (USDD) vs Multi-Collateral Tether DeFi (USDD)	4
Pooled Ether (Temporary mechanism for Single-Collateral Tether DeFi (USDD))	5
Price Stability Mechanisms	5
Target Price	5
Target Rate Feedback Mechanism	6
Sensitivity Parameter	7
Global Settlement	7
Global Settlement: Step by Step	7
Risk Management of The Tether DeFi Platform	8
Risk Parameters	9
USDD Token Governance	10
USDD and Multi-Collateral Tether DeFi (USDD)	11
Automatic Liquidations of Risky CTDFs	11
Liquidity Providing Contract (Temporary mechanism for Single-Collateral Tether DeFi (USDD))	12
Debt and Collateral Auctions (Multi-Collateral Tether DeFi (USDD))	12
Key External Actors	13
Keepers	13
Oracles	14
Global Settlers	14
Examples	14
Addressable Market	16
Risks and their Mitigation	17
Malicious hacking attack against the smart contract infrastructure	17
Black swan event in one or more collateral assets	18
Competition and the importance of ease-of-use	18
Pricing errors, irrationality and unforeseen events	18
Failure of centralized infrastructure	19



Conclusion	19
Glossary of Terms	20
Links	21



OVERVIEW OF THE TETHER DeFi (USDD) STABLECOIN SYSTEM

Popular digital assets such as Bitcoin (BTC) and Ether (ETH) are too volatile to be used as everyday currency. The value of a bitcoin often experiences large fluctuations, rising or falling by as much as 25% in a single day and occasionally rising over 300% in a month.¹

The Tether DeFi (USDD) Stablecoin is a collateral-backed cryptocurrency whose value is stable relative to the US Dollar. We believe that stable digital assets like Tether DeFi (USDD) Stablecoin are essential to realizing the full potential of blockchain technology.

Tether DeFi is a smart contract platform on Ethereum that backs and stabilizes the value of Tether DeFi (USDD) through a dynamic system of Collateralized Debt Positions (CTDFs), autonomous feedback mechanisms, and appropriately incentivized external actors.

Tether DeFi enables anyone to leverage their Ethereum assets to generate Tether DeFi (USDD) on the Tether DeFi Platform. Once generated, Tether DeFi (USDD) can be used in the same manner as any other cryptocurrency: it can be freely sent to others, used as payments for goods and services, or held as long term savings. Importantly, the generation of Tether DeFi (USDD) also creates the components needed for a robust decentralized margin trading platform.

COLLATERALIZED DEBT POSITION SMART CONTRACTS

Anyone who has collateral assets can leverage them to generate Tether DeFi (USDD) on the Tether DeFi Platform through Tether DeFi's unique smart contracts known as Collateralized Debt Positions.²



CTDFs hold collateral assets deposited by a user and permit this user to generate Tether DeFi (USDD), but generating also accrues debt. This debt effectively locks the deposited collateral assets inside the CTDF until it is later covered by paying back an equivalent amount of Tether DeFi (USDD), at which point the owner can again withdraw their collateral . Active CTDFs are always collateralized in excess, meaning that the value of the collateral is higher than the value of the debt

1. <https://github.com/trustwallet/assets/pull/1518>
2. <https://github.com/MznRahi/Tether-DeFi/blob/master/Tether-DeFi.sol>
3. <https://etherscan.io/token/0x861d899E74eC0e84fa8A15Ba58088Bb3BACcb6FA>

Tether DeFi enables anyone to leverage their Ethereum assets to generate Tether DeFi (USDD) on the Tether DeFi Platform. Once generated, Tether DeFi (USDD) can be used in the same manner as any other cryptocurrency: it can be freely sent to others, used as payments for goods and services, or held as long term savings. Importantly, the generation of Tether DeFi (USDD) also creates the components needed for a robust decentralized margin trading platform.

The screenshot shows the Etherscan.io interface for the Tether DeFi token. The page title is "Token Tether DeFi". At the top right, there are buttons for "Buy", "Exchange", "Marketplace", and "Crypto Credit". Below the title, there is a "Feature Tip" and a navigation bar with tabs for "Transfers", "Holders", "Info", "DEX Trades", "Read Contract", "Write Contract", "Analytics", and "Comments". The "Transfers" tab is active, showing "A total of 39 transactions found". The main content area is divided into two columns. The left column, titled "Overview [ERC-20]", displays the price as "\$0.0000 @ 0.000000 Eth" and the fully diluted market cap as "\$0.00". It also lists "Total Supply: 10,101,010 USDD", "Holders: 15 addresses", and "Transfers: 39". The right column, titled "Profile Summary [Edit]", shows the "Contract" address as "0x861d899E74eC0e84fa8A15Ba58088Bb3BACcb6FA", "Decimals: 10", and "Social Profiles: Not Available, Update?". At the bottom right of the page, there are pagination controls showing "Page 1 of 2".



etherscan.io/token/0x861d899E74eC0e84fa8A15Ba58088Bb3BACcb6FA#tokenTrade

Overview [ERC-20]

PRICE: \$0.0000 @ 0.000000 Eth

FULLY DILUTED MARKET CAP: \$0.00

Total Supply: 10,101,010 USDD

Holders: 15 addresses

Transfers: 39

Profile Summary [Edit]

Contract: 0x861d899E74eC0e84fa8A15Ba58088Bb3BACcb6FA

Decimals: 10

Social Profiles: Not Available, [Update ?](#)

Transfers Holders Info **DEX Trades** Read Contract Write Contract Analytics Comments

Showing the last 3 records

Txn Hash	Age	Maker	Taker	Price	DEX
0x957ede99ecfa0c7...	4 days 21 hrs ago	29.9102691924 USDD	0.0122632103688933 ETH	0.0004100 ETH	
0xadd4b6192558c5f...	5 days 46 mins ago	19.9401794616 USDD	0.00837487537387836 ETH	0.0004200 ETH	
0xd6b21035713da6...	5 days 56 mins ago	39.8803589232 USDD	0.0179461615154536 ETH	0.0004500 ETH	

[This website uses cookies to improve your experience and has an updated Privacy Policy.](#) [Got it](#)



THE CTDF INTERACTION PROCESS

- **STEP 1: CREATING THE CTDF AND DEPOSITING COLLATERAL**

The CTDF user first sends a transaction to Tether DeFi to create the CTDF, and then sends another transaction to fund it with the amount and type of collateral that will be used to generate Tether DeFi (USDD). At this point the CTDF is considered collateralized.

- **STEP 2: GENERATING TETHER DEFI (USDD) FROM THE COLLATERALIZED CTDF**

The CTDF user then sends a transaction to retrieve the amount of Tether DeFi (USDD) they want from the CTDF, and in return the CTDF accrues an equivalent amount of debt, locking them out of access to the collateral until the outstanding debt is paid.

- **STEP 3: PAYING DOWN THE DEBT AND STABILITY FEE**

When the user wants to retrieve their collateral, they have to pay down the debt in the CTDF, plus the Stability fee that continuously accrue on the debt over time. The Stability Fee can only be paid in USDD. Once the user sends the requisite Tether DeFi (USDD) and USDD to the CTDF, paying down the debt and Stability Fee, the CTDF becomes debt free.

- **STEP 4: WITHDRAWING COLLATERAL AND CLOSING THE CTDF**

With the Debt and Stability Fee paid down, the CTDF user can freely retrieve all or some of their collateral back to their wallet by sending a transaction to Tether DeFi .



SINGLE-COLLATERAL TETHER DEFI (USDD) VS MULTI-COLLATERAL TETHER DEFI (USDD)

Tether DeFi (USDD) will initially launch with support for only one type of collateral, Pooled Ether. In the next 6-12 months we plan to upgrade Single-Collateral Tether DeFi (USDD) to Multi-Collateral Tether DeFi (USDD). The primary difference is that it will support any number of CTDF types.³



POOLED ETHER (TEMPORARY MECHANISM FOR SINGLE-COLLATERAL TETHER DEFI (USDD))

At first, Pooled Ether (PETH) will be the only collateral type accepted on Tether DeFi . Users who wish to open a CTDF and generate Tether DeFi (USDD) during the first phase of the Tether DeFi Platform need to first obtain PETH. This is done instantly and easily on the blockchain by depositing ETH into a special smart contract that pools the ETH from all users, and gives them corresponding PETH in return.

If there is a sudden market crash in ETH, and a CTDF ends up containing more debt than the value of its collateral, the Tether DeFi Platform automatically dilutes the PETH to recapitalize the system. This means that the proportional claim of each PETH goes down.

After the Tether DeFi Platform is upgraded to support multiple collateral types, PETH will be removed and replaced by ETH alongside the other new collateral types.



PRICE STABILITY MECHANISMS

TARGET PRICE

The Tether DeFi (USDD) Target Price has two primary functions on the Tether DeFi Platform: 1) It is used to calculate the collateral-to-debt ratio of a CTDF, and 2) It is used to determine the value of collateral assets Tether DeFi (USDD) holders receive in the case of a global settlement.

The Target Price is initially denominated in USD and starts at 1, translating to a 1:1 USD soft peg.

TARGET RATE FEEDBACK MECHANISM

In the event of severe market instability, the Target Rate Feedback Mechanism (TRFM) can be engaged. Engaging the TRFM breaks the fixed peg of Tether DeFi (USDD), but maintains the same denomination.



The TRFM is the automatic mechanism by which the Tether DeFi (USDD) Stablecoin System adjusts the Target Rate in order to cause market forces to maintain stability of the Tether DeFi (USDD) market price around the Target Price. The Target Rate determines the change of the Target Price over time, so it can act either as an incentive to hold Tether DeFi (USDD) (if the Target Rate is positive) or an incentive to borrow Tether DeFi (USDD) (if the Target Rate is negative). When the TRFM is not engaged the target rate is fixed at 0%, so the target price doesn't change over time and Tether DeFi (USDD) is pegged.

When the TRFM is engaged, both the Target Rate and the Target Price change dynamically to balance the supply and demand of Tether DeFi (USDD) by automatically adjusting user incentives for generating and holding Tether DeFi (USDD). The feedback mechanism pushes the market price of Tether DeFi (USDD) towards the variable Target Price, dampening its volatility and providing real-time liquidity during demand shocks.

With the TRFM engaged, when the market price of Tether DeFi (USDD) is below the Target Price, the Target Rate increases. This causes the Target Price to increase at a higher rate, causing generation of Tether DeFi (USDD) with CTFs to become more expensive. At the same time, the increased Target Rate causes the capital gains from holding Tether DeFi (USDD) to increase, leading to a corresponding increase in demand for Tether DeFi (USDD). This combination of reduced supply and increased demand causes the Tether DeFi (USDD) market price to increase, pushing it back up towards the Target Price.

The same mechanism works in reverse if the Tether DeFi (USDD) market price is higher than the Target Price: the Target Rate decreases, leading to an increased demand for generating Tether DeFi (USDD) and a decreased demand for holding it. This causes the Tether DeFi (USDD) market price to decrease, pushing it down towards the Target Price.

This mechanism is a negative feedback loop: Deviation away from the Target Price in one direction increases the force in the opposite direction.



SENSITIVITY PARAMETER

The TRFM's Sensitivity Parameter is a parameter that determines the magnitude of Target Rate change in response to Tether DeFi (USDD) target/market price deviation. This tunes the rate of feedback to the scale of the system. USDD voters can set the Sensitivity Parameter but when



the TRFM is engaged the Target Price and the Target Rate are determined by market dynamics, and not directly controlled by USDD voters.

The Sensitivity Parameter is also what is used to engage or disengage the TRFM. If the Sensitivity Parameter and the Target Rate are both zero, Tether DeFi (USDD) is pegged to the current Target Price.

GLOBAL SETTLEMENT

Global settlement is a process that can be used as a last resort to cryptographically guarantee the Target Price to holders of Tether DeFi (USDD). It shuts down and gracefully unwinds the Tether DeFi Platform while ensuring that all users, both Tether DeFi (USDD) holders and CTFD users, receive the net value of assets they are entitled to. The process is fully decentralized, and USDD voters govern access to it to ensure that it is only used in case of serious emergencies. Examples of serious emergencies are long term market irrationality, hacking or security breaches, and system upgrades.



GLOBAL SETTLEMENT: STEP BY STEP

- **STEP 1: GLOBAL SETTLEMENT IS ACTIVATED**

If enough actors who have been designated as global settlers by Tether DeFi Governance believe that the system is subject to a serious attack, or if a global settlement is scheduled as part of a technical upgrade, they can activate the Global Settlement function. This stops CTDF creation and manipulation, and freezes the Price Feed at a fixed value that is then used to process proportional claims for all users.

- **STEP 2: GLOBAL SETTLEMENT CLAIMS ARE PROCESSED**

After Global Settlement has been activated, a period of time is needed to allow keepers to process the proportional claims of all Tether DeFi (USDD) and CTDF holders based on the fixed feed value. After this processing is done, all Tether DeFi (USDD) holders and CTDF holders will be able to claim a fixed amount of ETH with their Tether DeFi (USDD) and CTDFs.



- **STEP 3: TETHER DEFI (USDD) AND CTDF HOLDERS CLAIM THE COLLATERAL WITH THEIR TETHER DEFI (USDD) AND CTDFS**

Each Tether DeFi (USDD) and CTDF holder can call a claim function on the Tether DeFi Platform to exchange their Tether DeFi (USDD) and CTDFs directly for a fixed amount of ETH that corresponds to the calculated value of their assets, based on the target price of Tether DeFi (USDD).

E.g. If the Tether DeFi (USDD) Target Price is 1 U.S. Dollar, The ETH/USD Price is 200 and a user holds 1000 Tether DeFi (USDD) when Global Settlement is activated, after the processing period they will be able to claim exactly 5 ETH from the Tether DeFi Platform. There is no time limit for when the final claim can be made.



RISK MANAGEMENT OF THE TETHER DEFI PLATFORM

The USDD token allows holders to vote to perform the following Risk Management actions:

- **Add new CTDF type:** Create a new CTDF type with a unique set of Risk Parameters. A CTDF type can either be a new type of collateral, or a new set of Risk Parameters for an existing collateral type.
- **Modify existing CTDF types:** Change the Risk Parameters of one or more existing CTDF types that were already added
- **Modify Sensitivity Parameter:** Change the sensitivity of the Target Rate Feedback Mechanism
- **Modify Target Rate:** Governance can change the Target Rate. In practice modifying the Target Rate will only be done in one specific circumstance: When USDD voters want to peg the price of Tether DeFi (USDD) to its current Target Price. It will always be done in conjunction with modifying the Sensitivity Parameter. By setting both Sensitivity Parameter and Target Rate to 0%, the TRFM becomes disabled and the Target Price of Tether DeFi (USDD) becomes pegged to its current value.



- **Choose the set of trusted oracles:** The Tether DeFi Platform derives its internal prices for collateral and the market price of Tether DeFi (USDD) from a decentralized oracle infrastructure, consisting of a wide set of individual oracle nodes. USDD voters control how many nodes are in the set of trusted oracles, and who those nodes are. Up to half of the oracles can be compromised or malfunction without causing a disruption to the continued safe operation of the system
- **Modify Price Feed Sensitivity:** Change the rules that determine the largest change that the price feeds can affect on the internal price values in the system.
- **Choose the set of global settlers:** Global settlement is a crucial mechanic that allows the Tether DeFi Platform to survive attacks against the oracles or the governance process. The governance process chooses a set of global settlers and determines how many settlers are needed to activate global settlement.

RISK PARAMETERS

Collateralized Debt Positions have multiple Risk Parameters that enforce how they can be used. Each CTDF type has its own unique set of Risk Parameters, and these parameters are determined based on the risk profile of the collateral used by the CTDF type. These parameters are directly controlled by USDD holders through voting, with one USDD giving its holder one vote.

The key Risk Parameters for CTDFs are:

- **Debt Ceiling:** The Debt Ceiling is the maximum amount of debt that can be created by a single type of CTDF. Once enough debt has been created by a CTDF of any given type, it becomes impossible to create more unless existing CTDFs are closed. The debt ceiling is used to ensure sufficient diversification of the collateral portfolio.



- **Liquidation Ratio:** The Liquidation Ratio is the collateral-to-debt ratio at which a CTDF becomes vulnerable to Liquidation. A low Liquidation Ratio means USDD voters expect low price volatility of the collateral, while a high Liquidation Ratio means high volatility is expected.
-
- **Stability Fee:** The Stability Fee is a fee paid by every CTDF. It is an annual percentage yield that is calculated on top of the existing debt of the CTDF and has to be paid by the CTDF user. The Stability Fee is denominated in Tether DeFi (USDD), but can only be paid using the USDD token. The amount of USDD that has to be paid is calculated based on a Price Feed of the USDD market price. When paid, the USDD is burned, permanently removing it from the supply.
- **Penalty Ratio:** The Penalty Ratio is used to determine the maximum amount of Tether DeFi (USDD) raised from a Liquidation Auction that is used to buy up and remove USDD from the supply, with excess collateral getting returned to the CTDF user who owned the CTDF prior to its liquidation. The Penalty Ratio is used to cover the inefficiency of the liquidation mechanism. During the phase of Single-Collateral Tether DeFi (USDD), the Liquidation Penalty goes to buy and burn of PETH, benefitting the PETH to ETH ratio.



USDD TOKEN GOVERNANCE

In addition to payment of the Stability Fee on active CTDFs, the USDD token plays an important role in the governance of the Tether DeFi Platform.

Governance is done at the system level through election of an Active Proposal by USDD voters. The Active Proposal is the smart contract that has been empowered by USDD voting to gain root access to modify the internal governance variables of the Tether DeFi Platform.

Proposals can be in two forms: Single Action Proposal Contracts [SAPC], and Delegating Proposal Contracts [DPC].

Single Action Proposal Contracts are proposals that can only be executed once after gaining root access, and after execution immediately applies its changes to the internal governance variables of the Tether DeFi Platform. After the one-time execution, the SAPC deletes itself and cannot be re-used. This type of proposal is what will be used during the first phases of the system, as it is not very complicated to use, but is less flexible.

Delegating Proposal Contracts are proposals that continuously utilize their root access through second layer governance logic that is codified inside the DPC. The second layer governance logic can be relatively simple, such as defining a protocol for holding a weekly



vote on updated risk parameters. It can also implement more advanced logic, such as restrictions on the magnitude of governance actions within defined time periods, or even delegating some or all of its permissions further to one or more third layer DPCs with or without restrictions.

Any Ethereum account can deploy valid proposal smart contracts. USDD voters can then use their USDD tokens to cast approval votes for one or more proposals that they want to elect as the Active Proposal. The smart contract that has the highest total number of approval votes from USDD voters is elected as the Active Proposal.

USDD AND MULTI-COLLATERAL TETHER DEFI (USDD)

After the upgrade to Multi-Collateral Tether DeFi (USDD), USDD will take on a more significant role in the Tether DeFi (USDD) Stablecoin System by replacing PETH as the the recapitalization resource. When CTDFs become undercollateralized due to market crashes, the USDD supply is automatically diluted and sold off in order to raise enough funds to recapitalize the system.



AUTOMATIC LIQUIDATIONS OF RISKY CTDFS

To ensure there is always enough collateral in the system to cover the value of all outstanding Debt (according to the Target Price), a CTDF can be liquidated if it is deemed to be too risky. The Tether DeFi Platform determines when to liquidate a CTDF by comparing the Liquidation Ratio with the current collateral-to-debt ratio of the CTDF.

Each CTDF type has its own unique Liquidation Ratio that is controlled by USDD voters and established based on the risk profile of the particular collateral asset of that CTDF type.

Liquidation occurs when a CTDF hits its Liquidation Ratio. The Tether DeFi Platform will automatically buy the collateral of the CTDF and subsequently sell it off. There is a temporary mechanism in place for Single-Collateral Tether DeFi (USDD) called a Liquidity Providing Contract. For

Multi-Collateral Tether DeFi (USDD) an auction mechanism will be used.



LIQUIDITY PROVIDING CONTRACT (TEMPORARY MECHANISM FOR SINGLE-COLLATERAL TETHER DEFI (USDD))

During Single-Collateral Tether DeFi (USDD), the mechanism for liquidation is a Liquidity Providing Contract: a smart contract that trades directly with ethereum users and keepers according to the price feed of the system.

When a CTDF is liquidated, it is immediately acquired by the system. The CTDF owner receives the value of the leftover collateral minus the debt, Stability Fee and Liquidation Penalty.

The PETH collateral is set for sale in the Liquidity Providing Contract, and keepers can atomically purchase the PETH by paying Tether DeFi (USDD). All Tether DeFi (USDD) paid this way are immediately removed from the Tether DeFi (USDD) supply, until an amount equal to the CTDF debt has been removed. If any Tether DeFi (USDD) is paid in excess of the debt shortfall, the excess Tether DeFi (USDD) is used to purchase PETH from the market and burn it, which positively changes the ETH to PETH ratio. This results in a net value gain for PETH holders.

If the PETH selloff initially does not raise enough Tether DeFi (USDD) to cover the entire debt shortfall, more PETH is continuously created and sold off. New PETH created this way negatively changes the ETH to PETH ratio, causing PETH holders to lose value.



DEBT AND COLLATERAL AUCTIONS (MULTI-COLLATERAL TETHER DEFI (USDD))

During a liquidation, the Tether DeFi platform buys the collateral of a CTDF and subsequently sells it in an automatic auction. This auction mechanism enables the system to settle CTDFs even when price information is unavailable.

In order to take over the collateral of the CTDF so that it can be sold, the system first needs to raise enough Tether DeFi (USDD) to cover the CTDF's debt. This is called a Debt Auction, and works by diluting the supply of the USDD token and selling it to bidders in an auction format.



In parallel, the collateral of the CTDF is sold in a Collateral Auction where all proceeds (also denominated in Tether DeFi (USDD)) up to the CTDF debt amount plus a Liquidation Penalty (A Risk Parameter determined by USDD voting) is used to buy USDD and remove it from the supply. This directly counteracts the USDD dilution that happened during the Debt Auction. If enough Tether DeFi (USDD) is bid to fully cover the CTDF debt plus the Liquidation Penalty, the Collateral Auction switches to a reverse auction mechanism and tries to sell as little collateral as possible--any leftover collateral is returned to the original owner of the CTDF.

KEY EXTERNAL ACTORS

In addition to its smart contract infrastructure, the Tether DeFi Platform relies on certain external actors to maintain operations. Keepers are external actors who take advantage of the economic incentives presented by the Tether DeFi platform. Oracles and Global Settlers are external actors with special permissions in the system assigned to them by USDD voters.

KEEPERS

A keeper is an independent (usually automated) actor that is incentivized by profit opportunities to contribute to decentralized systems. In the context of the Tether DeFi (USDD) Stablecoin System, keepers participate in the Debt Auctions and Collateral Auctions when CTDFs are liquidated.

Keepers also trade Tether DeFi (USDD) around the Target Price. Keepers sell Tether DeFi (USDD) when the market price is higher than the Target Price and buy Tether DeFi (USDD) when the market price is below the Target Price to profit from the expected long-term convergence towards the Target Price.



ORACLES

The Tether DeFi Platform requires real time information about the market price of the assets used as collateral in CTDFs in order to know when to trigger liquidations. The Tether DeFi Platform also needs information about the market price of Tether DeFi (USDD) and its deviation from the Target Price in order to adjust the Target Rate when the TRFM is engaged. USDD voters choose a set of trusted oracles to feed this information to the Tether DeFi Platform through Ethereum transactions.

To protect the system from an attacker who gains control of a majority of the oracles, and from other forms of collusion, there is a global variable that determines the maximum change to the value of the price feed permitted by the system. This variable is known as the Price Feed Sensitivity Parameter.

As an example of how the Price Feed Sensitivity Parameter works, if the Price Feed Sensitivity Parameter is defined as “5% in 15 minutes”, the price feeds cannot change more than 5% within one 15 minute period, and changing ~15% would take 45 minutes. This restriction ensures there is enough time to trigger a global settlement in the event that an attacker gains control over a majority of the oracles.

GLOBAL SETTLERS

Global Settlers are external actors similar to price feed oracles and are the last line of defense for the Tether DeFi (USDD) Stablecoin System in the event of an attack. The set of global settlers, selected by USDD voters, have the authority to trigger global settlement. Aside from this authority, these actors do not have any additional special access or control within the system.



EXAMPLES

The Tether DeFi (USDD) Stablecoin System can be used by anyone without any restrictions or sign-up process.

- **Example 1:** Bob needs a loan, so he decides to generate 100 Tether DeFi (USDD). He locks an amount of ETH worth significantly more than 100 Tether DeFi (USDD) into a CTDF and uses it to generate 100 Tether DeFi (USDD). The 100 Tether DeFi (USDD) is instantly sent directly to his Ethereum account. Assuming that the Stability Fee is 1% per year, Bob will need 101 Tether DeFi (USDD) to cover the CTDF if he decides to retrieve his ETH one year later.

One of the primary use cases of CTDFs is margin trading by CTDF users.



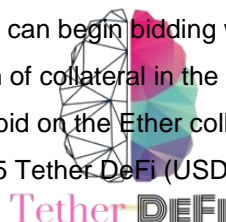
- **Example 2:** Bob wishes to go margin long on the ETH/Tether DeFi (USDD) pair, so he generates 100 USD worth of Tether DeFi (USDD) by posting 150 USD worth of ETH to a CTDF. He then buys another 100 USD worth of ETH with his newly generated Tether DeFi (USDD), giving him a net 1.66x ETH/USD exposure. He's free to do whatever he wants with the 100 USD worth of ETH he obtained by selling the Tether DeFi (USDD). The original ETH collateral (150 USD worth) remains locked in the CTDF until the debt plus the Stability Fee is covered.

Although CTDFs are not fungible with each other, the ownership of a CTDF is transferable. This allows CTDFs to be used in smart contracts that perform more complex methods of Tether DeFi (USDD) generation (for example, involving more than one actor).

- **Example 3:** Alice and Bob collaborate using an Ethereum OTC contract to issue 100 USD worth of Tether DeFi (USDD) backed by ETH. Alice contributes 50 USD worth of ETH, while Bob contributes 100 USD worth. The OTC contract takes the funds and creates a CTDF, thus generating 100 USD worth of Tether DeFi (USDD). The newly generated Tether DeFi (USDD) are automatically sent to Bob. From Bob's point of view, he is buying 100 USD worth of Tether DeFi (USDD) by paying the equivalent value in ETH. The contract then transfers ownership of the CTDF to Alice. She ends up with 100 USD worth of debt (denominated in Tether DeFi (USDD)) and 150 USD worth of collateral (denominated in ETH). Since she started with only 50 USD worth of ETH, she is now 3x leveraged long ETH/USD.

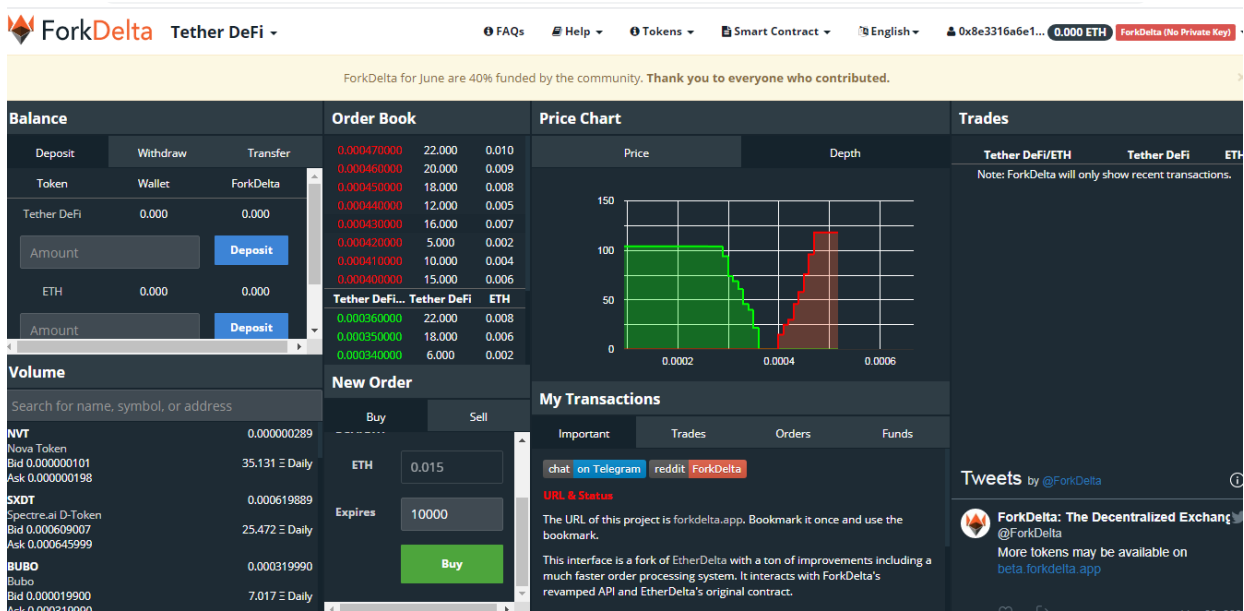
Liquidations ensure that in the event of a price crash of the collateral backing a CTDF type, the system will automatically be able to close CTDFs that become too risky. This ensures that the outstanding Tether DeFi (USDD) supply remains fully collateralized.

- **Example 4:** Let's assume that there is an Ether CTDF type with a Liquidation Ratio of 145%, a Penalty Ratio of 105%, and we have an Ether CTDF with a collateral-to-debt ratio of 150%. The Ether price now crashes 10% against the Target Price, causing the collateral-to-debt ratio of the CTDF to fall to ~135%. As it falls below the Liquidation Ratio, traders can trigger its Liquidation and begin bidding with Tether DeFi (USDD) for buying USDD in the debt auction. Simultaneously, traders can begin bidding with Tether DeFi (USDD) for buying the ~135 Tether DeFi (USDD) worth of collateral in the collateral auction. Once there is at least 105 Tether DeFi (USDD) being bid on the Ether collateral, traders reverse bid to take the least amount of collateral for 105 Tether DeFi (USDD). Any remaining collateral is returned to the CTDF owner.



ADDRESSABLE MARKET

As mentioned in the introduction, a cryptocurrency with price stability is a basic requirement for the majority of decentralized applications. As such, the potential market for Tether DeFi (USDD) is at least as large as that of the entire blockchain industry. The following is a short, non-exhaustive list of some of the immediate markets (in both the blockchain and the wider industry) for the Tether DeFi (USDD) Stablecoin System in its capacity as a cryptocurrency with price stability and its use case as a decentralized margin trading platform:



- **Prediction Markets & Gambling Applications:** When making an unrelated prediction, it is obvious not to want to increase one’s risk by placing the bet using a volatile cryptocurrency. Long term bets become especially infeasible if the user has to also gamble on the future price of the volatile asset used to place the bet. Instead, a cryptocurrency with price stability like Tether DeFi (USDD) will be the natural choice for prediction market and gambling users.



- **Financial Markets; Hedging, Derivatives, Leverage:** CTDFs will allow for permissionless leveraged trading. Tether DeFi (USDD) will also be useful as stable and reliable collateral in custom derivative smart contracts, such as options or CFD's.
- **Merchant receipts, Cross-border transactions and remittances:** Foreign exchange volatility mitigation and a lack of intermediaries means the transaction costs of international trade can be significantly reduced by using Tether DeFi (USDD).
- **Transparent accounting systems:** Charities, NGO's and Governments will all see increases in efficiency and lower levels of corruption by utilizing Tether DeFi (USDD).

RISKS AND THEIR MITIGATION

There are many potential risks facing the successful development, deployment, and operation of the Tether DeFi Platform. It is vital that the Tether DeFi community takes all necessary steps to mitigate these risks. The following is a list spells out some of the risks identified and the accompanying plan for risk mitigation:



MALICIOUS HACKING ATTACK AGAINST THE SMART CONTRACT INFRASTRUCTURE

The greatest risk to the system during its early stages is the risk of a malicious programmer finding an exploit in the deployed smart contracts, and using it to break or steal from the system before the vulnerability can be fixed. In a worst case scenario, all decentralized digital assets that are held as collateral in The Tether DeFi Platform, such as Ether (ETH) or Augur Reputation (REP), could be stolen without any chance of recovery. *The part of the collateral portfolio that is not decentralized, such as Digix Gold IOU's, would not be stolen in such an event as they can be frozen and controlled through a centralized backdoor.*

Mitigation: Smart contract security and best security practices have been the absolute highest priority of the Tether DeFi (USDD) development effort since its inception. The codebase has already undergone three independent security audits by some of the best security researchers in the blockchain industry.

In the very long term, the risk of getting hacked can theoretically be almost completely mitigated through formal verification of the code. This means mathematically proving that the code does exactly what it is intended to do. While complete formal verification is a very long term goal, significant work towards it has already been completed, including a full reference implementation of the Tether DeFi (USDD) Stablecoin System in the functional programming language Haskell, which serves as a stepping stone towards more sophisticated formalizations that are currently under active research and development

BLACK SWAN EVENT IN ONE OR MORE COLLATERAL ASSETS

Another high impact risk is a potential Black Swan event on collateral used for the Tether DeFi (USDD). This could either happen in the early stages of Tether DeFi (USDD) Stablecoin System, before USDD is robust enough to support inflationary dilutions, or after the Tether DeFi (USDD) Stablecoin System supports a diverse portfolio of collateral.

Mitigation: CDF collateral will be limited to ETH in the early stages, with the debt ceiling initially limited and growing gradually over time.



COMPETITION AND THE IMPORTANCE OF EASE-OF-USE

As mentioned previously, there is a large amount of money and brainpower working on cryptocurrency with price stability. By virtue of having “true decentralization”, the Tether DeFi (USDD) Stablecoin System is by far the most complex model being contemplated in the blockchain industry. A perceived risk is a movement among cryptocurrency users where the ideals of decentralization are exchanged for the simplicity and marketing of centralized digital assets.

Mitigation: We expect that Tether DeFi (USDD) will be very easy to use for a regular cryptocurrency user. Tether DeFi (USDD) will be a standard Ethereum token adhering to the ERC-20 standard and will be readily available with high liquidity across the ecosystem. Tether DeFi (USDD) has been designed in such a way that the average user need not understand the underlying mechanics of the system in order to use it.

The complexities of the Tether DeFi (USDD) Stablecoin System will need to be understood primarily by Keepers and capital investment companies that use the Tether DeFi (USDD) Stablecoin System for margin trading. These types of users have enough resources to onboard themselves as long as there is abundant and clear documentation of every aspect of the system's mechanics. The Tether DeFi community will ensure that this is the case.

PRICING ERRORS, IRRATIONALITY AND UNFORESEEN EVENTS

A number of unforeseen events could potentially occur, such as a problem with the price feed from the Oracles, or irrational market dynamics that cause variation in the value of Tether DeFi (USDD) for an extended period of time. If confidence is lost in the system, the TRFM adjustments or even USDD dilution could reach extreme levels while still not bringing enough liquidity and stability to the market.

Mitigation: The Tether DeFi community will need to incentivize a sufficiently large capital pool to act as Keepers of the market in order to maximize rationality and market efficiency and allow the Tether DeFi (USDD) supply to grow at a steady pace without major market shocks.



FAILURE OF CENTRALIZED INFRASTRUCTURE

The Tether DeFi Team plays a major role in the development and governance of the Tether DeFi Platform in its early days: budgeting for expenses, hiring new developers, seeking partnerships and institutional users, and interfacing with regulators and other key external stakeholders. Should the Tether DeFi Team fail in some capacity — for legal reasons, or due to internal problems with management — the future of Tether DeFi could be at risk without a proper backup plan.

Mitigation: The Tether DeFi community exists partly to act as the decentralized counterparty to the Tether DeFi Team. It is a loose collective of independent actors who are all aligned by holding the USDD token, giving them a strong incentive to see the Tether DeFi Platform succeed. During the early phases of USDD distribution, great care was taken to ensure that the most important core developers received a significant USDD stake. In the event that the Tether DeFi Team is no longer effectively able to lead the development of the Tether DeFi Platform, individual USDD holders will be incentivized to fund developers (or simply carry out development themselves) in an effort to protect their investment.



CONCLUSION

The Tether DeFi (USDD) Stablecoin System was designed to solve the crucial problem of stable exchange of value in the Ethereum ecosystem and the wider blockchain economy. We believe that the mechanism through which Tether DeFi (USDD) is created, transacted, and retired, along with the direct Risk Management role of USDD holders, will allow for self-interested Keepers to maintain the price stability of Tether DeFi (USDD) over time in an efficient manner. The founders of the Tether DeFi community have established a prudent governance roadmap that is appropriate for the needs of agile development in the short term, but also coherent with the ideals of decentralization over time. The development roadmap is aggressive and focused on widespread adoption of Tether DeFi (USDD) in a responsible fashion



GLOSSARY OF TERMS

- **Collateralized Debt Position (CTDF):** A smart contract whose users receive an asset (Tether DeFi (USDD)), which effectively operates as a debt instrument with an interest rate. The CTDF user has posted collateral in excess of the value of the loan in order to guarantee their debt position.
- **Tether DeFi (USDD):** The cryptocurrency with price stability that is the asset of exchange in the Tether DeFi (USDD) Stablecoin System. It is a standard Ethereum token adhering to the ERC20 standard.
- **Debt Auction:** The reverse auction selling USDD for Tether DeFi (USDD) to cover Emergency Debt when a CTDF becomes undercollateralized.
- **Collateral Auction:** The auction selling collateral from a CTDF undergoing liquidation. It is designed to prioritize covering the debt owed by the CTDF, and secondarily to give the CTDF owner the best possible price for their excess collateral refund.
- **The Tether DeFi (USDD) Foundation:** A decentralized team of smart contract developers committed to the development and successful launch of the Tether DeFi Platform.
- **Keepers:** Independent economic actors that trade Tether DeFi (USDD), CTDFs and/or USDD; create Tether DeFi (USDD) or close CTDFs; and seek arbitrage on The Tether DeFi (USDD) Stablecoin System. As a result, Keepers help maintain Tether DeFi (USDD) market rationality and price stability.
- **USDD:** The ERC20 token used by USDD voters for voting. It also serves as a backstop in the case of insolvent CTDFs.
- **USDD Voters:** USDD holders who actively manage the risk of the Tether DeFi (USDD) Stablecoin System by voting on Risk Parameters.
- **Tether DeFi :** The name of the Decentralized Autonomous Organization that is made up of the Tether DeFi Platform technical infrastructure, and the community of USDD voter



- **Risk Parameters:** The variables that determine (among other things) when the Tether DeFi Platform automatically judges a CTDF to be Risky, allowing Keepers to liquidate it.
- **Sensitivity Parameter:** The variable that determines how aggressively the Tether DeFi (USDD) Stablecoin System automatically changes the Target Rate in response to Tether DeFi (USDD) market price deviations.
- **Target Rate Feedback Mechanism (TRFM):** The automatic mechanism by which the Tether DeFi (USDD) Stablecoin System adjusts the Target Rate in order to cause market forces to maintain stability of the Tether DeFi (USDD) market price around the Target Price.



Tether **DEFI**