DEUS Finance : A Peer-to-Peer Bilateral Agreement System

Max Piau, Lafayette Tabor

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Abstract

A purely peer-to-peer version of bilateral agreements allows for digitized derivatives to be cleared directly between one party and another in a trustless way. Decentralized threshold-signature-based oracles provide part of the solution by verifying the agreement upon request at any given time by economic-driven third-party market observers. Consider every parameter that leads to a traditional trade as **one dimension**. For example, typical order book based exchanges have a single variable parameter for matching orders and the price, limiting the variety of markets.

We propose an **n-dimensional** "request for Quote" based marketplace. N-dimensional setups give Liquidity Providers the ability to produce derivatives with their preferred rulesets creating unlimited access to any market in the process. After the user provides the necessary collateral, they can create an immutable "request for Quote" to a Blockchain with their desired trade parameters, allowing third-party order matching engines to connect the Seller with the Buyer. For a minimized trust trade setup, the Seller also locks necessary collateral in the AccountManager engine. Both parties are now in a Bilateral Agreement, as they both provided collateral. A neutral party called "oracle" then verifies how the balances of each party change at any given time, demanding for one side to increase their collateral to make sure the other party can exit and the counterparty is solvent. Anything with a data point can be traded.

With this technology, a free market around derivatives evolves. The Liquidity Provider that can provide the most desirable parameters such as price, funding rate, and maintenance margin, will ultimately win the most significant market share.

A global "peer-to-peer Bilateral Agreement System," based on the name of its traditional finance predecessor, "Bilateral OTC derivatives."

Contents

1 Author's thoughts

DeFi adoption and market participation would increase significantly if users understood some key points around this emerging market. Derivatives play a major role in the continuation of economic growth. As a tool, derivatives reduce risk exposure, which is a major part of protecting earnings and building a sustainable portfolio. Derivatives enable strategies that are not possible with spot assets.

Additionally, derivatives serve as an essential tool for price discovery of the underlying assets. Users should understand that derivatives offer a significant advantage in hedging risk exposure, contributing to market efficiency, and having access to otherwise unavailable assets and liquidity.

In building common ideas, this paper takes the time to explain notions that can appear basic in finance but have been misrepresented in the crypto space with much misleading information. Every claim and suggestion made in this whitepaper is subject to our interpretation and assumptions.

DEUS has been built by idealists seeking to decentralise everything. We invite a diverse range of users to share their experiences and thoughts on this system to enable us to build products and services that best meet the needs of these users.

2 Introduction

2.1 The role of derivatives

Different types of institutions utilize derivatives to increase the yield of certain assets, reduce risk, take advantage of arbitrage opportunities, market making, and take positions. They are an excellent tool for market participants to gain access and exposure to a broader range of assets and strategies. The more participants, the broader the range of potential products and the customizability of said products. Increasing the range of derivatives would bring diversity to the digital asset market and make it more resilient. Market participants tend to seek more exposure while reducing risk. Increasing the hedging possibilities can also encourage price discovery and liquidity of assets composing the market by driving bonds, farming, and yield products.

Derivative products can be used to enhance portfolio efficiency. By allowing trading with cross margin on credit, foreign exchange, IR, equity, and stocks, all from one place with the same margin, users can create portfolios with more diversity.

2.2 Market efficiency

The derivative market can be split between market makers (MM), who provide the market, and end-users, who use the market. DEUS is building a protocol where end-users can request quotes from MM's directly. DEUS's vision includes derivative market

liberalization, increased access, and financial reform.

DeFi has shown efficiency in creating a permissionless market for loans and automated market makers (AMMs), however, there are no permissionless derivative protocols that are sufficiently efficient. The more use-cases there are for derivatives, the more volume will be attracted to the market, and the broader the derivative use-cases become.

2.3 Permissionless system

To be permissionless and censorship-resistant, a derivative protocol needs to be scalable, flexible, and devoid of any central party capable of denying access to participants or choosing the rules for their users, otherwise, the central party always ends up dictating limitation rules because of conflicts of interests.

Neutral oracles are the key to being permissionless. They allow smart contracts to receive input, meaning that, ideally, all parties need to agree on a price before any trade can occur. Because we cannot wait for an agreement between each party, those that behave dishonestly must incur a penalty. A broader set of data availability grants new types of derivative products that can reach a broader audience.

The over-the-counter (OTC) derivatives share of the market is directly impacted by the inefficiency of the underlying asset. Our Master Agreements are designed to comply with regulations. Regulations are important but each regulation should be in free competition, allowing any participant to create their own regulations. It should also be considered that between regulators, it is possible to engage in cross-margin under certain conditions, allowing, for example, a cross-margin between stocks of two closed countries. Access to the OTC derivatives market is enhanced by allowing a broader range of participants, including retail investors, to open foreign markets without the need to wait for government regulations and by simplifying the OTC trading process, the general market framework is improved.

2.4 Legislation and regulations

Translating legislation to code allows a hyper-efficiency of the market with elements such as instant settlement and closeouts. Furthermore, it allows transparency and clarity of understanding because it is not subject to the interpretation of a judge. TradFi regulations are a major hurdle for initiates, requiring a lot of energy, and non-initiates because it blocks them. A team of lawyers, a risk desk, and many more resources are required to create and manage products, limiting small market participants to start a business or innovate. DeFi derivatives protocols built on immutable code ensure that no party can break the rules, making them simple to use and easy for development. Users can begin trading with very little barrier to entry, such as know-your-customer (KYC), and additional barriers that come with more complex derivatives.

2.5 Transparency

A transparent market promotes increased liquidity, coupled with increased efficiency, which leads to improved asset pricing. When market participants have more trust in a market and less fear of the unknown, participation and liquidity increase, increasing efficiency. The more efficient a market is, the more accurate an asset is priced, decreasing the risks of pump-and-dumps.

On-chain activities mean users and traders have transparency and knowledge of MM's activities, increasing trust in the market. The more data available to analyze a market, the more trust users can have in phases of uncertainty, resulting in less reactionary trading. This results in a decrease in volatility, creating a feedback loop of trust in the market. Free competition between market makers, risk management tools, defined market rules, and infrastructure, makes for a more attractive and efficient market.

2.6 Automation

Automated, simplified derivative products promote growth in the market. The current DeFi framework doesn't allow for complex financial products due to a lack of oracles and not being able to compute complex functions. By creating a complex framework that behaves automatically, resources are freed up to focus on vision and innovation rather than constantly building infrastructure. DeFi products that reduce risks, such as using options and shorts as hedging strategies, help to build a robust DeFi portfolio. Additionally, this attracts TradFi to the DeFi market due to decreased risk and the option of taking large positions.

Introducing close-out netting across all blockchains promises to be a massive improvement to the current TradFi model. Currently, parties need to ask for a daily settlement on open positions because they cannot trust counterparties to be able to pay themselves after more than one day of market deviations. In blockchain, however, this is not a concern. Close-out netting closes all transactions at once in case of liquidation before a party is truly defaulting and transfers cash flow to each party eliminating the risk of loss.

One of DEUS DAO's key future roles is the education of practitioners in the areas of law, computer science, and statistics, in programming derivative contracts. Additionally, by reducing operational costs for his builders, allocation is freed up for product development and innovation.

3 The current state of the market

The current market for derivatives in DeFi has some major flaws that can be broken down into 4 main elements.

3.1 Liquidity pools

In protocols such as Uniswap, liquidity providers (LPs) add collateral to a global liquidity pool, which is then used to trade against users. When this system is applied to derivatives, users are automatically trading against the liquidity pool, creating a risk for the LPs.

To combat this, a series of solutions are implemented to extract more from the trader and create more value for the liquidity providers. These can come in the form of virtual liquidity, funding, liquidation fees, and more.

A system such as the one explained above operates under the assumption that the markets are delta neutral and that there are generally more losers than winners in day-trading. Because of the risk of market manipulation, the number of tradable assets and the amount of leverage available is limited. This liquidity due to the above-mentioned risks results in almost no synthetic or derivative trading in the cryptocurrency markets.

Additionally, to discourage users from holding long-term positions, regular interest rates, called funding, are often charged, making long-term holds unsustainable. This adds to the lack of flexibility, making this system unsuitable for derivatives trading.

Semi-permissionless protocols are not solving market-wide problems. These protocols allow users to create custom pools with custom parameters of a bonding curve, but they rely on restrictive rules. Needing liquidity for each strike, each termination, and each asset can be good for customizability but is inefficient in practice.

3.2 Hedged tokens

On paper, this system is sustainable, however, it creates a massive spread when buying these tokens which leads to a bad trading experience and no possibility of creating any leveraged financial products.

3.3 Delta-neutral setups

These systems don't require direct, stacked liquidity. The principle is simple: if someone loses then someone wins. This type of system is sustainable, however, it requires an equal amount of shorts and longs, resulting in a poor trading experience.

Some projects alleviate this by using leverage. In a situation where there are more shorts than longs, then longs will have leverage below one, and shorts will have high

leverage. The idea is that these systems would be used enough to attract users through arbitrage opportunities. The problem with this is that these projects are less capital-efficient than others, resulting in no arbitrageurs. Even if there was a large user base, the project wouldn't be able to scale because each asset requires a large amount of volume.

Some notable projects start to emerge, where each AMM deployer can choose custom parameters including entry and exit spread, holding time, and max leverage. Some others allow users to create custom options but the counterparty still needs to deposit their collateral in advance to answer to the market needs, and the amount of liquidity in a pool still counts for the buying spread.

Splitting the liquidity and asking for a deposit before someone wants a trade is not an efficient system, and furthermore, specialized protocols in options or certain versions of swaps are less competitive than a marketplace that allows interoperability of each of these products.

3.4 Order book models

On-chain order books are inefficient by nature, as they need to be able to handle a high volume of updates. One solution to this would be a fast blockchain, however, in the case where the first problem is solved by an off-chain order look like 0x, a market maker is required to manage an order book of hundreds of assets.

4 DEUS v1 and v2 - what has been achieved

In 2021, DEUS v1 implemented a structure that allowed the trading of 500 assets, backed by an economic model with similar traits to $OHM with vested tokens and protocols owning liquidity in 6-month locked vaults, where vested tokens had a liquid secondary market.

We found this model to be unsustainable in the long run and began work on DEUS v2, where the same assets were available, however, this time they were backed by $DEI, a cross-chain stablecoin, to prepare for the economy of DEUS.

V2 itself does not solve the issue of who pays the winners. DEUS holders are the counterparties and cannot hedge themselves. Presented from here on is the basis of an upgradable and scalable system and an exploration of the different possibilities for the DEUS DeFiX (decentralized financial information exchange protocol) and beyond.

5 Global overview of the DEUS DeFiX (decentralized financial information exchange protocol)

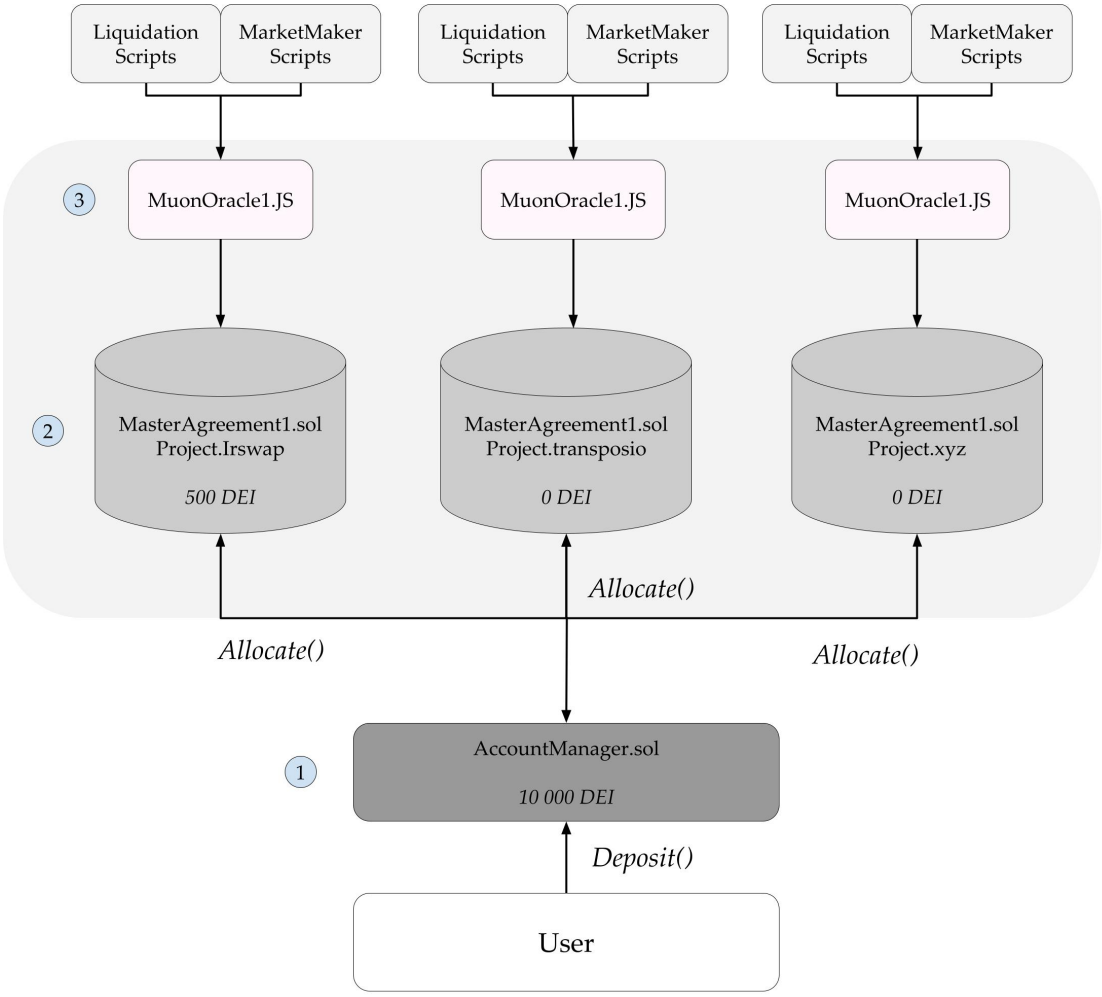


Figure 1: DEUS DeFiX

1. The account manager. This block is where assets are deposited and allocated to the different master agreements.
2. The master agreements. These are deployed by third parties and are where positions are opened and where rules are defined and settled. For example, cross margin, liquidations, or position PnL rules. DEI inside the DEUS DeFiX will always be considered $1. To avoid liquidation, each DEI sent to a master agreement cannot be utilized in another master agreement.
3. Muon oracles. All rules are executed by Muon oracles. A Muon node can be called by a participant in the trade or by anybody else.

The DEUS DeFiX architecture is divided into two parts: some built by DEUS, and others built by third parties on top of DEUS infrastructure. DEUS acts as a custody

platform and an incentivized ecosystem but is not responsible for the usage by third parties of the permissionless and censorless architecture.

5.1 Master agreement

In the following example, the collateral inside a master agreement is in cross-margin, meaning that every position shares the same balance. If a position wins and another loses and the total of all positions results in a negative balance, then the overall set of positions are liquidated.

Let's look at the example of the life of a position.

1. Once user Party A opens and adds collateral (1000 DEI) to a master agreement, they have all of their collateral available and no positions.

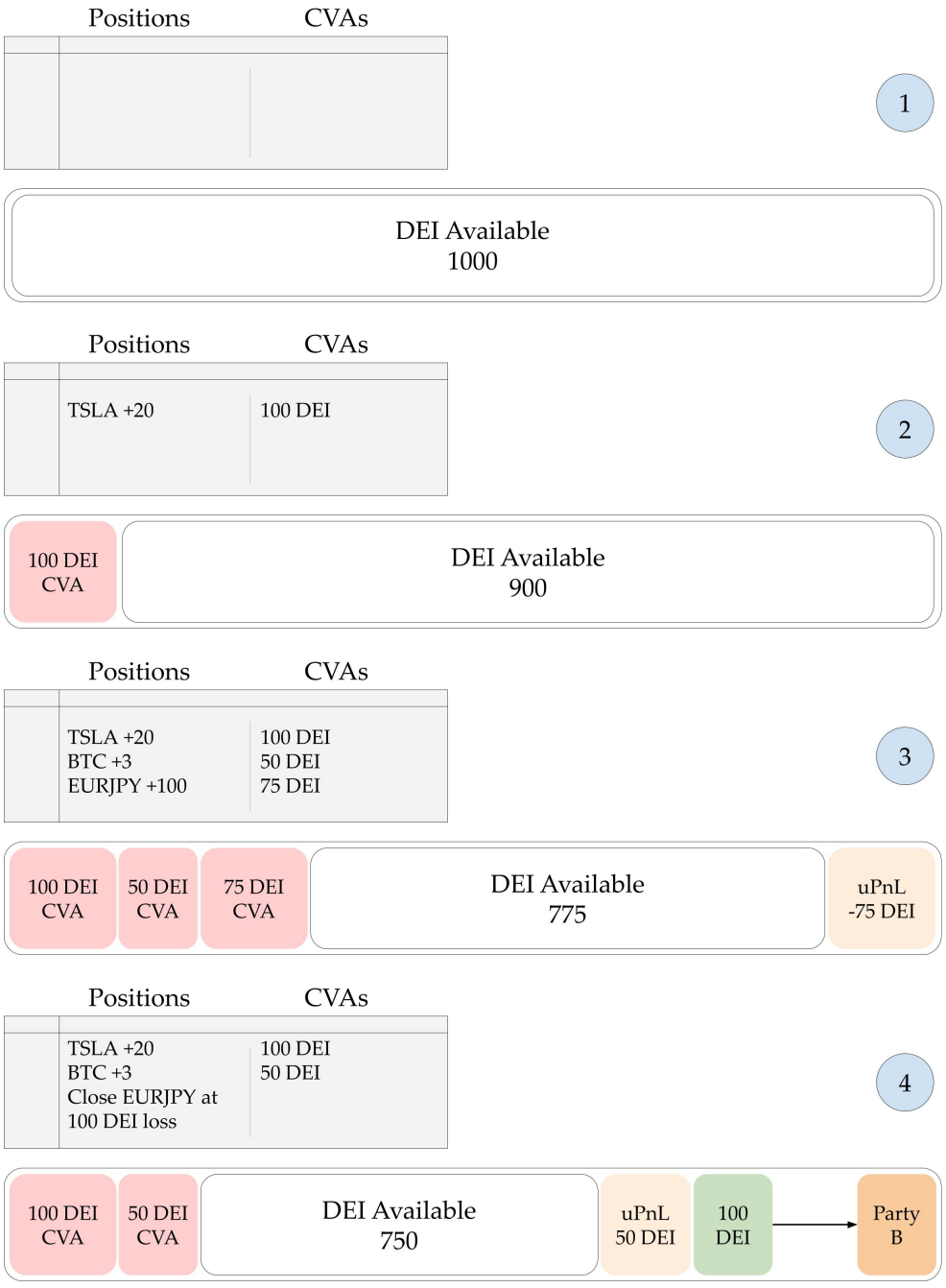
2. They open a trade with Party B of 20 contracts of TSLA long with a CVA of 1000 DEI. CVA is collateral that is isolated and locked to pay liquidation fees and incentivize avoiding liquidation.

3. After some time, the user opens multiple other positions, 100 EURJPY long contracts with Party B with a CVA of 75, and 3 BTC long contracts with Party C with a CVA of 50 DEI. We can see that the CVAs are deducted from the available balance and can also note that the TSLA position is already in the negative. However, this won't affect the balance until a close, an event is updated, or the position is liquidated.

4. The user closes their EURJPY position that is in a loss of 100 DEI. In the event of the closing, 100 DEI is transferred from the user's account to Party B's account, the counterparty. The available DEI balance is updated and the CVA allocated to the TSLA position is unlocked and considered as available balance.

5. Later, a market crash may occur, and the user runs out of margin. This means that their BTC and TSLA positions have a greater loss than the available balance (loss of 760 DEI and 750 DEI available), with the CVA not taken into the available balance.

6. Party A is liquidated and their DEI is distributed between Party B and Party C, who are the counterparties.


Positions
CVAs
1
DEI Available
1000
Positions
CVAs
TSLA +20
100 DEI
2
100 DEI
CVA
DEI Available
900
Positions
CVAs
TSLA +20
BTC +3
EURJPY +100
100 DEI
50 DEI
75 DEI
3
100 DEI
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50 DEI
100
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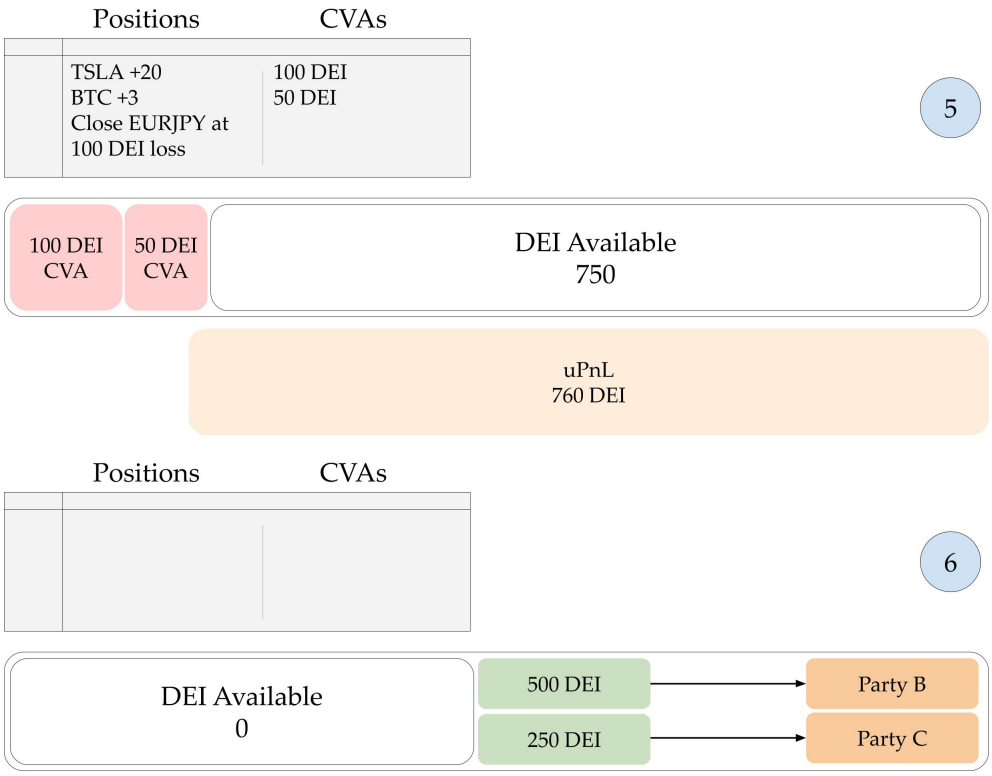

Figure 2: Life of a Trade

It is impossible to create a system that verifies the trust level of an asset inside a master agreement or position. The goal of a master agreement deployer is to have the most possible number of different contracts and assets while keeping the master agreement safe and secure. Ideally, we want every asset to be in cross-margin but we illustrate that this is not possible through the example of a cross-margin attack and a permissionless system where MMs can attack users.

User #1 opens a positive contract with user #2

After some time, user #1 is winning and user #2 is losing, so in order to not have to pay the loss, user #2 opens a position with another one of his accounts (we'll call it #2b) of a manipulatable asset and causes that asset to suddenly crash 100%. User #2 is liquidated but when it comes to the time where a Muon node needs to allocate the collateral of user #2 between user #1 and #2b, the rules are exploitable. #2b can collect all the collateral of user #2, causing a loss for user #1 but enabling user #2 to never really lose.

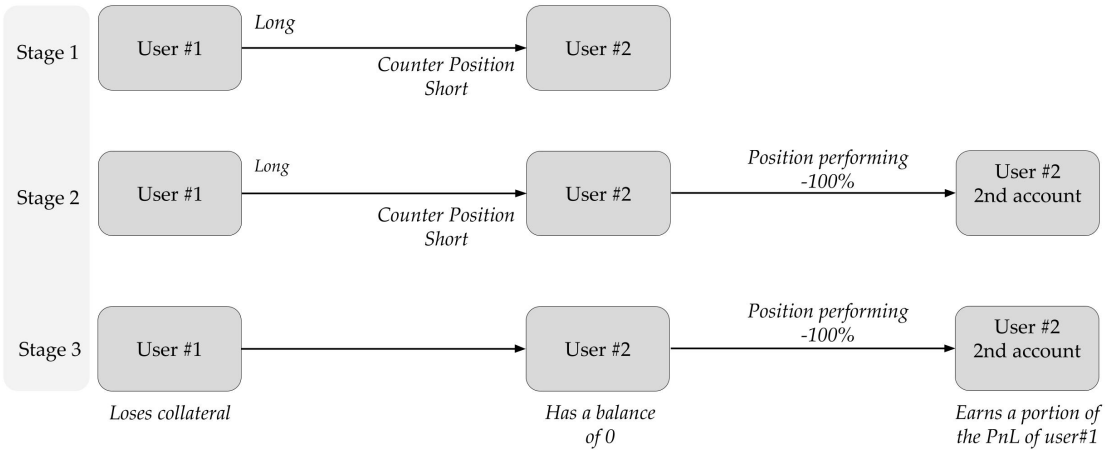

Figure 3: Position

In order to make a master agreement permissionless and avoid the issues listed above, a governance system is needed which regulates the restrictions of certain functions within, such as the maximum leverage, contract type restrictions, and asset price feeds, etc.

5.2 Sending a quote on-chain

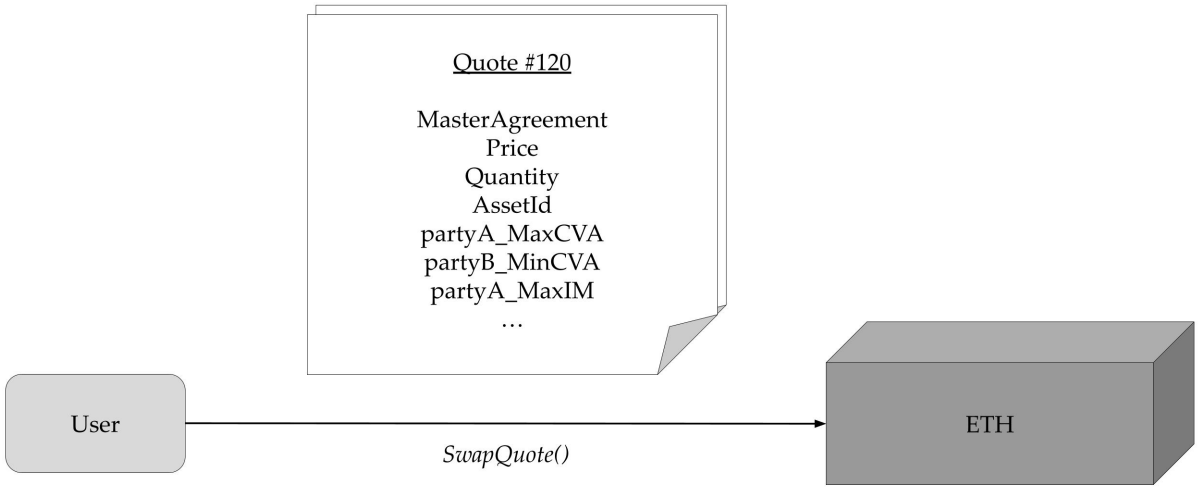

Figure 4: Sending a Quote

After allocating to a master agreement, there are multiple ways a user can open a position but we will focus on one. The user sends a set of parameters that correspond to a type of position. We call this a quote.

5.2.1 Parameters

Parameters inside of a quote can be very broad. In the following, we'll focus on basic swap contract parameters that are more retail-focused.

A swap contract is composed of a partyA and a partyB who are betting on a difference in value of an asset, interest rate, etc. If partyA wins something then partyB loses the equivalent amount. We define partyA as the one who initiates the quote and partyB as the one who claims the quote.

Swap parameters: Our standard swap contracts allow users to close a position however MMs cannot close a position unless their trade is defaulted on and a liquidator liquidates his position.

Credit valuation adjustment (CVA): To ensure that defaulted trades still hold a certain percentage of collateral value in a liquidation event, CVA is assigned to all trades within the DEUS ecosystem. CVA is collateral that is locked to USD and doesn't fluctuate based on a price feed, unlike available collateral. All parties participating in a derivative contract have CVA locked into their trade.

When defining CVA, both parties need to study the worst-case scenario in the event of a default, such as replacement costs and others. Another party or entity may consider buying out other positions of the defaulting party at a cheaper price.

Swap expiration: It is important that MMs have some security on the duration of the trade, as they cannot close the position unless their available collateral is absorbed and CVA is lost. This is why all swaps have an expiration date.

FVA: MMs have costs associated with providing collateral such as fees paid when hedging trades, fees paid when moving assets, credit risk, and other operational costs. To cover these hedging costs a MM may request an APR which is what we call FVA.

Early termination fee: At expiration, a position expires at oracle price. In the case of one of the parties wanting to end the position promptly, some additional costs may be accrued such as spread on the hedging position or portfolio rebalances.

Swap initial margin (Swap IM): To ensure that traders are not instantly liquidated, all swaps have a minimum amount of collateral which is known as the swaps initial margin. Swap IM is only verified when a position is opened.

Quote expiration: The issuer of the quote that we call partyA might not want their quote live on the blockchain without needing to spend gas to terminate said quote.

Price: On a quote, partyA asks for a maximum price. Not asking for an exact price allows for partyB to request a lower price. Let's look at an example of a trade aimed at

a whitelisted address that is a centralized exchange built on top of the DEUS DeFiX. The exchange has the option to give the best price to their user without the need to communicate the best price to partyA and having issues with spread while hedging due to blockchain latency.

example: Swap quote parameters

```
Price // Price of the asset, for example, $40435 per contract
Quantity // Number of contracts
AssetId // BTC
partyA_MaxCVA // Max CVA amount that quote emitter is willing to pay to their counterparty in case of liquidation
partyB_MinCVA // Min CVA amount that quote receiver is willing to pay to their counterparty in case of liquidation
partyA_MaxIM // Max IM amount that quote emitter needs to have to open position
partyB_MinIM // Min IM amount that quote receiver need to have to open position
MaxFVA // Max FVA that quote emitter is willing to pay
```

5.3 Opening a position

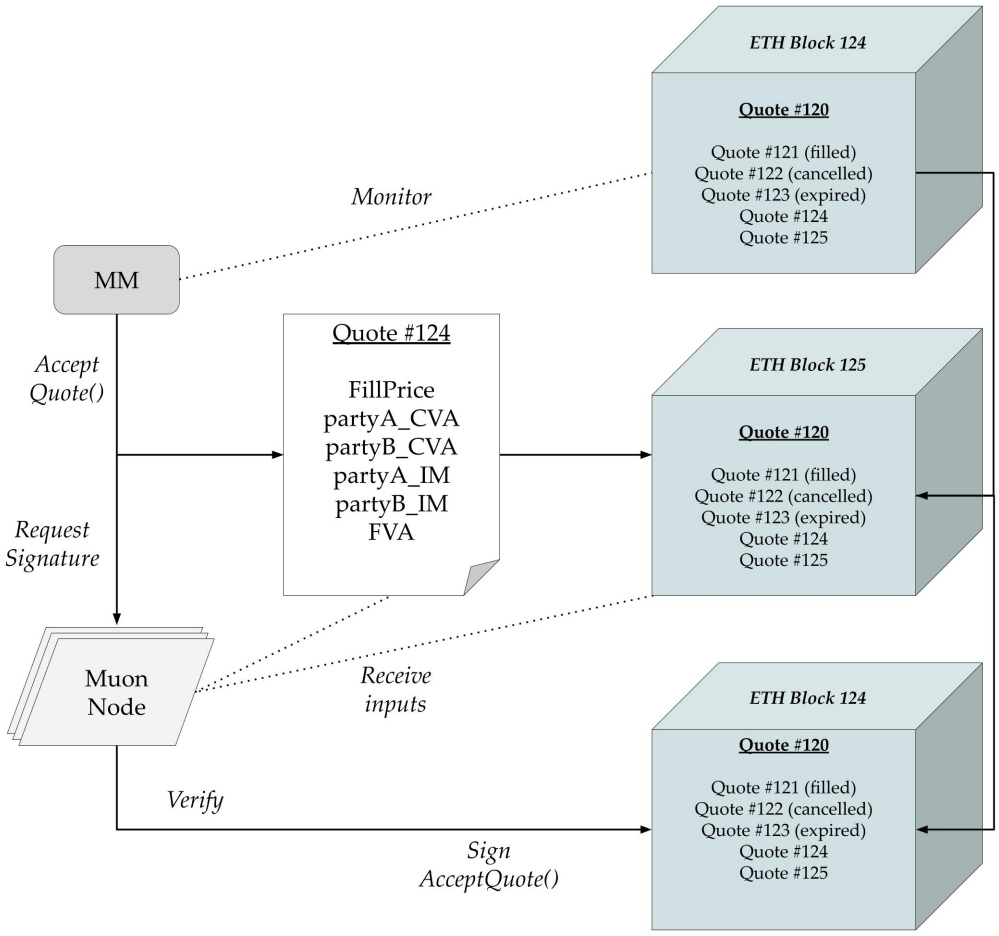

Figure 5: Opening a Position

Once a quote is emitted, a MM/partyB who is monitoring the quotes on-chain can respond to that quote by sending some parameters on-chain and asking a Muon node to validate and sign the transaction.

5.3.1 Accepting an on-chain quote

example: Swap quote accept parameters

```
FillPrice // Exact entry price of the position
partyA_CVA // partyA CVA in DEI
partyB_CVA
partyA_IM // partyB initial margin in DEI
partyB_IM
FVA // If > 0 then partyA pays partyB and vice versa
```

5.3.2 Verifying a quote

example: Parameter verification

Once partyB has sent their parameters a Muon node verifies that the parameters match.

```
Price > entryPrice
partyA_MaxCVA > partyA_CVA
partyB_MinCVA < partyB_CVA
partyA_MaxIM > partyA_IM
partyB_MinIM < partyB_IM
MaxFVA > FVA
```

5.3.3 Adding a quote to the system

Once Muon nodes verify that the trade complies with all of the trade rules and a user has a trade filled, a user can hold many ***different types of positions*** that range from derivative swaps to option contracts. Certain sophisticated instruments such as options contracts are not to be implemented by DEUS. DEUS is designed to incentivize 3rd parties to build on top of the protocol and if a 3rd party wishes to implement options contracts with DEUS, it is certainly possible.

5.4 Closing a swap

Closing a position is a critical part of the process where bad actors and behavior can take place causing a loss to one of the parties. As the custodial, the DEUS DeFiX aims for the fairest conditions but it is up to the users to choose in which manner it takes place, with their preferred pros and cons. This issue exists in TradFi and is one of the most time-consuming events. As there are no oracles, every input needs to be entered manually and both parties need to agree.

When a position is closed at expiration, the trader does not pay a spread. If a party decides to close the swap before expiration, an additional spread is to be paid to the other party. The simplest solution relies on a bit of trust or inefficiency. When initiating a position, partyA defines a maximum spread in case of an early close. In the event it occurs, partyB has x blocks to send a spread for the early close and partyA then sends an on-chain request for a close. If partyB does not respond then the trade is closed at oracle price by a Muon node.

There are opportunities for additional algorithm development to increase oracle trust and efficiency. This may prevent one or both parties from having to make decisions. Other solutions can allow the non-closing party to take their time to find enough

liquidity to close at a good price.

5.5 Withdrawing collateral

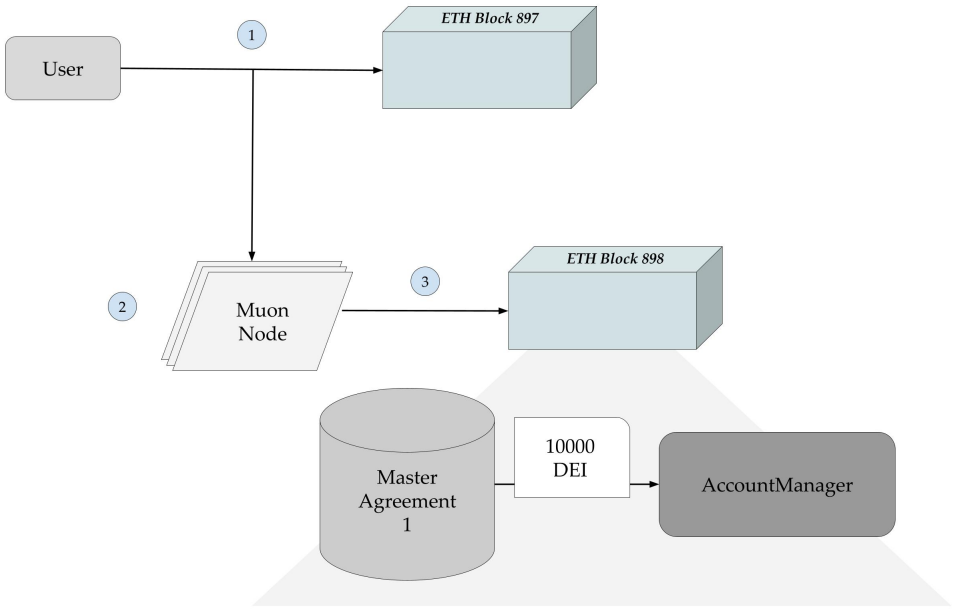

Figure 6: Withdrawing Collateral

1. *1000 DEI unallocated, MasterAgreement 2*
2. *Verify withdrawal conditions, MasterAgreement 2*
3. *Sign withdraw*

Withdrawing is similar in form to validating a trade. The user requests a withdrawal on-chain and a Muon node signs the request. The node checks all PnL (the user may have lost some collateral and the position has not been updated yet) in order to make sure no lost collateral can be withdrawn.

5.6 Liquidations within the master agreement

The liquidation process can be started by any entity, by requesting a Muon node to liquidate an account. If the request ends in a liquidation, the entity is rewarded. The process starts by identifying each position and sorting them in order of priority defined by the master agreement rules. Each position's PnL is computed one by one in order and in the same way, attributes each party's PnL, including the value of the CVAs in the account balances.

Let's take an example where there is an account at liquidation. There are 6 ranked positions. FB with a PnL of -300, TSLA 200, AAPL -950, ETH +60, BTC(1) -100, BTC(2) -56, and a global account balance with a CVA of 1000. Every positive position results in a total balance of $1260. After paying #1, we have $960. #2 already paid us and after paying #3 only $10 remains. #4 paid us, #5 receives $10 because there is no more collateral and #6 receives $0 for the same reason.

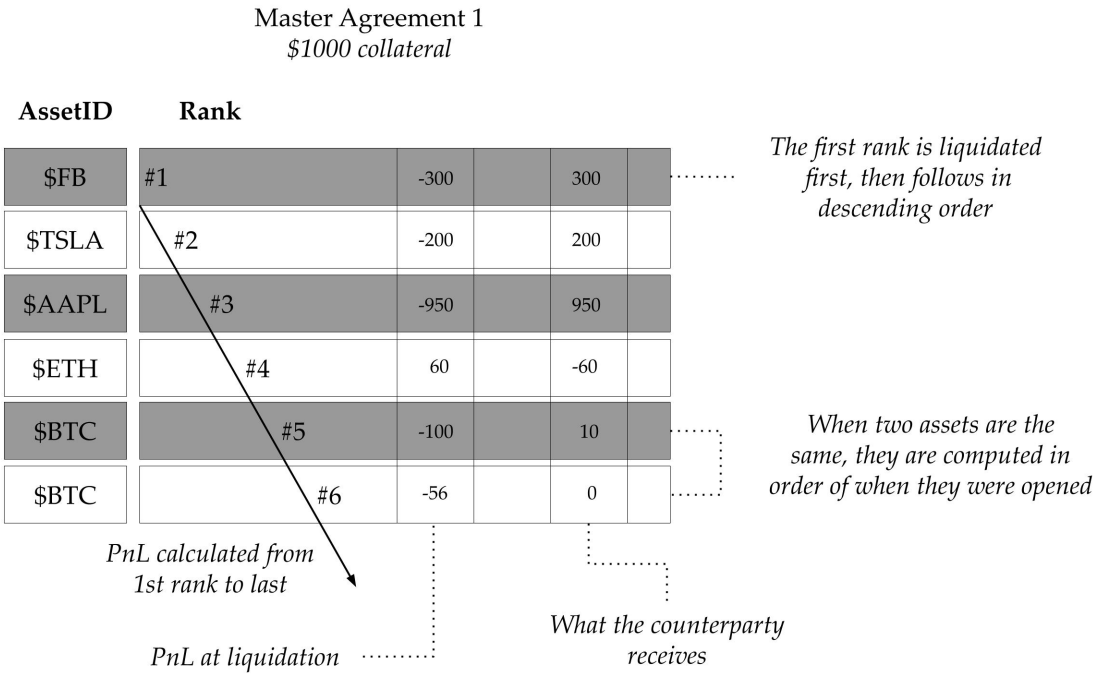

Figure 7: Liquidation

Master agreements are in cross-margin, meaning that there are a number of positions that share the same collateral within each master agreement. When an entity requests a liquidation, it is checked that the sum of all PnL is negative.

```
Collateral Balance = PnL Position 1 + PnL Position 2 + . . . + PnL Position
#n < 0
```

If that condition is true, then Muon nodes begin a liquidation of the account.

Within each master agreement is an array of positions that are ranked in arithmetic sequence from 1, 2, 3, 4, 5, and so on. If amendments are made to the Asset IDs or number rank, then a new master agreement must be created. This structure allows traders and MMs to check the validity of a contract and assess all possible risks of other contracts, however, this may affect the cross margin experience. This is why positions taken from an old master agreement can be continued in a new agreement and are computed first to avoid an attack. In the example below, we can see that the

contract from update 1.0 comes before the 1.1 update.

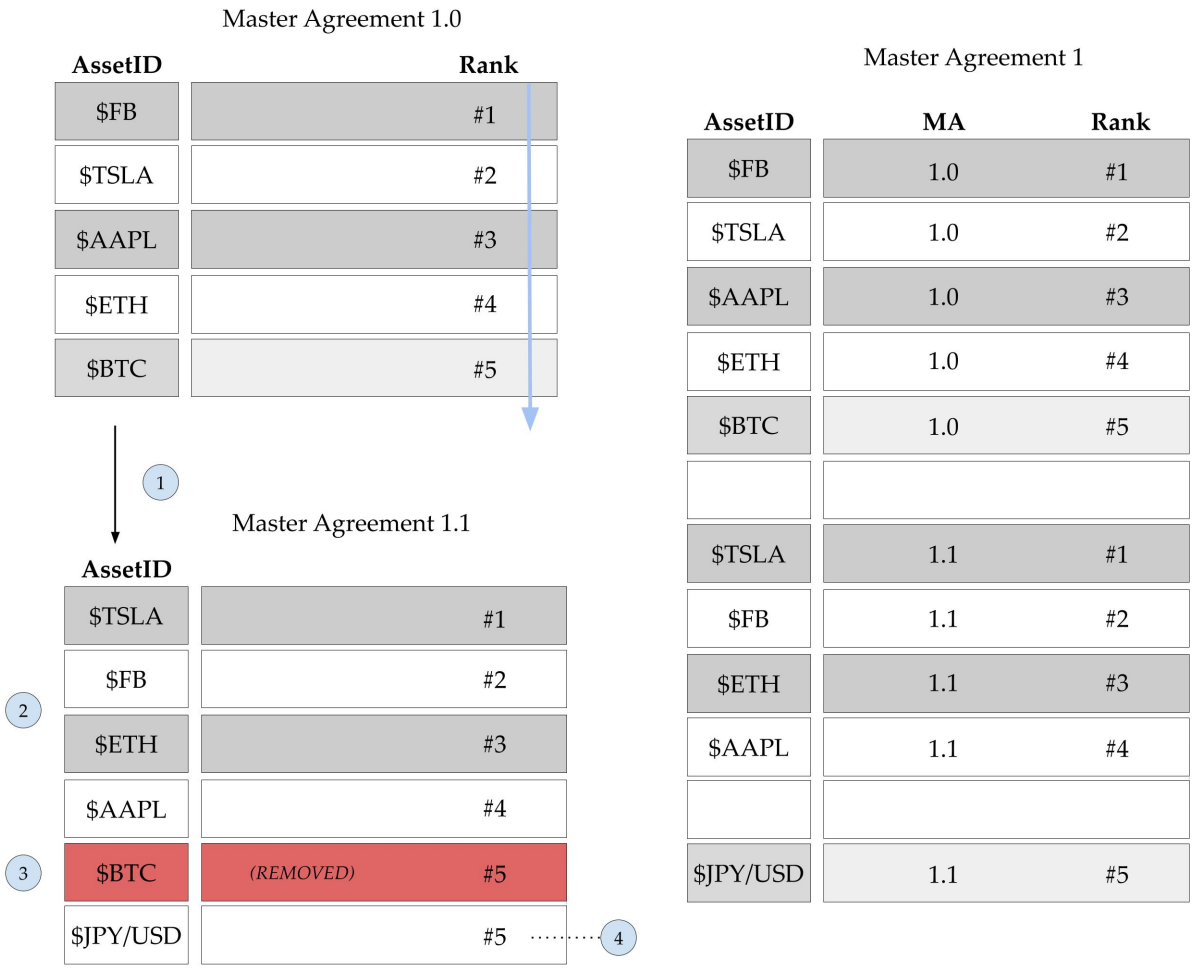

Figure 8: Cross-Margin Collateral Structure

1. *Master Agreement Updated*
2. *Order can be changed*
3. *Asset can be removed*
4. *AssetId parameters added*

5.7 Counterparty defaults and incentivized trade continuation with CVA

Current implementations of OTC derivatives involve performing due diligence on counterparty solvency risks to ensure that the counterparty can continue a trade. There are instances when the agreed-upon collateral for the trade is used up and the counterparty is forced to close the trade. This can be an unfortunate situation for the trader if they wish to continue the trade and it is a result of outdated and manually intensive

processes without counterparty diversification. Digital derivatives are able to solve this issue via automating and incentivizing the continuation of a defaulted trade with the remaining CVA of the defaulted trade.

When a trader defaults or wishes to terminate early, their positions can be bought by another party in exchange for a part of their CVA. When this transaction occurs, a Muon node verifies that the new party has enough maintenance margin to hold the position. This allows the non-defaulting party to avoid force-closing their position and, in some cases, their hedge. This primarily avoids liquidation events that can snowball into further liquidations.

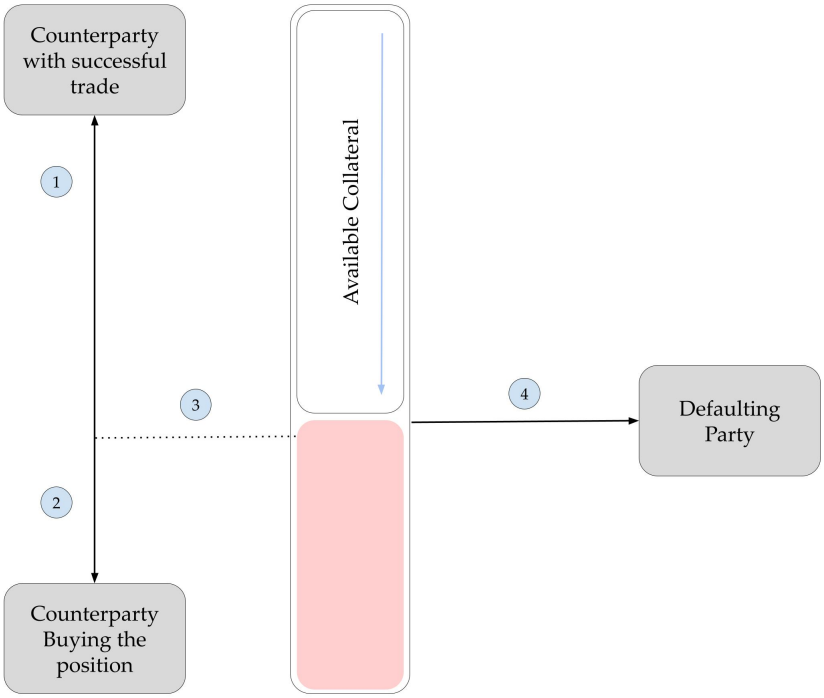

Figure 9: Incentivized Trade Continuation

1. *% of CVA distributed to successful counterparty*
2. *% of CVA used to incentivize the new counterparty to continue the trade*
3. *CVA of defaulted party*
4. *Position is liquidated when available collateral is absorbed*

5.8 Smarter liquidations

This involves implementing the possibility for MMs to partially liquidate positions before a total liquidation event occurs. Users and MMs have multiple positions, with some of them potentially leading to liquidation. MMs should be able to choose which of their positions, or which of their user's positions, they wish to close before a global

liquidation of their account, which can lead to cascading liquidations.

For example, when a party margin is less than 105% of their CVA, and thus close to liquidation, anyone is able to take the position and be rewarded with CVA, under the condition that they hold double the CVA_IM in their account. 30% of the CVA is given to the other part as compensation for the change in counterparty.

If the liquidating position is not bought up before 102.5% of the user's CVA then the party can choose which position to liquidate to avoid liquidation, however, they are still liable to pay the CVA. This system allows a user to partially liquidate their position instead of total liquidation. A party is able to liquidate their own position at any time and pay the CVA. When a party has a margin below 100% of the CVA then the standard sequence of events occurs where anyone can liquidate them and all their positions.

If a party has a margin below 100% of the CVA, then anyone can liquidate them and all their positions.

5.9 Partial fill

In some instances, the RFQ might be too substantial for a MM to absorb, due to lack of liquidity, high risk, etc. In these cases, it is preferable for a position to be split between multiple parties, in what is called a Partial Fill. After each fill, the quote is updated. Some parameters can be added to the quote to set a min/max value on the fill value.

The partial fill function is a DEUS innovation that contributes towards the efficiency of liquidity. Allowing MM's to partially fill orders solves multiple issues related to lack of liquidity (a quote might be too large for one counterparty to fill) and counterparty default risk diversification. It is also possible to set parameters for the partial fill to define a minimum and maximum amount of the fill value. When taking all of these factors into account splitting one position across multiple counterparties is the most efficient method, even if a position ends up being netted.

The example below represents the process of how a request for quotation (RFQ) can be partially filled. After each fill, the quote is updated, and the remaining unfilled quote is filled by as many MMs as it takes to completely fill the position.

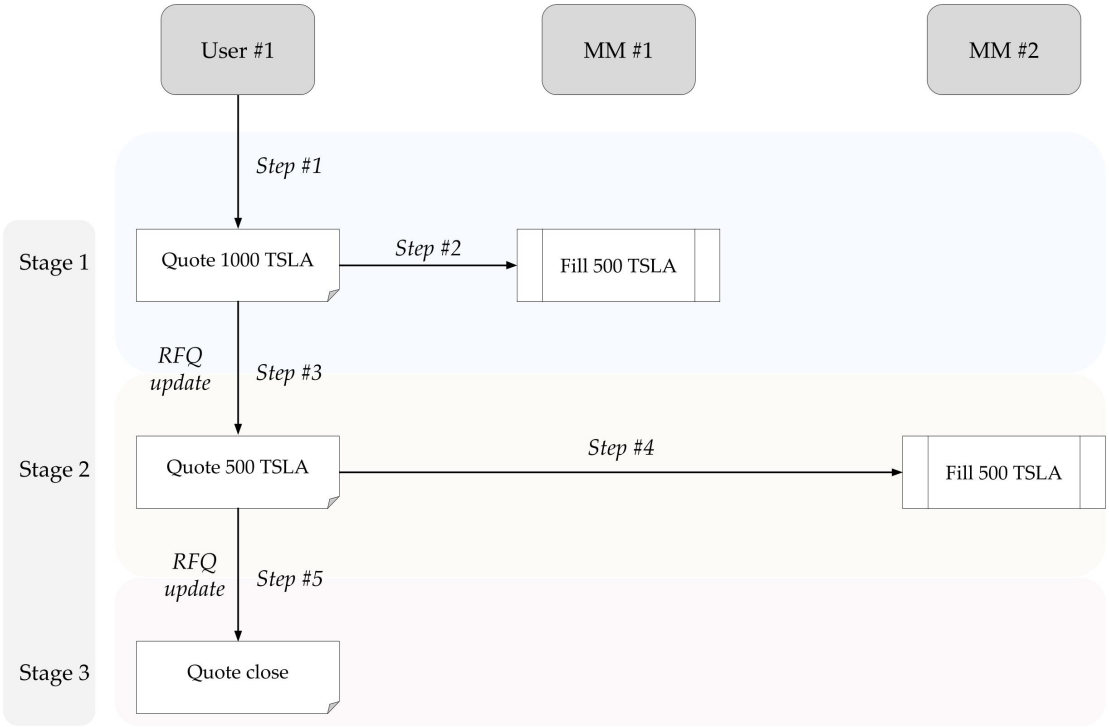

Figure 10: Partial Fill

5.10 Upgradeable Master Agreements

The DEUS DeFiX is designed to be modular, upgradeable, and ultimately to cater to the needs of users and MMs.

Following the basic system presented thus far, we now discuss future updates to continue building the DEUS DeFiX platform.

5.10.1 Netting

The OTC derivatives market involves many contracts between MMS and users, all of which have varying levels of trade size, margin, settlement parameters, and other associated risks. MMs that are active in providing liquidity will commonly have thousands of contracts in our system. Ultimately, each MM has a non-delta neutral portfolio and needs to hedge themselves in order to reduce exposure.

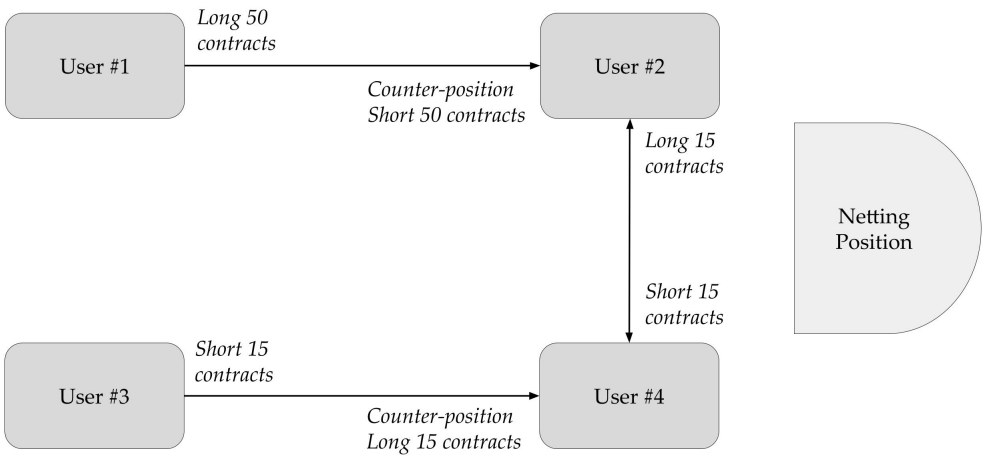

Figure 11: Netting

In this example, #1 and #3 are the users who open the contracts and #2 and #4 are the counterparties that are hedging. #1 has 50 positive positions with #2 and on the other side, #3 has 15 negative positions with #4. This means that #4 is seeking 15 negative contracts to be delta neutral and #2 is seeking 50 positive contracts, thus a 15 contract net can be opened between #2 and #4.

With netting, the MMs don't have to hedge themselves if they find someone to net their position, which drastically reduces operational costs mobilizes capital for other tasks, and reduces the fee for the end-user.

Netting provides other benefits too. If we consider the volatility of the market where shorts need to close their positions, the shorts don't have to hedge on the market because they have a delta-neutral position. They won't cause a supply shortage by buying back their positions and by closing their positions the other side of the netting position is likely to hedge, creating a selling pressure that reduces volatility.

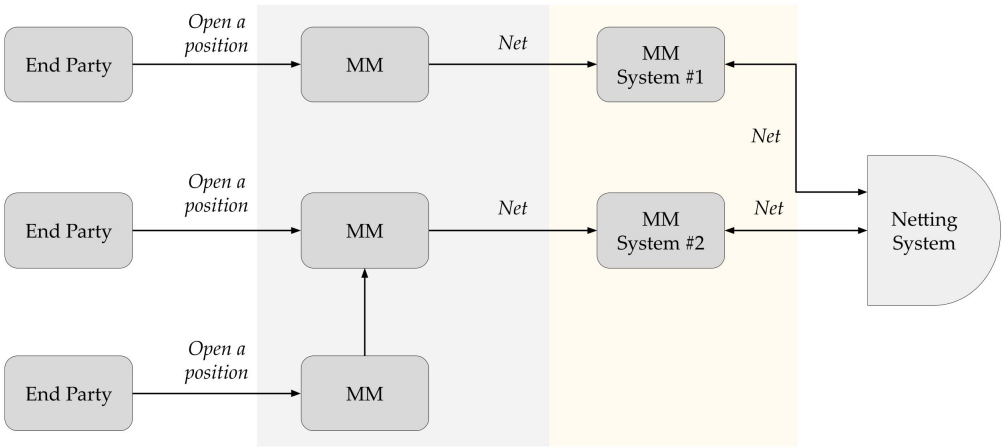

Figure 12: Netting 2

The open-loop model that we see in TradFi seems to be the best in increasing efficiency and is possible to build with DEUS. However, since it is composed of many parameters that DEUS is not aware of as an infrastructure provider, third parties need to manage the netting activities. End users who seek simplicity might take trades with a broker that nets their trades for capital efficiency with other MMs in their master agreement. On top of that, a MM might clear with one or more global netting systems, making the global DEUS ecosystem behave like a global CCP, or allowing for projects to build a CCP system inside the DEUS ecosystem.

5.10.2 Transferring a position

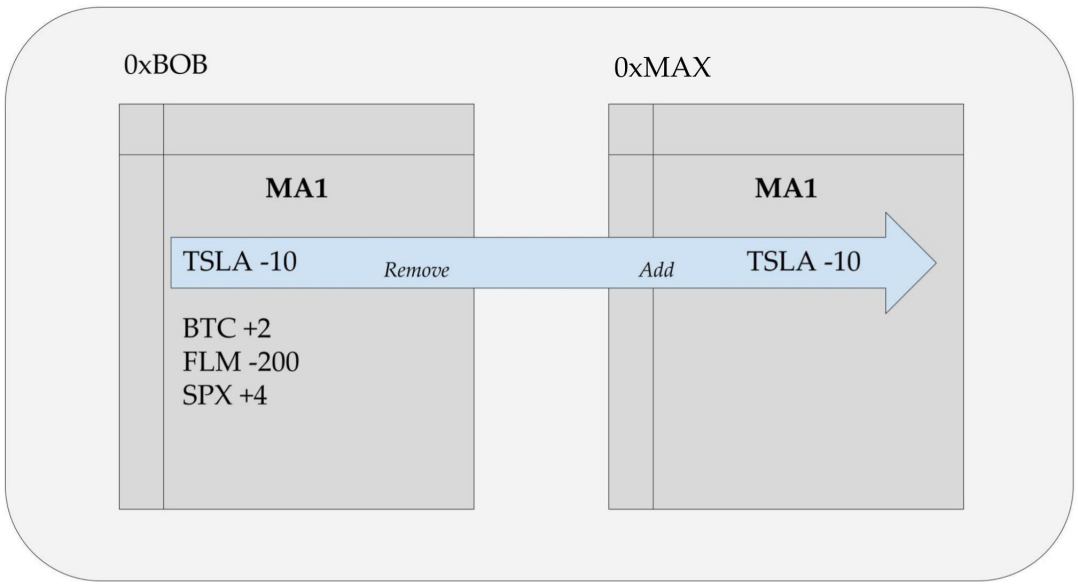

Figure 13: Position Transfer

When a user opens a position, it is linked to an address. If for any reason the position needs to be transferred to another address, the position needs to be closed and reopened, with the risk of the other party not reopening the position. With a transfer of position, one user can transfer their position to another address under the condition that the receiving address has the initial margin required.

This transfer of position ownership allows fees to be added to the transfer which acts as a sell or a buy of the position. For example, it might be useful to a MM that is hedging the opposite position to cut their hedge and receive interest for a very low cost.

In the case where one of the parties predicts that they will be liquidated, in order not to lose CVA, it may be beneficial to sell the position. This strategy may also be useful for someone who wants to hide their trading activities to avoid copy-trading and frontrunning. Because this type of transaction entails a transfer of money, it acts under the same rules as a withdrawal.

5.10.3 Transposing a position

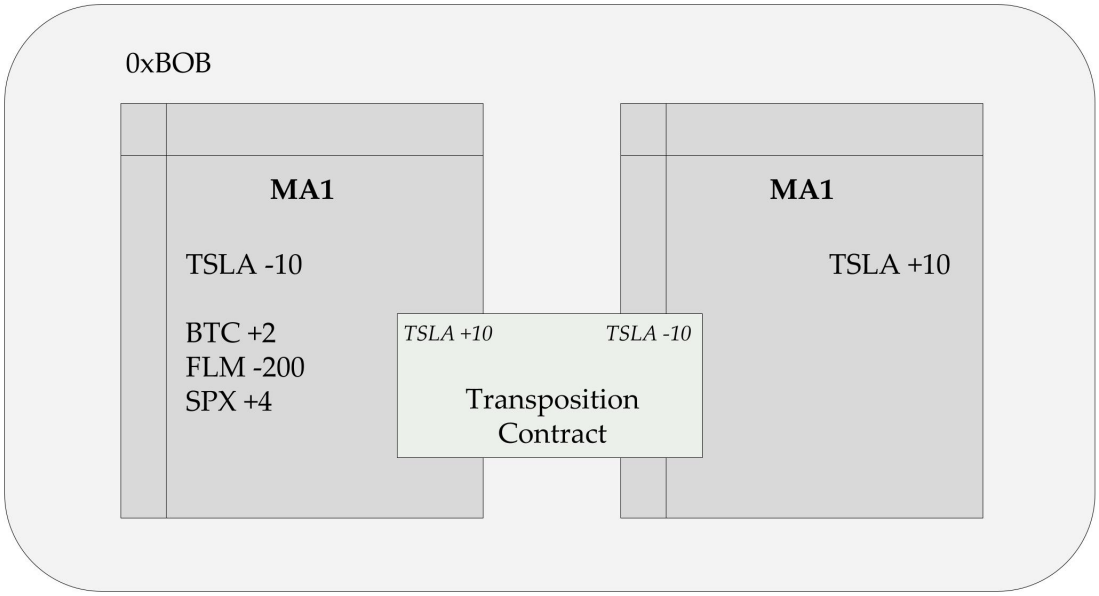

Figure 14: Position Transpose

One major inefficiency in the design presented up to this point is that each master agreement is isolated from the others. A transposition is when a position open in one master agreement is inverted in another master agreement. This allows for cross-margin between two master agreements.

An example of the above could be one where a user nets a master agreement under German regulation to a master agreement under US regulation. This user has direct access to both markets and may be interested in an almost zero-cost bridge of positions

across master agreements. This also allows the linking of two master agreements that are the same but on two different chains.

Transposing a position from one master agreement to another introduces the risk of a user exploiting the transposition as a way to exit their liquidity from a rogue master agreement and withdraw on another master agreement. This additional type of position allows for different kinds of attacks and operates under the rule of always being computed last, with the conditions to open the same as a withdrawal.

5.10.4 Closing out positions

One of DEUS's innovations is solving the closing out system, a persistent problem found in TradFi. It is inefficient to constantly check the availability of off-chain funds, and it is for this reason that banks update positions every day as they know that an asset cannot deviate more than X in 24 hours. Therefore, a small CVA is needed to always be profitable as long as the counterparty has enough collateral to not default.

Blockchain allows us to monitor collateral 24/7 by incentivizing liquidators. Additionally, we can monitor counterparties, ensuring they always have sufficient collateral. For DEI to be trusted as collateral, we have an insurer that insures the value of DEI in a lending contract of USDC to DEI.

5.10.5 Cross collateral

Cross collateral between accounts means that a user trading on Binance is able to be in cross margin on Robinhood. This allows people to develop custom contracts and for others to add them to their systems at a later stage.

DEUS provides an account system where things traditionally found in centralized finance (CeFi) can be made possible in DeFi. This is achieved through customizing rules in the Muon nodes. This opens up new use cases and products that users can trade with cross margin.

In DeFi, some chains might be good for quotes and accepting trades, whereas others are safer for holding assets. Being cross-chain makes it possible to take advantage of the different blockchain strengths. Permissionless, cross-chain collateral is one of DEUS's major innovations, albeit one of great complexity, but is crucial to enhancing market efficiency.

5.10.6 Best offer fill

Our free-market system design causes competition between MMs, meaning that when a user creates a quote, we can leverage that to create a short auction to determine the best fill price for parameters for the quote pusher.

A user requests a maximum fill price on their quote. After a determined period of time, the best offer is chosen by a Muon node. If there is no offer before the auction period ends, the first offer is taken after the initial batch is filled.

5.10.7 Mid-term position change

During the lifecycle of a position, parties may want to adjust an amendment of terms mid-contract, for example, to roll the position, i.e. extend the maturity or change strikes, change margin calls at predetermined levels, etc. Ideally, the two parties would agree, off-chain, in the parameter change(s) in the position. One of the two parties pushes the requested change on-chain and the other signs it.

Any parameter can be changed but Muon nodes are required to update the account balances of the users, in the case of an agreed partial close, for instance. For example, this can also be used to mutually agree on closing a trade on a stock price on Sunday or to lower a CVA.

5.10.8 Custom API

One of the key components of DEUS is a neutral oracle ensuring the price feeds. When two parties agree on opening a position, the price can be determined without an oracle because both parties have the option to enter into the position or not. Disputes can happen at the time then the trade needs to be closed.

Market makers should be able to choose which exchange the data is fed from, as prices differ between exchanges. In order for a price to be validated, input prices from every oracle need to be verified.

5.10.9 Forward regulator's compliance

Due to the ease of adding or withdrawing collateral, even if jurisdiction exists in our system, we do not oversee users actions in a master agreement between depositing and withdrawing. A user can simply transfer a position by opening that same position on their cross-margin account and be their own counterparty on another account.

Muon scripts can be modified by a master agreement deployer to verify such things and implement regulation by executing in-depth checks before each new position is signed. Another way would be to delay withdrawal from the master agreements in order to thoroughly check the account situation. This enables us to verify if an address is associated with a license, the user's actions and on-chain activities, and much more.

Since trades are transparent, it allows other participants to acquire enough data to not have to rely on speculation, leading to less likelihood of positions being closed in panic, less temptation to cheat or manipulate the rules, and allowing regulators to do their jobs.

5.11 Variable FVA

We have shown an FVA that remains the same for the duration of a trade but it can also be variable. Muon oracles allow us to add multiple kinds of FVA.

For example, in the crypto CeFi derivatives market, FVA changes and is applied every 8 hours. To build this, a keeper calls a Muon node to target exchange APY and stores values of FVA on a low-cost chain every 8 hours with the final PnL computed on withdrawal or closing of a position.

As long as an oracle can fetch data then it is possible to create a custom system. If we wanted to create a long-pays-short system, we would need to store the required values on a blockchain. This design is chosen over updating the positions each time, in order to increase the efficiency of the positions.

5.12 Fraud-proof pricing

The exit price is one of the most difficult parts to settle, as in many scenarios, there is one party that wants less spread and the other party that can decide to abuse their power position.

In the case where both parties agree on an exit price, an RFQ is generated, submitted to their counterparty, broadcasted and compared to the market price. If the price is correct, an exit quote is set and the counterparty validates. It is the duty of the exchange broker to select trusted, incentivized third parties to give a fair price under the threat of being delisted from the marketplace whitelist.

In the case of a disagreement, we want to make it dangerous for both parties to abuse the system from a position of power. In order to get a fair price, anyone can ask for an RFQ from the entire market. If a MM answers by quoting, they are forced to take the trade if it is accepted but market makers don't know if it is for a close or an open, and they don't know the real author of the quote since it can be anyone. Within a defined time, if there is a sufficient answer to the RFQ, one user can use these quotes as an exit price, or in the case of abuse, an arbitrager can open a position using this quote with a short expiration at the oracle price.

6 Use cases

Financial markets are composed of many different actors with different goals and strategies, and when these are brought together and traded in one place, create the market as we know it. In the DeFi space, many projects have attempted to solve the derivative problem by offering a service to only a few of the market participant types, which fragments the market, focusing on use-cases.

DEUS addresses multiple use-cases, user experiences, and industry standards.
DeFi has the unique opportunity to be the first permissionless market that includes small and large retail users, professionals, and institutions all engaging in the same system. The main differences are in the usage and the value of the orders. Derivative positions can represent large orders and the common use of the liquidity curve does not work in these cases.

A system is needed that can absorb orders of any size.
In TradFi, in order for any entity to be able to trade a specific product, a credit check needs to be passed due to the high risk of default and financial loss that can occur for both parties. This constraint automatically excludes retail and many institutions from engaging with these products. Additionally, it is common for an entity to use the ISDA master agreement contracts and annexes when opening a trade with another entity. This is costly and introduces additional problems.

An efficient and desired system is one where the two parties don't need to know or trust each other. The DEUS Finance trading exchange system is designed to be censorship-resistant. As long as there is one MM with access to the market and is willing to take the risk of providing liquidity, the market on DEUS is operational.

If a market price provider doesn't agree to feed our oracles their price feeds, they have no way of knowing which subscribers to their feeds are servicing which oracles. By having multiple subscribers to multiple price feeds, we can achieve censorship-resistance, and as long as the blockchains and Muon are censorship-resistant, the system will prosper.

Another factor that should be taken into account is that a system that is optimized for one scenario wouldn't necessarily remain so under changing conditions. DEUS Finance cannot take on the role of a MM, as there will always be an entity emerging with more products, better spreads, etc. DEUS Finance's role in this ecosystem is one of an infrastructure provider, enabling composability and scalability.

6.1 Fund managers

With many actors being dishonest regarding the liquidity of their order books, leading to significant losses, using oracle calculated prices and a decentralized quote system may attract users of these low-trust products. We can think of many crypto exchanges, CFD brokers, and other offshore-based financial institutions.

Predefined rates and fees might also promote more trust in a decentralized fund manager than one that comes from TradFi and does not care about winning or losing because they are getting paid regardless through management fees. On a global scale, the number of hedge funds outperforming the SP500 highlights an institutionalized inefficiency.

This transparency added to a free market competition might allow some less shiny and more legitimate individuals to be able to manage funds without the need for any license and without extra fees to pay for office space and the like.

Our vision around that is to allow the creation of a decentralized fund where the fund manager is only restricted to predefined master agreements or to have their own master agreement.

6.2 Exchange brokers

Users, investors, market makers, and other market participants can all use the DEUS DeFiX, however, due to there being no aggregated liquidity, users need to RFQ (request for quote) on public channels, discord chats, and the like.

End users want a simple solution, and this is where exchange brokers come in. An exchange broker is a front-end with associations to multiple MMs that take countertrades. For example, the Binance future UI can be recreated, using DEUS as a backend. To incentivize these services, exchange brokers are receiving referral fees from each trade that they conduct.

This implies that anyone is able to create an exchange without needing liquidity. Trading exchanges have multiple ways of linking end-users to MMs. For example, creating complex matching engines that allow anyone to find liquidity, or to set standards in their position variables to filter the market, as well as by whitelisting MMs. Additionally, it can also be in the form of a website or resource that provides investment advice and enables users to take a position directly from its UI.

In all of the above cases, DEUS DAO empowers other protocols to provide centralized third-party solutions that are very difficult to provide in a decentralized way.

Instead of being one large marketplace, what would happen if we were thousands of individual marketplaces, with a broader range of users and increased diversity in our products, stimulating a competitive marketplace? Third parties are incentivized to create the links between users and AMMs, with dealer incentives being a percentage rate of the fee of the MM. The dealer defines their affiliation rate and the MM has the choice of accepting trades routed by the dealer or not.

In order to keep the system permissionless, a third party provides the link between user and user, MMs to MMs, users to brokers, and so on.

6.3 Trading bots and stop limits

For trading UX providers to take a share of the referral market, utilities such as trading bots and stop limits are needed and are better handled by third parties, as opposed to

event-based functions as used by many exchanges.

Functions may include:

- Stop orders that close a position at the best price once an asset crosses a chosen threshold price
- DCA (dollar-cost averaging), where buys occur regularly, defined by the user
- Grid trading orders - to profit from the stability of a market by speculating on reversals without the constraints of iron condors or other trading strategies

By offering these kinds of services, a third-party provider can be the referrer of a trade that they allow, creating the potential for exchange brokers to be competitive against other brokers.

The above can also be handled in a decentralized manner by having a keeper call a Muon node to sign the price for any trade to take place.

Non-retail users with higher capital would benefit from being able to customize their own hosted systems based on their needs. Moreover, exchange brokers themselves might have an affiliation program.

6.4 CFDs

CFDs (contract for difference) are OTC derivative products that allow users to enter an agreement where the buyer pays the seller the difference between the current value of an asset and its value at the time of the contract, without having to hold the asset.

The CFD industry suffers from a bad reputation due to low regulations that lead to a lot of scam exchanges. DEUS allows CFD brokers to build on top of our architecture and restore truth with their customers.

In the case of a CFD provider wanting to be isolated from the rest of the market, they can deploy a master agreement allowing only themselves to take trades, denying other CFD providers to compete with them on the same customers with the cross margin system. Free market competition between master agreements makes it harder for a liquidity provider to be competitive when isolated from the market, however. This also includes traditional CFD brokers that accept cryptocurrencies.

6.5 Gamifying derivatives

We allow game developers to build games on top of derivatives without the need for a broker's license.

For example, a game where users need to pay a premium and need to survive in a BTC x200 position for 1 hour without being able to exit the market, only going long or short.

Gamify derivatives in CEX are usually not enjoyable by retail users, even if this kind of event is tailored for them, due to some users trading bigger volumes and becoming participants, by default, to these types of competitions. Other gamify derivatives are more like a casino where the house always wins. Being transparent, the margins that MMs make on these kinds of activities may be reduced, inducing more interest in these types of products.

It's possible to reinvent the trading competitions field. For example, every participant opens a position of a certain size in a master agreement as an entry fee, where the trader is limited to a certain amount of trades with a certain amount of value in a limited time, with the winner claiming the pot.

6.6 Credit rating third party

In Uniswap, when a user wants to swap a token that is not in the safe list of organizations like Coingecko, an alert pop-up notifies the user that they are trading at their own risk.

A user is unlikely to verify the safety of a master agreement that they are trading through. Since all assets are not trustworthy, there are many rules that require verification. A master agreement can be modified, therefore a user must need to know whether the master agreement they are trading on is the latest version and safe. Economic incentives to data checkers are needed in such a scenario because of the difficulty of generating an impartial qualitative risk analysis on a wide range of assets. This is another case where the benefits of affiliation are clear.

When a master agreement is validated by multiple centralized checkers, the risk of an attack is highly unlikely as the risk-reward of the attack is very low due to the ease of verifying the information.

7 Open leverage case study

Consider a market with a participant who wants to trade different assets, such as stocks, ethereum gas, and volatility derivatives. In order to trade all these different assets, the user would need to deploy their capital in each of these projects separately, ensure that they rebalance their capital to avoid liquidation, and optimize capital usage if taking any leveraged positions.

It would be much more efficient to take a 5x leverage on a stock and yield farm with the balance of the collateral on a spot farm and employ some money management

than to commit all collateral because, in the example above, it's not possible to take an undercollateralized position.

In order to solve this, an under-collateralization mechanism is required. For this to be possible, funds need to be in a closed circuit where the exits are controlled. In DEUS's case, Muon nodes control every exit point of the system. A closed-circuit system is possible on-chain but it is limited in complexity and cannot encompass an entire ecosystem. With an under-collateralization mechanism, a user still needs to manage their collateral regularly to avoid liquidation. A solution would be a permissionless, cross-margin mechanism. This is the most critical element of the DEUS DeFiX but also the most complex.

Without cross margin, if a user has 1000 positions, it requires money management on all 1000 positions. With the risk of high volatility on some positions, it implies that a system without cross margin would be unsustainable and impossible to manage. With additional degrees of freedom come greater responsibilities. Many different types of attacks need to be mitigated in order to make the system permissionless. The system must be permissionless because no DAO, nor any other organization, can successfully, and accurately rate the risks on assets, and DEUS is no exception.

For context, in TradFi, imagine a scenario where Chinese stocks can be traded with the same collateral as US stocks and Brazilian commodities, or in a country where counterparties operate under no legal framework. Imagine what these scenarios would mean for a fund that doesn't have to allocate resources to comply with each jurisdiction or find third parties.

TradFi is plagued by a multitude of third parties who all take an individual commission because of their inefficiencies. An efficient system is a system that links the trader to the liquidity source directly for any products. In a decentralized and trustless system, in theory, all intermediaries can be removed because everyone can trade with everyone else without much concern, and due to the free competition between each intermediary and the ease with which to find and use the best one, only the strongest ones, with the best fees and service systems, will remain. The only third parties that should remain are the risk manager and the party that links asks and bids. Once again, it works like a flywheel, by only deleting one intermediary in the chain, making the new system competitive.

It would stand to reason that the first MMs using the DEUS DeFiX will be retail. However, as the democratization of the protocol progresses, third parties who see their users utilizing their liquidity to meet a need on the DEUS exchange systems might be tempted to provide liquidity to the DEUS ecosystem themselves and retails that see competitiveness will seek niches to provide liquidity, expanding the range of their available products.

8 The market maker's responsibilities

From the moment a broker accepts a trade, they must assume the responsibility that someone can potentially front-run their hedge on the market. For this reason, a DAO cannot perform a direct hedging service as it cannot assume a monopoly on executing decisions because only one entity with a faster or more sophisticated bot is needed to exploit an entire DAO.

A third party takes on all risks associated with a trade, and is punished for bad decisions and trusting bad actors. This is a key component of blockchain technology. Validators compute transactions and risk their collateral if they confirm transactions that are deemed to be inaccurate or fraudulent.

A MM can choose not to take a hedge position based on a trader's behavior. Because a trader's address is known to the MM, the MM can monitor a trader's behavior over time. They can identify arbitrageurs, or users that repeatedly take advantage of the MMs mispriced orders. A MM also considers the cost of hedging, collateral, operational costs, etc. Taking this into account along with trader behavior, MMs can blacklist users that they do not wish to engage with.

As the counterparty, the market maker can require a different set of fees, the three main ones being regular interest on open positions, fees on opening and closing of positions, and liquidation fees. These fees compensate for capital immobilization for hedging the position and cost of hedging, including moving collateral between the market and the DEUS DeFiX, and lastly, because of the sudden need to exit positions, liquidity may not be sufficient. In general, it can be considered that counterparties who take a risk of discountinuity on their positions should be rewarded. It can also be considered that the counterparty is trading in multiple layers and the liquidated trade can affect the rest of their layers.

9 Standardization, regulation, and broadening the market

A market with a narrow band of products doesn't attract interest, resulting in a static market. DeFi markets remain at a disadvantage if they don't open up to off-chain products. In TradFi, the listing of a security is far too complex and regulation helps with this. For a market to stimulate activity and price discovery, the easier the onboarding process for new products, the better.

Trading products on exchanges are standardized, leading to increased stability in liquidity. Financial products also need to be comprehensible, which again leads to an increase in market participants and promotes activity.

The current DeFi market rates on lending are uncorrelated from more traditional markets due to a lack of trust and demand. Short-selling and, in general, derivatives products, can encourage holders to lend their tokens. More lending improves the rate of lending and increases the global attraction of a market.

Counterparties must be allowed to select master agreements that suit their needs. Competition between master agreements systems must be promoted. Regulations should be transparent, which promotes commitment to long-term investments.

Unified rules are needed to calculate risks. It is easier for a fund manager to buy derivatives than spot, as it does not modify their holdings. In order to enhance price discovery in a market, a derivative market is created that is flexible and able to adjust risk profiles. DEUS assists DAOs and projects to stabilize their operations.

A well-functioning and highly liquid derivatives market is one with a broad range of market participants that want to actively trade derivative products, with the view to enhance and strengthen the management of their business and financial risks. Credit-rating agencies publishing annual reports are important for transparency purposes. To promote investor trust, guidance on recommended MMs is provided.

In TradFi, small and medium-sized entities are unable to participate in derivatives, which has a net-negative impact on market efficiency. In DeFi, the listings are possible and in a much shorter time frame compared to TradFi. Another advantage DeFi has over TradFi is that it's possible to use tools and products built by others, reducing development costs and promoting innovation. Enabling derivatives to be collateral products with loan mechanisms allows for short selling that encourages price discovery. To allow derivatives, a MM might need to short sell in order to hedge. A bad scenario is one where there is nothing to short sell, so it should be common practice for protocols to lend to allow for short selling.

10 DEUS decreases spot volatility

We observe that in a closed market, when a derivative market is deployed on a security, said security tends to be less volatile and increases in trading volume. Because speculation brings leverage, market participants are required to rebalance their positions more often, creating buying pressure when the price drops and the reverse when there are price increases. As on-chain projects don't have to wait or pay a CEX to allow users access to the derivatives market, volatility is reduced and volume and user bases increase.

A white-label solution creates many positive conditions. It allows projects to gain a competitive edge in attracting speculators, as hedging means that any value opened on a DEUS DeFiX (Exchange Trading System) will reflect in the price of the derivative. This also presents the opportunity of providing APR for single-token staking, as their

stake can be used by the protocol to provide liquidity for shorters. Additionally, this incentivizes holders to keep their tokens.

Protocol/DAO owners can now hedge their tokens on the market by providing liquidity for longs in the form of futures and calls, meaning they don't need to sell on the market to reduce their exposure. Furthermore, locked-token holders are able to sell the cash flow of their tokens earlier. Retailers can speculate on microcap securities if there is a liquidity provider.

11 IR derivatives

11.1 Example of an IR swap

The interest rate derivative (IRD) market represents between 65% and 80% of the TradFi derivative market, with some order of magnitude in DeFi, largely made up of loans and diverse debt products, representing 70% - 80% of the DeFi TVL.

These types of products allow users to take leverage on a yield farm, trade the spread between two APRs, insure against an increase or decrease in APR, and much more. There are many applications and products in TradFi around IRDs. We'll focus on DeFi, bringing about this new type of product, and empowering the ecosystem. In summary, what is needed to expand a financial market is easy access, diversity of participant types, covered/low risk, and liquidity. These are the needs that we want to answer.

More than farming interest rates, in the architecture of the DEUS DeFiX, a low-risk position of a farm that is usually not considered by higher risk DeFi users can be taken with the same collateral as higher risk positions, allowing an increase in gain expectancy without significantly increasing the total risk of the portfolio. In most cases, it's difficult to exit to another token and multiple farms are used in the process. This introduces multiple risks with multiple tokens, and if a token loses value then a liquidation may occur, destroying profitability. In other cases, entering into these farms costs too much in gas.

A major issue in the chain is that positions can cause large financial losses due to the fact that profitable positions take time to close, and losing positions are very difficult to close because collateral may have been sent to another chain, or in some cases converted to purchase a physical good.

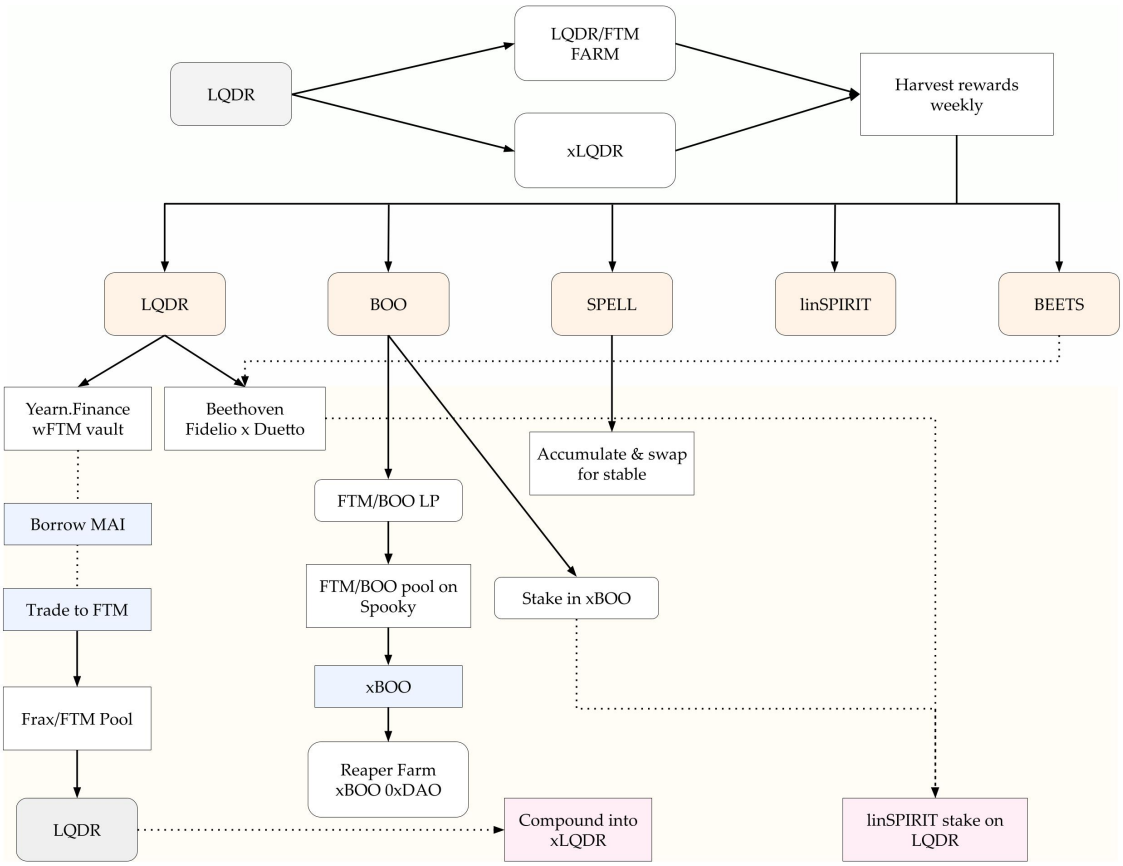

Figure 15: Multi-asset Yield Strategy

The above is an example of a multi-asset yield farming strategy, where staking rewards are paid out in the form of many different tokens, which in turn are reinvested and compounded into different pools and farms for additional returns.

The initial liquidity ($LQDR) is split between the LQDR/FTM pool (108% APY) and xLQDR single staking (96% APY). The harvested rewards from these farms are then handled via different strategies. The LQDR is split between Yearn.Finance's wFTM vault (these rewards compounded back into xLQDR) and the Fidelio x Duetto pool (104% APY) on Beethovenx. The BOO is sent to the FTM/BOO pool on Spookyswap, and the resulting xBOO staked on Reaper Farm (31% APY) and staked on LQDR for linSPIRIT (129% APY).

By sacrificing some of the profitability on an asset, users are able to take more risks by buying an option or a swap that hedges the risk of lost capital. Additionally, some collateral is available to add if at risk of liquidation.

To illustrate what derivative products can bring to DeFi, let's take an example of

a master agreement linked to lending contract inputs. In this scenario the user of the lending contract takes insurance on their position in exchange for a yield. If there is an economic or technical failure in the contract, their counterparty pays them the insurance amount. With that in mind, a special master agreement on insurance can be created to optimize cross margin for insurance providers and increase exposure to a safe asset on their insurance collateral.

Typically, the position that the hedger takes is going to be short, and considering that there is unusually more long demand than short, an MM might be interested in netting their trade with some users who seek protection on their assets.

11.2 Existing leverage yield-farming products

A common strategy to increase yield entails entering one farm, receiving a token as a reward and entering another farm, and so on. In some cases, it is possible to loop these strategies, where a user receives the same token, allowing leverage on specific farms.

Magic Internet Money (MiM) is an example of this, where users can take leverage without any lending on farms that have sufficient liquidity and a bearer token.

For example:

The MiM protocol deposits non-collateralized MIM into a Kashi pool. (A Kashi pool is used only to allow lending/borrowing an asset against other predefined assets, avoiding a scenario where assets can impact others.) The user obtains tokens, deposits them into a Kashi pool, and receives minted MIM. Then, the MIM tokens are swapped through a curve against a stablecoin, to receive a bearing token. This loop is repeated until the user has the desired leverage.

11.3 Portfolio as collateral of lending

While the idea of farming with collateral to receive an APY and still having access to the collateral exists, we can also think of stock portfolios or other assets to avoid the user taking leverage. The strategy to put a portfolio as lending collateral exists in TradFi but leads to complications that bring restrictions.

A DEUS DeFiX upgrade can offer loans in DEI against a portfolio in a master agreement where every asset has been validated for risk. This would allow farmers to farm with their capital while still having access to said capital. Additionally, we can lend DEI against an SP500 portfolio on DEUS, granting users exposure to the FED money-printing while trading cryptocurrencies.

On the other side, the MM is assured a fixed APY by the trader. This kind of position is attractive to institutional money that is after safe returns, and retail that is after more exposure. Our vision is that entities that are large enough to manage

risk, choose to risk their money instead of hedging derivatives products that users and other projects buy on DEUS. This means that these last two entities have less work to do in permanently checking the safety of every element.

In this system, a user is afforded the same exposure if, for example, 10% of their collateral is used to purchase stock with leverage, however, because it is not a spot position, it requires the user to rebalance their position to avoid liquidation.

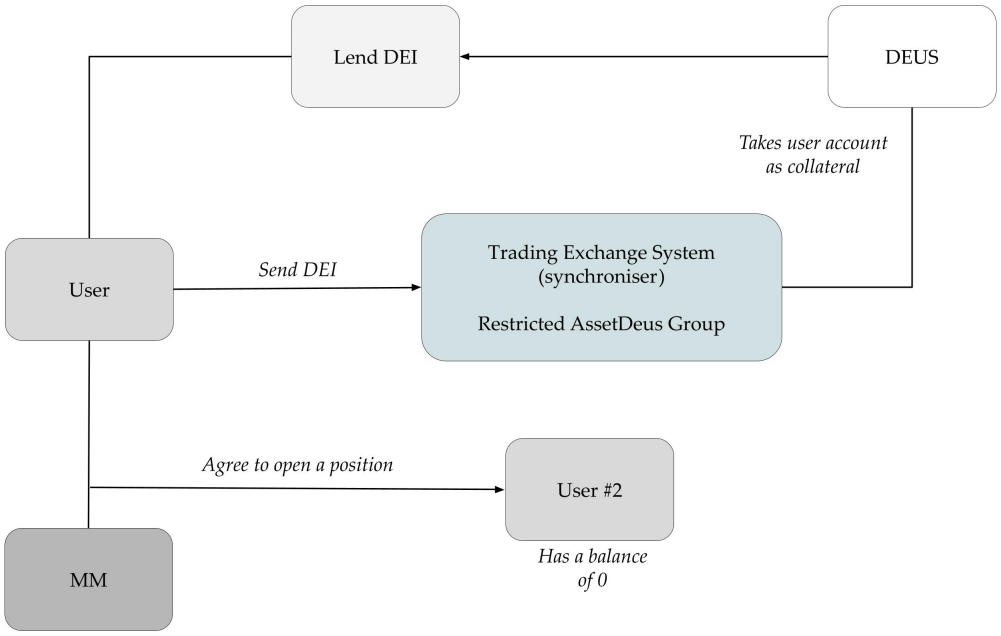

Figure 16: Portfolio Lending

The system works as follows:

1. The user deposits DEI into a master agreement that offers portfolio lending
2. The user searches for an asset to trade via a front-end that matches a user with a counter-trader
3. The user selects the fill price and other parameters (empty parameters are filled automatically)
4. The MM accepts the position
5. The position is pushed on-chain
6. The user requests a Muon node to execute an overcollateralized loan in DEI
7. The Muon node computes the amount of loaned DEI, freezes the collateral in the master agreement, and releases the DEI

In order to modify any of the assets and parameters in the lending master agreements as well as the collateralization ratio, a snapshot vote would need to take place at the protocol level.

11.4 LP swaps

One problem facing liquidity farmers with liquidity pools is the impermanent loss. Suppose that we have an LP farmer with little knowledge, who wants to reduce the risk of IL on their portfolio, but wants to earn an APY, or provide liquidity, for whatever reason. On the contrary, another user who is more knowledgeable may be able to reduce their IL due to their understanding of risk-free yield farming protocols, however, they lack diversity in their risks and in turn suffer from the low APY of low-risk protocols.

12 Conclusion

In this paper, we introduced a digital derivatives architecture. There are numerous derivative projects in the DeFi space but the comparisons with DEUS DeFiX end when discussing the range of possibilities that other solutions offer. The major innovations are to the derivative system that exists in traditional finance that is 20 years outdated compared to blockchain and digital consensus technologies. Such improvement in the capital efficiency, risk management, and oracles of digital derivatives can influence and revolutionize the way derivatives are utilized using these products. Removing the need for trust is the most crucial element that Bitcoin introduced to money. With the same technology now available in the tightly closed derivative industry, the market is accessible to the non-professional, with more advanced products able to enhance

personal and global economies. We invite participants to be critical of our ecosystem and to consider additional possibilities of this layer-one digital derivatives system.

13 Glossary

Account manager: A set of functions that allow users to deposit collateral, set accept on-chain quotes, close positions, and withdraw collateral

Available collateral: Collateral that fluctuates with a price feed, this collateral is used to pay counterparty PnL

DEUS DeFiX: Decentralized financial information exchange protocol

Exchange: An entity building a front-end that interacts with DEUS smart contracts

Interest rate derivative (IRD): A derivative of a fixed income asset

Market maker (MM): A counterparty that places countertrades to fill positions in return for trading fees, MMs can only close their positions in the case of liquidation or swap expiration

Muon and Muon nodes: Muon is a decentralized Microservice Network that enables running Web2 and Web3 applications, off-chain, on-chain, and cross-chain. The network acts as a base layer that bridges the division between blockchains, creating a fluid DeFi ecosystem. Learn more at docs.muon.net

Request for quote: A user submits a quote on-chain

Swap/swap contract: A derivative between two or more counterparties

Third-party: A third party is any entity that is interacting with DEUS smart contract, these entities include: MMs, users/traders, and exchanges

User/trader: An entity that interacts with DEUS contracts via an exchange

14 Resources

[1] (ISDA Legal Guidelines for Smart Derivatives Contracts: Foreign Exchange Derivatives, 2020)
https://www.isda.org/a/bPYTE/ISDA-Legal-Guidelines-for-Smart-Derivatives-Contracts-FX.pdf.

[2] (International Swaps and Derivatives Association, ISDA Clause Library, 2021)
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[7] (Risk Management Guidelines for Derivatives, 1994)
https://www.bis.org/publ/bcbsc211.pdf

[8] (Muon Network, 2021)
https://muon.gitbook.io/basics/

15 Disclaimer

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