RISKSWAP WHITEPAPER

The incredible growth of the cryptocurrency market has seen some unexpected development in recent times. Curiously, digital currencies and respective trading platforms namely exchanges are shapeshifting quite dramatically into the common and familiar financial entities. In so far as this advancement is concerned we can't make any solid predictions on whether it is an omen of good or evil. Apart from this aspect, however, the growth and so-called maturing of the cryptocurrency market in this vein welcomes ramifications into well-known financial instruments called derivatives.

This matured state of the market emerged naturally as more and more retail investors started to inhabit it, elevating demand for a more varied and diverse set of financial instruments. Consequently, with growing demand and an upsurge in the public presence of crypto, well-known CEXes (Central Exchange) initiated a swift act of incorporation of derivatives on the backbone of digital currencies. The first event of such a grand scale happened at the dawn of the last decade. The first reverberations of "Bitcoin Derivatives" can be salvaged going back to 2011. In the era of "crude" spot Bitcoin trading, ICBIT appeared then to pioneer the futures as an instrument of crypto trading. Despite its small scale and limited liquidity, it was the very first spark that soon grew to experience increasing popularity.

The undeniable value of derivatives in traditional financial market settings has been well scrutinized and presents a viable avenue of diversification, hedging, and leveraging for a high risk – high reward domain. Trading with derivatives instead of just spot buying has allowed traders to maximize their potential gains in a shorter period. Because of the relatively stationary movement of the traditional equity

market, compared to the digital currency one, derivatives have enabled traders to increase their returns, day trade with sustaining returns, and hedge their position more efficiently.

Readapting traditional equity market derivatives on the grounds of the digital currency market is not a small feat? In essence, the digital currency market is inherently volatile which further leads to either greater losses or increased returns. This calls for a more pedantic and cautious approach. Therefore, professional traders exploit the benefits of derivatives on the crypto scene to hedge and secure the underlying position, trade on the movement of the market, and leverage fundamental analysis. The ingrained sensitivity of the cryptocurrency market to the social backdrop and media outpour is something that can become extremely profitable if seized at the right moment with the right derivative instrument.

To this point, we have only been concerned with CEX as the main edifice of crypto trading. Justifiably so, since CEXes have been the earliest adopters of derivative trading, it warrants for us to look at them as being the vanguards of this movement. The integrity of blockchain is measured however in its decentralized quality, democratized nature, and unrestrained transactional dealings. Oppositely disposed to that, CEXes generally represent the very epitome of centralized and regulated modus operandi.

Finding a viable alternative to CEX's dominating influence has been one of the main reasons for DEX (decentralized exchange) gaining momentum. Insofar as decentralization goes DEX offers an unbeatable degree of both privacy and untraceability. Adding to that the fact that the mission of Blockchain became conspicuous for a wider audience and privacy gradually attracted more people, the demand for a decentralized exchange that doesn't violate user privacy has

taken its place. Privacy and decentralization are however not the only constituents of DEX. Based on its decentralized quality, DEXes work in a conceptually different manner. This difference conceptualizes the trade execution model.

The trade execution model delineates the conceptuality of how the trade is being processed. Most well-known CEXes operate perforce via the Central Limit Order Book that in basic terms relies on liquidity providers to join the pool. To remedy some of the shortcomings of AMM (Automated Market Maker), the Order Book trade execution model comes with many advantageous solutions. Unlike AMM, Order Book doesn't mandate for liquidity to be ever-present in the pool. Order Book operates on and with an aggregated list of buy and sell orders submitted by traders on a given pair. This approach enables an "immediate spot buying" which is the holy grail of modern cryptocurrency trading.

AMM on the other hand to avail in this regard needs a large amount of liquidity to be sufficiently operative. That in and of itself might not be possible in some instances as not every token can "inlay" or attract enough liquidity providers to the pool to supply it with volume.

The most popular DEXes that are currently moulding the industry are dictated by the Swap Model that inherently utilizes AMM. Uniswap, PancakeSwap, SushiSwap, Bancor, Kyber, and similar incorporate liquidity pool protocols to gauge the price. They also employ a peer-to-peer solution which is the bedrock of decentralization as every transaction is confined in between two machines.

Recently there is however a spur to action to accommodate the ease-of-use, effectiveness, and free-flow quality of the Order Book trade execution model into DEX. In theory, this will open up a rift for quick, decentralized, and unregulated trading that is not inhibited

by centralized, governing, and overseeing organs. The issue arises in the technical implementation of such shifts. For order books to work it necessitates some data to be held and stored. These trades might contradict and contravene the decentralized aspect. The currently proposed solutions do look promising and seem to be working according to the intent though the majority of the options are very limited in some regards and lack much-needed attention from the crypto populace (LoopRing, Binance DEX, TomoDex).

Therefore building financial derivatives on DEX, specifically, Solana, poses a dichotomy of a problem. Firstly, it's the intruding question of whether to choose an Order Book solution as the basis of trading execution model or AMM that is easier and doesn't require artificial liquidity injected. Secondly, the integration of derivatives as financial instruments onto the blockchain exposes a manifold of issues with leverage and voluminous trades. This can partially be resolved with algorithmic computation that will be assessing prices based on the oracle feed.

OVERVIEW

RiskSwap is a premier multichain decentralized trading platform that enables frictionless, trustless, and censor-resistant interaction with underlying assets via financial instruments – called derivatives. RiskSwap encapsulates the traditional financial derivatives from the equity market and seamlessly transitions it into the world of decentralized blockchain infrastructure permitting uninterrupted trading of different futures contracts, perpetual futures contracts, and options contracts.

RiskSwap introduces retail traders of the digital currency market to the idea of utilizing derivatives as an instrument for hedging one's risks, generating increased returns, and employing professional and expert knowledge translated from the world of traditional finances. RiskSwap gives traders limited risk opportunities to get speculative exposure on crypto assets via price and volatility and gives market makers efficient capital usage by receiving fees and premiums.

RiskSwap is designed to operate in a cross-chain manner and open derivatives trading to a wider audience of crypto enthusiasts. The very first iteration of RiskSwap will, however, be integrated on Solana to promote, leverage, and activate our ambitions to create a premier derivatives trading platform. Solana represents the ultimate solution with its high throughput and scalable nature.

GOALS

With the digital currency market revelling in the first stages of adoption, and retail-investor interest, there is a growing demand for a diverse set of hedging, and risk-gauging instruments. The goal of RiskSwap is thus to bring into the world one of the leading solutions for derivative trading that intrinsically operates within decentralized infrastructure with the Order Book trade execution model. With the Order Book model, RiskSwap will have the combined ease of execution of trade with the non-existent risk of frontrunning and other malicious trading practices.

Our goal is to minimize the risks of cryptocurrency trading by allowing users to hedge their positions with derivatives of underlying crypto assets. We are also striving to welcome more uninitiated traders into the platform and introduce them with the help of user-friendly, low-entry point UI/UX, to the unappreciated advantages of financial derivatives on

the decentralized infrastructure of blockchain.

Because of the immediacy of Solana's speed, high throughput of transactions (swaps), and absence of mempool – Solana possesses the high potential to become the reigning victor in securing users from being exploited with most of the popular "trade attacks" such as flash loans, sandwiching, and frontrunning.

ADVANTAGES OF RISKSWAP IN THE CURRENT MARKET OF DEX DERIVATIVES

Unlike a wide variety of choices that are currently available in DeFi in terms of financial derivatives, RiskSwap employs the Order Book trade execution model juxtaposed with AMM as a complementary liquidity pool facilitator. With regards to Order Book, it reigns supreme in a few notable aspects. Specifically, the Order Book works on the underpinnings of established liquidity that permits an instantaneous execution of a trade. RiskSwap's model of implementation of on-chain Central Limit Order Book delegates the right to users to submit orders with constituents such as the size of a trade, price ranging, and directional future of a derivative of underlying crypto asset. The situation that most of the implementations of Order Book on DEXes find themselves in is limited, risk-exposed, and slow trading that is fundamentally intermingled in the Blockchains with slow throughput. Fortuitously, Solana rectifies issues concerned with scalability and speed. This is crucial in several facets.

- Because of the almost instantaneous execution and validation of a transaction, the risk of being exploited is close to zero. On top of that the Order Book model also precludes frontrunning, and sandwiching attacks as the "ask" and "bid" will follow a

deterministic model of generating order.

- Scalable characteristic of Solana aids in enlarging the available toolset on the fly without a need to scale down or dismantle existing elements.

Despite the long-entrenched idea of Order Books being centralized and governed, RiskSwap introduces a non-custodial base for ordering. RiskSwap's Order Book is based on deterministic algorithms that are unsupervised and invulnerable to tampering. Their sole purpose is to eliminate pitfalls in trading and help enable fully automatic intermediary matching orders algorithms between users.

SOLANA – GAME-CHANGING BLOCKCHAIN THAT SCALES

Scalability presents a great roadblock that many blockchain solutions stumble on. The aspect of blockchain being able to scale proportionally to the usage cases is crucial for the adoption and efficacy. Despite a plethora of proposed layer 2 solutions including ZK-Rollups, and Optimistic Rollups, there are still a lot of hidden pitfalls even for the behemoths of the industry such as Ethereum to implement it accordingly. The overall concept of Rollups, and their operative function is, at this point, very thoroughly researched.

The feasibility of implementation and reliability of the security of the solution is solid having also been implemented numerous times. The problem of employing rollups does manifest in several domains. Firstly, rollups require "onboarding" of the participants and compatibility with wallets creating a problem of incongruent cross-compatibility. Therefore to proceed further with rollups there is a need for parties involved to

adapt it or adapt TO it. Secondly, rollups are not unilateral. Different types of rollups work in and are implemented in a heterogeneous manner thus making it increasingly difficult to execute cross-rollup transactions.

Solana is a new paradigm of a blockchain solution that leverages yet untapped PoH (Proof of History) consensus combined with PoS (Proof of Stake). The approach Solana has taken towards tackling the long-plaguing issue of scalability is novel and that allowed Solana to gain traction both within crypto circles as well as outside the realms of digital currencies. The reason for this high popularity in recent times can be credited to two notable facets: an unusual but effective approach to rectifying the contemporary list of blockchain inefficacies and capturing the interest of Capital Investors in the real-life implementation of Solana.

While Ethereum is battling the ever-present issues of employing Layer 2 solution on Blockchain and enabling efficient use of rollups, Solana takes a recourse and bridges the gap of Layer 1 and Layer 2 without a need to completely readapt the entire ecosystem. This is achieved with the inherent scalability of Solana, meaning that it was initially created with the underpinnings of scalable and progressively growing expansion in mind. Proof of History is unique to the Solana method of validating and verifying transactions by chronologically ordering their sequence with timestamps. Timestamps play a defining role in Solana and work synergistically with PoS consensus that eliminates potential inconsistency of the time synchronization. This mode of operation helps to offload some of the congestion that frequently is incurred upon the network while under load, increasing transaction validation time and general efficiency.

Solana is still relatively infantile in terms of the projects being built on

it. Although the recent development in this regard has been tremendous, dozens of projects are now being pro-actively interested or fostered to innovate exclusively on Solana Blockchain. The exorbitant growth of Solana has become the driving factor of transition to the Solana Blockchain, and financial incentive from the team itself has also been untamed with Solana Season Hackathon offering 1 Million $ in total prize remuneration. Given these aspects, current market trends, and blockchain innovation, Solana confidently towers above the rest as the most promising blockchain solution to develop on.

Despite present hurdles arising when introducing derivatives into DEX, some solutions effectively allow for the convenient use of such instruments on the grounds of decentralization. RiskSwap will present its vision of how the implementation of derivatives can be attained on DEX.

RISK MANAGEMENT

In traditional equity market trading, derivatives frequently take on the role of risk management function. This is a very relevant topic for the digital currency market insofar as it presents extremely volatile grounds with unhedged positions and fluctuating risk-reward curves. This is one of the main reasons, in the eyes of retail investors, for opting out or not willing to explore crypto assets as a valid investment option. The remedy for that is the introduction of tools, models, and mechanisms commonly used in the common market setting that alleviate being exposed to aggravated risks of digital currency trading within the realms of decentralized space.

On the RiskSwap platform, traders can specify and modify a fixed set of parameters to set up their trading experience to their liking and

minimize potential risks. This includes changing and customizing different kinds of options, future, and perpetual with a gamut of ranging constituents: American put options, American call options, Barrier options, Snowball options, Phoenix options, Rainbow options with more to boot. RiskSwap is also equipped with an Option Pricing Mechanism that allows for real-time option pricing and quantity quotations that in turn eliminate slippage. Risk Hedging is done via the Black-Scholes model and effective Delta Hedging strategy unique to RiskSwap. The concept of the Black-Scholes model is to institute risk minimization by employing a continuous buying and selling of an underlying asset and keeping the equilibrium of risk constant. In this vein, retail investors through the RiskSwap platform will have unprecedented access to the most robust set of tools and mechanisms that in the traditional equity market is available and leveraged exclusively by large institutional players in the Finance industry. RiskSwap provides effective and proven risk management techniques that are principally embedded into the RiskSwap platform and help to preclude common risk-related predicaments: Liquidity Risk, Greek Risks, and Extreme Risks.

THEORY

In the scope of the contemporary digital currency market, RiskSwap offers a unique set of derivatives that are realized completely on-chain. RiskSwap assumes the integrity of security and privacy for traders of derivatives similar to DEX whilst embedding an Order Book model of trade execution. The immediacy of trade settlement with the Order Book model allows for seamless intermedial trading backed by the AMM pool to ensure sufficient liquidity.

RiskSwap institutes three main derivative types namely futures, perpetual futures, and options. Complementary to this, RiskSwap

also manages to deliver premier quality risk-mitigating elements that facilitate a more secure and safe trading experience without exposing even a novice trader to the unhedged risks. Specifically: Delta Hedging, Black-Scholes Model, RiskSwap Insurance, and Price Slide-Off Mitigation. We readily employ Solana-exclusive Pyth Network, trusted Price Oracles, to bootstrap our platform with the most up-to-date data feed on asset pricing.

In the grand scheme of things, we are striving to provide the most forward-thinking, innovative, and user-friendly decentralized derivative trading platform that leverages current Blockchain advancements to the utmost degree.

FUTURES

Perpetual Futures

Perpetual Futures or Perpetual Swaps differ from traditional futures in that they don't possess a predetermined date of expiry. Perpetual Futures represent the core derivatives trading currently available on the digital currency market. They are relatively easy to implement and don't require a reimagining of the concept from traditional equity market settings.

Perpetual futures contract price must be as close as possible to the price of the underlying asset. To achieve this convergence the funding rate is applied.

Funding Rate

Funding rate (Fr) defines the amount of payments, which are regularly paid from buyers to sellers (and vice versa) of the perpetual futures contracts:

- in case Fr>0, buyers pay funding fees to contract sellers
- in case Fr <0, sellers pay funding fees to contract buyers

The funding rate is calculated using the premium ratio. The higher is the mark price of the perpetual futures contract relative to the asset price sourced from the Pyth Network oracle, the lower is the premium ratio, and vice versa.

The premium ratio is calculated using the following formula:

$$k_M = \frac{\sum_{i=1}^{N} \frac{mP_i - oP_i}{oP_i} * 100\%}{N}$$

where
k_M – premium ratio
mP_i – mark price in period i
oP_i – oracle price in the period i
N – number of periods, values per every minute for the last 8 hours are used, meaning N=60*8=480.

The funding rate is calculated using the following is the formula:

$$Fr=Max(0,05\% \text{ or } k_M)+Min(-0,05\% \text{ or } k_M),$$

where
Fr – Funding Rate, can't be higher than 0.5% or lower than -0.5%
Max – Maximum nominal of the two
Min – Minimal nominal of the two
k_M – Premium Ratio

The funding amount is calculated using the following formula:

$$Fa=S*Fr*Tp*Vp,$$

where
Fa – Funding Amount
S – Nominal Volume of Position
Fr – Funding Rate
Tp – Period during which trader maintained an opened position
Vp – Volume weighted average price for the last 8 hours time period

Funding amount is calculated every 8 hours, traders pay and receive funding only in the case of their position still being opened at the indicated timestamp.

Quarterly Futures

Quarterly futures are the types of financial derivatives with a

predetermined expiry date. Futures positions, which were not exercised before the expiration will be settled using the expiration prices specified in the contracts. This way Quarterly futures are linked to real asset prices. Irrespective of the price change or market conditions future contracts cannot be held on to after the expiration is reached. The importance of futures as derivatives on the traditional financial market is substantial as they are frequently employed as a safety net and hedging variant to abate the risk and/or increase potential profit by the use of leverage.

In regards to futures, there can only be bidirectional movement either long or short. Long positions indicate potential profit that can be made if the price appreciates. On the other hand, short direction indicates the opposite determinant, and as the price trends downward the respective return can be made. The initial price of the contract is determined by the use of on-chain oracles that supply price data off of the data provider.

A futures contract is defined by several basic parameters:

- Futures price – in USDC
- Expiry time – date and time
- Underlying asset – any crypto asset
- Collateral or margin type – USDC
- Collateral or margin requirement – determined by the platform automatically
- Settlement type – cash settlement in USDC

Leverage and Margin

When trading futures, respective leverage and margin can be configured for the contract, and consequently, the size of the position is calculated. As profit is computed against the notional value of a contract, higher leverage increases the contract's liquidation risk.

Collateral on RiskSwap platform defines a sum of funds that are being temporarily blocked on the margin account when the position calculated for one contract is opened. It can be viewed as a type of insurance that a user is obligated to follow to assure its validity. Collateral is regulated by the platform government and depends on the volatility and current price fluctuations of the underlying asset.

Collateral presents a dynamically altering parameter that stems from the constant change of price. To trade with margin, a trader needs to transfer funds to his margin account. Subsequently, the trader will be met with 3 parameters: margin (which accounts for the total sum of funds transferred), unrealized PnL (current Profit and Loss), and funding rate. After the settlement of the position, unrealized PnL and funding amounts are either added to or deducted from the margin account.

The result of closing a position is a settlement of the funds. Both parameters PnL and funding amount are calculated and the leftover margin is transferred to the corresponding account.

OPTIONS

Options are one of the most widely used derivatives that are based on the inherent value of an underlying asset. Unlike futures contracts, options do not impose an obligation on the buyer or seller

to respectively execute any of the actions by the time specified. In the traditional equity market, options are universally employed as a hedging tool that may induce a lower risk exposure and operate well if utilized in tandem with spot buying to further hedge the risk.

The prevalent majority of crypto trading has consisted of spot trading. While this type of trading has its benefits and is the easiest one to understand, financial derivatives, specifically options, have long been the financial instrument of experienced speculators who can exploit the overt market movements to their immediate advantage. The cascading difficulty of options, however, oftentimes preclude inexperienced investors from exploring the possibility of trading with them.

Options and their centralized quality in the digital currency market have been a known roadblock for some speculators as they are discouraged by the absence of privacy and censor-resistance. The goal of the RiskSwap platform, therefore, is to deliver on both aspects simultaneously: provide decentralized options trading platform and ensure a convenient and easy-to-use foundational block for well-versed, expert traders and novel traders likewise.

As in the traditional options market, the two participants of the protocol are writers of option contracts, users who sell option contracts, and those who buy option contracts. At the highest level of the process mechanic, the writer deposits collateral assets in a smart contract, called VAULT, which allows the writer to sell options contracts and earn premiums. Buyers of the options can purchase them on the RiskSwap exchange and sell them or exercise in case such action is profitable.

For example, RiskSwap Put Options are settled in USDC and option holders receive cash payout upon exercise as per European style cash-settled options.

The following are the parameters for RiskSwap European Cash Settled Put Options:

- Option type – put option
- Option price – in USDC
- Expiry time – date and time
- Underlying asset – any crypto asset
- Strike price – in USDC
- Strike asset – USDC
- Collateral or margin type – USDC
- Collateral or margin requirement – determined by the platform automatically
- Settlement type – cash settlement in USDC

Example: Let's say Ann wrote a put option to John, which allows John to sell 1 BTC for 30000.00 USDC. Ann's USDC is locked in the vault as collateral. John acquired the option by buying it on RiskSwap through the Order Book. Let's say the price of BTC goes to 25000.00 USDC on the 30th of August 2021. That means John's option is now in the money and RiskSwap will automatically exercise the option by reserving 5000.00 USDC from Ann's vault for John's vault. After the 30th of August John will withdraw 5000.00 USDC profit from his vault.

Options Pricing

To calculate the initial price of a put option RiskSwap, we rely on standard Black-Scholes put option formula:

$$P=X*N(-d2)-S0*N(-d1),$$

where
S0 - underlying price, current price of an asset
X - strike price
σ - volatility (% p.a.)
T - time to expiration, calculated as % of the year
N(x) - standard normal cumulative distribution function

$$d1=(\ln(S0/X)+t(r-q+(\sigma^2/2))/\sigma*T^{(½)}$$
$$d2=d1-\sigma*T^{(½)}$$

Margin

Margin in Options Contracts is used as collateral to secure the user's solvency. Therefore to trade options, a speculator is mandated to collateralize his or her position to proceed with writing an option.

Initial margin is a margin that is required to write a position. In essence, the Initial margin defines the price of the asset that is required to be collateralized. On RiskSwap, Initial Margin is calculated by the following method:

The initial margin is calculated as the amount of USDC / USDT that will be reserved to open a position. To calculate the margin we rely on classical approaches of institutional derivatives exchanges.

For long call or put options: no initial margin is required, however, the buyer pays for each call or put the option in full. Funds need not be deposited in excess of call or put cost.

For short call option contract: Max (100% of option proceeds + 0.2 * Mark Price of the Underlying - OTM; 100% of option proceeds + 0.1 * Mark Price of the Underlying)

For short put option contract: Max (100% of option proceeds + 0.2 * Mark Price of the Underlying - OTM; 100% of option proceeds + 0.1 * Strike Price of the Underlying)

Maintenance margin is the amount of asset equity a speculator ought to hold after the writing of the contract is completed.

The maintenance margin is calculated as the amount of USDC / USDT that will be reserved to maintain the position.

Long call / put: none required.

Short call: Max (Mark Price of the Option + 0.2 * Mark Price of the Underlying - OTM; Mark Price of the Option + 0.1 * Mark Price of the Underlying)

Short call Out-of-the-money option example.

Assume, there is a Short call Out-of-the-money option at 500.00 USDC with an underlying asset price of 2150.00 USDC and a strike price of 3100.00 USDC. The first half of the margin equation would be 500.00 + 0.2 * 2150.00 - (3100.00 - 2150.00) = - 2170.00 USDC, therefore minimum is applied, which gives a margin requirement of 500.00 + 0.1 * 2150.00 = 715.00 USDC.

Margin requirement: 715.00 USDC

Margin call: 715.00 - 500.00 = 215.00 USDC

The margin requirement is 100% of the option proceeds plus 20% of the underlying asset value, less the OTM.

Short call In-of-the-money option example.

Assume, there is a Short call In-the-money option at 500.00 USDC with an underlying asset price of 2150.00 and a strike price of 2000.00 USDC. The margin would be 500 + 0.2 * 2150.00 = 930.

Margin requirement: 930 USDC

Margin call: 930 - 500 = 430 USDC

The margin requirement is 100% of the option proceeds plus 20% of the underlying asset value. The OTM in this case is equal to 0.

Short put: Max (Mark Price of the Option + 0.2 * Mark Price of the Underlying - OTM; Mark Price of the Option + 0.1 * Strike Price of the Underlying).

Short put Out-of-the-money option example.

Assume, there is a Short put Out-of-the-money option at 950.00 USDC with an underlying asset price of 2490.00 USDC and a strike price of 1350.00 USDC. The first half of the margin equation would be 950.00 + 0.2 * 2490.00 - (2490.00 - 1350.00) = 98.00 USDC, therefore minimum is applied, which gives a margin requirement of 950.00 + 0.1 * 1350.00 = 1085.00 USDC.

Margin requirement: 1085.00 USDC

Margin call: 1085.00 - 950.00 = 135.00 USDC

Mark price of an Option.

The mark price of an option is calculated via the Black-Scholes formula using the underlying asset price.

The mark price of the option is the price at which it will be valued on an ongoing basis. This can vary from time to time from the actual options market price, thus protecting market participants against manipulative trading.

Mark price of an underlying asset.

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Mark Price = Index Price + 30 seconds of EMA
    (Options Market Price - Index Price)
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where:
`Index price` – asset price sourced from Pyth Oracle
`EMA` – an exponential moving average of the 30-second close index prices of an asset
`Options Market Price` – the current price of options

RiskSwap reserves the right to reassess the margin requirements level based on the market volatility and possible market tribulations at the time.

Settlement

When settling option contracts the RiskSwap protocol relies on the cash settlement algorithm. In cash settlement of ITM options, the exact difference in value between the strike asset and the underlying asset is transferred from option writer to option buyer.

When the option is exercised by the system upon ITM option expiration, the writer sends the buyer the difference in price between the underlying asset and strike asset. To determine the difference the protocol evokes a trusted price oracle.

For example, assume that the put option has the following parameters at the moment of minting and sale:

- 1 ETH – underlying asset
- 2000.00 USDC – strike price
- USDC – strike asset

Now, assume that at the expiry the price oracle says that 1 ETH is worth 1800.00 USDC. Given that the strike price of the put option is 2000.00 USDC, the option is in the money by 200.00 USDC. Upon exercise of the option, 200.00 USDC is transferred from the vault of the put option seller to the buyer. The put option seller is left with the remaining 1800.00 USDC in the vault.

Cash settlement options are used since they are more capital efficient and tend to develop liquidity faster.

PORTFOLIO BUILDER

RiskSwap Position Builder is an effective management tool that enables seamless portfolio composition. With Position Builder, a user can tailor the trading experience to the customs of his or her risk-leverage strategy. In essence, Position Builder represents a chart that combines every position opened including future and option contracts. A user is also able to fuse options and futures contracts into one to better track changes in a portfolio.

Additionally, Position Builder is an interface that simplifies the trading experience and enables a trader to model a potential behaviour of an option position. A user can select any given option and its price with an off-chain interface that consequently will display the following: Reliance Graph of PnL off of the current or upcoming date of Basic Asset price; Greeks of the position; Collateral required to open a position; Reliance Graph of Greek position off of the Basic Asset price. Subsequently, Position Builder can be leveraged to simulate before actuating an option position.

RiskSwap Position Builder is a crucial distinguishing aspect of the platform because it presupposes a calculated risk thus exposing traders to a less venturous environment when opening a derivative position.

SINGLEBLOCK

Singleblock presents a case for a unique position-building interface separate from Position Builder. Therefore it’s unique in the way that it allows for option strategies to be flawlessly initiated. The degree of complexity of option contracts surfaces when there is a need to manage strategies and track their effectiveness. For instance: Option positions are likely to be constituted from several positions at once. The common

“straddle” strategy consists of buying call and put options with the same strike price. If a user is forming an option strategy by successive order placement, there is a high risk of price alteration on the asset by the time the succession of orders is executed.

With Singleblock a user can opt for immediate initiation of an option strategy order placement. Following that, every enacted order will be initiated simultaneously, ridding a user of a potential price alteration risk. This can be configured preliminarily by creating an order of, as an example, option and futures contracts simultaneously. Additionally, such construction will be executed within a single block on the Solana blockchain.

PORTFOLIO MARGIN

The salient element of the RiskSwap platform will be the implementation of Portfolio Margin. Portfolio Margin refers to a type of netting that enables a counterbalance of the assets in one’s portfolio. The objective is to minimize the risk of the lender by consolidating positions to account for the portfolio’s overall risk. As an example, if one of the assets in the portfolio nets an overall positive position, it can compensate for the net negative return of another asset in the same portfolio. Portfolio Margin is also very important for options trading strategies.

For example, the actual risk of a straddle is less than the risk of the sum of a put and a call options’ risks, so margin should be calculated not just like call`s margin plus put`s margin.

In digital currency trading, there is currently a very limited number of platforms that employ Portfolio Margin despite the advantage it brings

in terms of risk reduction by monitoring the required margin needed to hold a losing position of a derivative.

There are benefits for both retail investors and institutions alike. In the case of an institutional investor, instantiating your entire portfolio as collateral decreases the margin required to fund the trade.

PROBLEMS OF IMPLEMENTING FUTURES ON A DEX

Introduction of Futures on DEX poses impediments: the issue with contravening decentralization that stems from the need of keeping bids data off-blockchain in the majority of cases. Liquidity in the pools and implementation of order book execution model. And the liquidation process that ought to be initiated in case of overbearing incurred losses. To that can also be added the possibility of market skew and ensuing issues with liquidity, and general discordancy. Due to the implicitly ungoverned base of Blockchain, combating these issues requires a detour in the traditional implementation of future contracts on DEX.

THEORIZATION OF THE REMEDY

Liquidity Pools

The problem with the liquidity in the pools can be remedied by instituting two models at once. The Order Book can be used for generating a deterministic sequence of trading bids while the AMM model can provide users with the ability to become liquidity providers and reap rewards from doing so, ultimately solving both problems. What is left out however is the problem of order bookkeeping and storing data and that notion inherently contradicting decentralization.

This again can be rectified by storing the data on-chain and algorithmically programming the order book model to impartially and chronologically order bids.

RiskSwap will build an AMM pool, which will allow users to supply liquidity to the platform's orderbook.

Liquidation Process

To tackle the issue with liquidation a liquidation mechanism is implemented. The liquidation mechanism allows executing the liquidation of vaults using price feed on the collateral.

The liquidation process is designed simply and transparently, where all positions available for liquidation are listed in a dedicated section of the RiskSwap platform. Positions are sorted based on their margin ratio: the smaller the margin ratio the closer is the position to the liquidation.

Just like any other RiskSwap platform participant, Market Maker (MM) can also participate in the liquidations. To briefly describe what MM is: MM is a fully automated and algorithm-based trading program that channels and maintains liquidity and takes an active part in the liquidation schema. MM will assume a key role in the RiskSwap mechanism of work.

Importantly, RiskSwap incentivizes liquidators to partake in the liquidation process as often as possible by rewarding them with liquidator fees.

Key Participants on RiskSwap

For RiskSwap to operate as intended there is a need to accommodate external and internal actors into the system. Irreplaceable cogs in

the RiskSwap machinery are: Traders, Oracle, Liquidators, Liquidity Providers, Market Makers. The incentive for platform participants to follow the intention of the system mostly consists of the tokens. In this vein, the system is upheld by the naturally engendered incentive mechanism that facilitates the continuous operation of the platform.

Oracle is an external actor, to whom specific roles and permissions are assigned by the Public Governance.

- Traders are internal actors who have the right to interact with the platform, lock their tokens, and take part in platform-related events. In the broadest sense, traders are the immediate contributors to the volume, liquidity, and commissions on RiskSwap. Among all traders, one can differentiate several types with different roles and goals such as speculative traders, arbitrageurs, and longer-term investors.

- Oracle is an external actor that extracts the price feed from the given data provider to ensure the authenticity, and validity of the price of the collateral at that time. Price Oracles also have a crucial function in submitting timely data for the initiation of the liquidation process. To get consistent Oracle data, RiskSwap derives collateral prices by accessing a decentralized Oracle Infrastructure.

- The main assigned task of liquidators is to actuate the process of liquidation. Any liquidator on the RiskSwap platform can initiate the liquidation process of an undercollateralized vault. Liquidators play a salient role in the act of liquidating the outstanding debt of collateral and therefore are key figures in the platform's ecosystem.

- Anyone can become a liquidity provider by providing liquidity to the separate AMM pools within RiskSwap conceptually Order Book model. By providing liquidity to the futures pool (which is segregated from the options' pool) providers can accrue a much higher percentage of return with a risk of considerable loss. This type of liquidity providing becomes a double-edged sword that with auspicious market conditions can, ultimately, be extremely lucrative.

- On RiskSwap, Market Maker is the governing head of liquidity thereby acting as the main actor sustaining the Order Book model in an operative state. Market Maker upholds price slide-off risk to be minimal and to keep it in a medial state that allows for adequate spread. There are also two other crucial tasks accomplished by Market Maker on the RiskSwap platform. Market Maker can also take part in the liquidation process. With more users entering the platform, every user will have a chance to partake in the liquidation mechanism. Coincidentally with that, Market Maker maintains trades on illiquid strikes so that users can employ every existing financial instrument even with the other users' absence from trading with the same instruments.

Insurance

The distinguishing point of RiskSwap is the implementation of the Insurance System. Insurance will be a key element in the overall design of RiskSwap internal economy. The functioning operative deed of Insurance is to provide sufficient coverage for the liquidation process and mitigate an extreme price slide-off risk. The insurance system is being funded by two streams: commissions from the trades accrued, and Liquidation fees. Only the first half-year commission goes into the Insurance Fund to ensure the sufficiency of funds for debt coverage.

Insurance funds will be growing proportional to the number of users trading on the platform, which in turn will make the platform itself more sustainable.

In case of a steep decline or soaring rise of the market, vaults with a margin coefficient of < 0 can be implemented. This liquidation won't be of profit for liquidators. Unquestionably then, liquidation ought to be realized via an Insurance fund. For instance: Alice's collateral is 1000.00 USDC with an unrealized p&l (uPnL) of -1200.00 USDC. RiskSwap buys out a position and takes 1000.00 USDC to close a position afterwards and the surplus of 200.00 USDC is being repaid by the Insurance Fund. The funds inside Insurance should correlate with the trading volume of RiskSwap.

CONCLUSION

In this paper, we have outlined the main distinguishing features of the RiskSwap platform, its operational structure, and specified the saliency of a decentralized derivative platform for digital assets. The scope of this paper has mainly included theoretical implementations and the end product might not reflect the current state of the whitepaper. For this reason, we will promptly update the whitepaper to coincide with the ongoing development.

By the means of leveraging Solana Blockchain, RiskSwap is capable of delivering instantaneous trading settlement which supersedes in this realm every other platform-equivalent that utilizes slower blockchain infrastructure. In this regard, RiskSwap possesses a significant advantage as it also employs the Order Book model that conjointly with Solana transaction throughput guarantees the stability of the price.

RiskSwap aims at creating a decentralized derivatives exchange that is comparable with centralized exchanges in terms of ease of use, the seamlessness of trade executions, and an array of functionalities. RiskSwap is being built on the foundational ideals of censor-resistance and integral privacy rights hence reducing the risk of exposing one's private information. The importance of ensuring ungoverned and unmediated trades is essential and is the focal point of the whole concept of the platform.

Furthermore, RiskSwap cultivates a risk managing system that lends speculators essential tools set to efficiently deescalate the risk exposure that is unavoidably present when trading derivatives. The integration of the Black-Scholes formula allows for the fair price or theoretical value for a call or a put option to be reliably determined, therefore enabling speculators to make a more weighted decision. Incorporation

of unique to RiskSwap position building interface Singleblock empowers placement of deliberated risks that are calculated beforehand by modelling the potential result of a given trade. Singleblock represents the first iteration of the Delta Hedging risk management interface that allows even novice speculators of derivatives to effectively hedge their position by leveraging a plethora of well-known and complex trading strategies by simply navigating around the interface.