DiffEx: Distributed Platform for ERC20 Options Derivatives

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1 Abstract

DiffEx is a DApp (Decentralized Application) platform creating the ability for users to create, buy, sell, and execute options contracts for ERC20 tokens. Each options contract is either a covered call, or an Ether secured put. Each contract also has a strike price (the price per underlying token paid on execution denominated in Ether) and expiry (block number after which the option cannot be executed). The DiffEx smart contract handles balances, option writing and execution, as well as order execution. When DiffEx is launched on the mainnet, the DFX token will be able to be staked in the contract for reduced platform fees, profit sharing, and platform upgrade voting.

2 Introduction

The global options market for equities and currencies surpassed $1.3T in value in 2020. With the value of non-stablecoin ERC20 tokens totaling over $200 billion in market capitalization, a decentralized options protocol for this market doesn't yet exist. Diffex aims to provide for this untapped market by creating a decentralized platform based on the Ethereum network that allows users to write, trade, and execute options on ERC20 tokens through a smart contract.

A call option gives the holder the ability to buy 100 of the underlying ERC20 token from the option writer at the strike price. A put option gives the holder the ability to sell 100 of the underlying ERC20 token to the option writer at the strike price. To write a covered call, the writer must have 100 of the underlying ERC20 token, and for an Ether secured put the writer must have 100 * strike price Ether. After writing, the writer can sell these options on the DiffEx exchange to a buyer, who can then execute the option any time before the expiration block.

3 Benefits

Through DiffEx, ERC20 traders will now be able to

- Capitalize on underlying price movements of the ERC20.
- Reduce risk exposure to USD token valuations.
- Hedge long and short positions on ERC20 tokens and ETH.
- Make calculated moves based on timing of ERC20 project developments.
- Increase leverage.
- Earn a yield on held ERC20 tokens and ETH.
- Earn on long and short-term price predictions.

4 DFX Token

DiffEx's platform token, DFX, can be staked in the DiffEx contract. Once their DFX tokens are staked for 10,000 blocks (2 days), traders will have to pay a lower trading fee when trading on the DiffEx platform. Once their DFX tokens have been staked for 100,000 blocks (15 days) users will be able to receive their profit sharing payouts. Every 100,000 blocks, all trading fees collected over the past 100,000 blocks are dispersed amongst all stakers, proportional to the number of DFX tokens staked.

Estimated Fee Schedule		
DFX Tokens Staked	Trade Fee (Limit)	Trade Fee (Market)
0	0.25%	0.75%
500,000	0.20%	0.65%
1,000,000	0.175%	0.60%
5,000,000	0.15%	0.55%
10,000,000	0.125%	0.50%
100,000,000	0.10%	0.40%

Tokenomics:

Total supply: 100,000,000,000 DFX

Pre-ICO allocation: 20,000,000,000 DFX

ICO allocation: 40,000,000,000 DFX

Airdrops/Bounty allocation: 10,000,000,000 DFX

Founders allocation: 30,000,000,000 DFX (1 year lockup on half, 2 year lockup on other half)

Value proposition: as DiffEx accumulates users, there will be more demand for DFX from traders for lower fees, and existing stakers will see higher profit-sharing payouts as transaction fees increase.

5 DiffEx Dashboard

The Dashboard provides an easy to use interface through which traders can use the DiffEx platform. On the main screen, users are presented a sidebar with a selection screen for the token which is underlying the option they're looking for, as well as an option explorer, filled with all existing options for a token. Also on the left sidebar is the order area, where traders can buy and sell the currently selected option. Once an option is selected, its price chart will populate much of the screen. Right below the price chart is the depth

chart, showing an option's current buy/sell orders. Additionally in this area is the market data section, showing almost everything a trader would need to know about that option. Below that, a trader's past and present orders for this specific option are shown, allowing them to keep tabs on their market activity. To the left of that section is the option interaction area, allowing traders who hold the option to execute them. Here, writers of options can also close their positions, to receive the underlying collateral they locked up when they wrote the options.
In the account menu, users can see all of their current and past orders, current balances of ERC20 tokens, ETH, and options, as well as the staking menu.

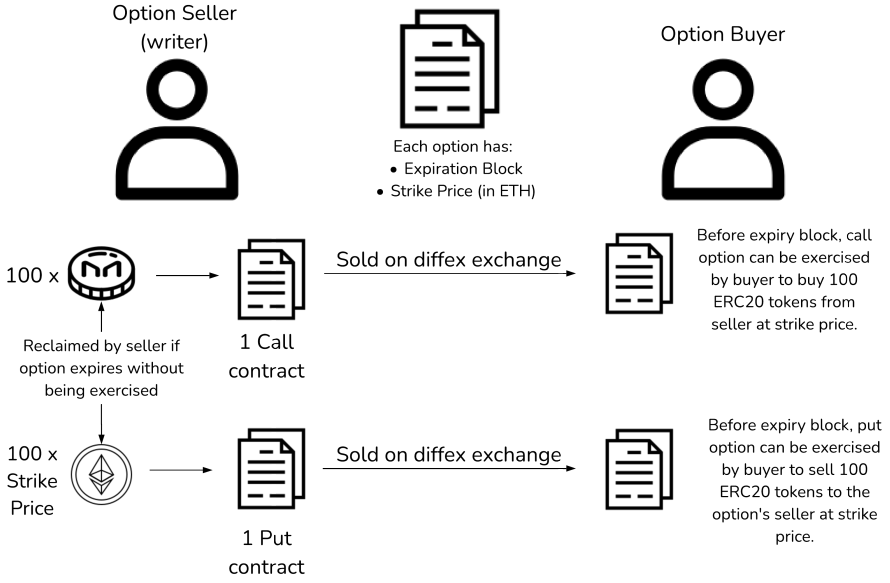
Beta version of DiffEx Dashboard.

6 Distributed Orderbooks

DiffEx limit orders are all signed using ECDSA before being sent to DiffEx orderbooks, thus making fraud/hacks mathematically impossible. However, if an orderbook were to have downtime, users may be unable to use that exchange. To accommodate for this, the mainnet version of the DiffEx platform will allow for unlimited numbers of external orderbook pools, and it will implement fee sharing with these external orderbooks. In doing this, decentralization is maintained as the order liquidity can be split amongst many orderbooks while still using a central smart contract, making switching between exchanges easy and efficient.

7 Technical Overview

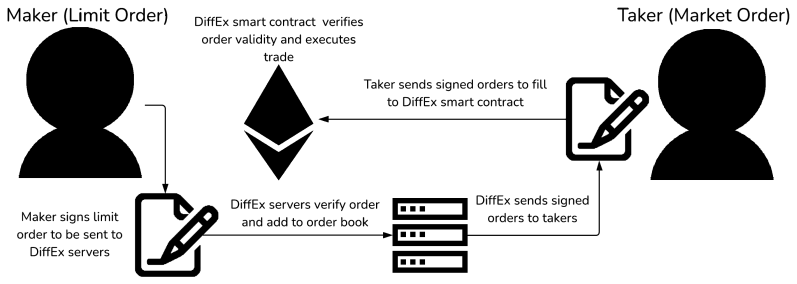
The way DiffEx's simple calls and puts operate by a trader locking up the collateral (100 of that option's ERC20 token type for calls, 100 * strike price ETH for puts), and then being able to sell that option on a DiffEx exchange, collecting the premium. If the buyer of that option chooses to exercise the option, then the option writer is assigned and the collateral they locked up is executed at the predetermined strike price. If a put, writer receives 100 ERC20 tokens and if a call, the writer receives 100 * that options strike price in ETH. If the writer wishes to close their options position before the expiry block and before being assigned, they are able to do so by re-buying the option and closing their position. A development goal of DiffEx is to add **partially collateralized options**, allowing traders to write options contracts without locking up nearly as much collateral.



How options contracts work on the DiffEx platform.

DiffEx's trading platform works by storing all trading logic and balances state in an Ethereum smart contract, along with decentralized off-chain orderbook pools for decreased trading costs and increased speed. When a user wishes to deposit or withdraw Ether or ERC20 tokens, write or execute an option, or execute a market order, they must call the smart contract. To post a limit order, a DiffEx orderbook must be given the order's hash, signed with

the private key of the market maker. The orderbook server then verifies the order hash and signature, to ensure the order's details are correct and the user submitting it is the market maker. To fill an order from the order book, the market taker sends the signed order to the smart contract, which then verifies the order's validity and executes the order. Thanks to this ECDSA verification, if an order was modified at any time from when the original signer sent it to the orderbook to when the taker sent it to the DiffEx smart contract, the order will fail to execute, meaning orderbook managers cannot commit fraud by modifying orders on their server.



How an order is added to a DiffEx orderbook.

8 Conclusion

Options contracts are an integral part of the financial industry outside of cryptocurrency, and there is currently no smart contract-based solution to trade options contracts for ERC20 tokens. Because of this, DiffEx could provide significant utility to retail and institutional cryptocurrency owners and traders, unlocking new value in their held tokens.