Hedger:

Option Derivatives Protocol

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1. Introduction

The market for cryptocurrencies and digital blockchain assets has developed into a vibrant ecosystem of investors, speculators, and traders. The volatility of the market and increased trading activity implies significant demand for derivative instruments. Options are one of the key financial instruments that can help people hedge their assets, increase cost efficiency and generate extra income.

An option is a contract between an option Writer and Buyer that gives the Buyer the right but not the obligation to either buy (Call Option) or sell (Put Option) Writer's underlying assets at a predetermined price (known as the Strike Price) anytime before a specified date (known as the Expiration Date). Today option trading and especially writing, is available through specialized exchanges which are susceptible to counter-party risk and limited to experienced, high net worth individuals, institutions and hedge funds.

In this paper, we introduce a decentralized system that allows any two individuals in the world to engage in a covered option contract with minimal counter-party risk.

2. Hedger Protocol

Hedger is a system of smart contracts that make it possible to initiate, write, and settle covered options on Ethereum. Premium rates are decided in an open, P2P market — writers and buyers are free to propose premium rates through Option Orders and Hedger Relayers will find the best available offer(s) to match. Relayers earn fees for hosting "Option Order books" that connect option writers and buyers. Purchased options are "tokenized" – to keep track of buyers' portions and can be traded on 3rd party exchanges like

any other token. Writer's collateral is held in escrow in smart contracts and released to option token holders if exercised or returned if expired.

3. Option Terms Contract

Defines basic structure of option contracts. You can think of an Option Terms Contract as a blueprint template for specific types option contracts. For example, Covered Option Terms Contract is a template for the right but not an obligation to buy Writer's [underlying asset] at an agreed to [Strike Price]in[SettlementCurrency] anytime before [Expiration Block#] for [Premium/contract].

4(a). Buyers

To initiate a covered option contract on Hedger the first thing you need to do is construct an Option Order. An Option Order is a signed message that represents a Buyer's commitment to purchase or sell a specified amount of an underlying asset at an agreed upon strike price and expiration date in exchange for a Premium fee.

Option Order contains the following information:

- Buyer's Ethereum address.
- Desired # of contracts to purchase/sell. (e.g. 1 ETH=1 Contract)
- Option Terms Contract address which will serve as the blueprint for an option agreement (i.e. Covered Option Contract)
- User fill in desired Option Contract Parameters (Desired Strike, Expiration, and Premium)
- The fees that will be paid to the Relayer.

Once an Option Order is signed by both the Writer and the Buyer, the Buyer is given an Option Token representing their right to exercise underlying assets at an agreed upon strike price anytime before the expiration block.

Hedger Option Tokens are tradable just like any other token, so if the buyer trades the Option Token with someone else, future rights on underlying assets will be routed to the new owner.

Each Option Token has an optionId – a unique 32-byte identifier that is generated deterministically from the associated option's terms. Each optionId is mapped on-chain to the address of a deployed Option Terms Contract and a set of Option Contract Parameters specific to that Option Token. This means that anyone who's interested in what the terms of an Option Token are can look up what Option Term Contract and Option Contract Parameters are associated with that Option Token's optionId. This makes it easy for exchanges to list and display Option Tokens – all the information they need is readily available on-chain. Option Tokens are non-fungible, which means that no two tokens are interchangeable.

4(b). Use cases:

- Put options can help CDP owners recover liquidation losses in case of unexpected market downturns. For example, Alice has 10 ETH collateralized at MakerDAO with a 200DAI liquidation price. To protect herself from a 13% liquidation fee in case ETH price plunges to 200, she purchases 10 Put option contracts with Expiration Date set for the anticipated duration of her loan and a 230DAI Strike Price (200DAI liquidation price + 13% liquidation fee + 4DAI Premium or cost of the option contract). Now if the price drops to 200 anytime during the duration of your loan, even though Alice will pay a 260DAI liquidation penalty fee to MakerDAO, she will be able to recover her losses by exercising your 230DAI Puts (buying 10 ETH @200 DAI and immediately selling it to Option Writer @230 generating 300 - 40 Premium paid for contracts).

- Alternatively, with call options optimistic investors are able to obtain exposure to an underlying asset at a huge cost saving. Alternatively, short-sellers are able to hedge against an unexpected bull market. For example, Alice believes the price of ETH will double in the next 30 days, by July 1st from $250 to $500. She has 1000 DAI to invest and is looking for ways to maximize her ETH exposure. If she simply bought 4 ETH with 1000 DAI she would realize a 1000 DAI gain (or 100%). But by buying 100 call options (10DAI/contract) with 350 DAI Strike price and July 1st Expiration, Alice was able to increase her profits to ((500-350)*100) - 1000=14,000 DAI (or 1,400%)

5(a). Relayers

Relayers play a crucial role in the Hedger system because they connect writers and buyers by hosting Option Orders. Relayers earn fees when Option Orders are filled, meaning Relayers are incentivized to create favorable conditions and UX for option traders in hopes of hosting more Option Orders for a chance to earn more fees. Relayers compete to build businesses whose products and services will bring greater stability to the entire decentralized finance ecosystem.

5(b). Use cases:

- Gives financial developers tools to create non-custodial option exchanges that are transparent, open-source, and uncensorable.
- With most backend operations and custodial liability taken care of by Ethereum’s smart contracts, developers are able to spend most of their time building great user experiences and learning materials.

6(a). Writers

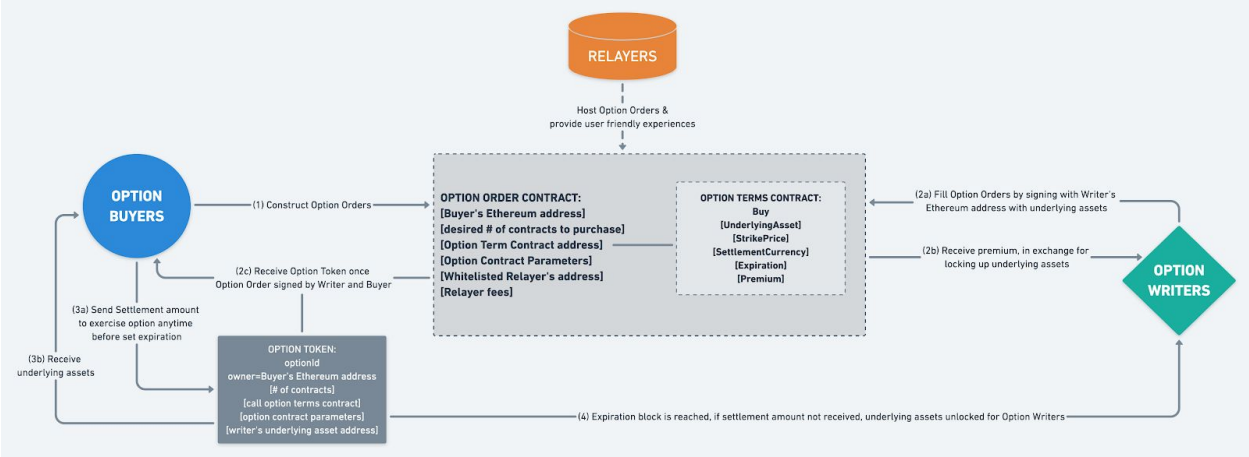
Hedger allows option Writers to lock up underlying assets to guarantee settlement and earn significantly higher premium rates from writing options as opposed to lending. From available Option Orders, writers select which orders they wish to fill and how much they want to underwrite. Writer's underlying assets are locked in a smart contract until expiration block or released to Buyer(s) if exercised.

6 (b). Use cases:

- Individuals with long-term Ether limit buy or sell orders can use Hedger as a source of additional returns. For example, a user that owns ETH and is willing to sell @300DAI within the next month can earn premium by writing a call option with a strike price of 300 and locking their ETH until next month.
- Alternatively, a user that wants to buy ETH in case of an unexpected price drop to 150DAI anytime within the next month can earn premium by writing a put option with a strike price of 150 and locking 150DAI until next month.
- Whether purchased option contracts get executed or expired, option writers always receive immediate premiums at the time of purchase. Because writers set their desired strike prices and expiration dates, they are essentially generating extra income in exchange for possibly executing orders they were willing to execute on anyways. Additionally, statistically speaking 75% of written options never get exercised because call / put buyers only win when asset prices go up / down while writers win if price goes down / up OR stays the same.
- Compared to lending, collateralizing underlying assets for option contracts can potentially yield much higher annual yields. 3% monthly premiums can compound to over 40% annually.

7. Settlements

To exercise an Option Contract, Option Token holder needs to send an agreed upon settlement amount into an option smart contract anytime before expiration block in order to unlock Writer's underlying assets.



https://whimsical.com/9Yk1TypLU1cAgTu4EKZ1ot

8. Governance

Hedger will begin with centralized control of the protocol over the following:

- Whitelisting or delisting Relayers.
- Publishing new Option Terms Contracts.

Over time, we will transition to the community and stakeholder control.