



OptionFlow
A Decentralized Option Protocol On The Cardano Blockchain

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Abstract

OptionFlow is an innovative decentralized option protocol, leveraging Cardano's blockchain to offer efficient and seamless option creation within a trustless environment. The protocol utilizes smart contracts and Cardano's EUTxO model to provide Option tokens in return for locked tokens, redeemable at a fixed price later. This strategy successfully emulates both Call and Put Options. For determining prices for complex financial products, the robust MuesliSwap order book/AMM hybrid DEX is employed.

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Contents

1	Introduction	4
2	Our Mission	4
3	Background	5
3.1	Options in traditional Finance	5
3.2	Cardano Blockchain and eUTxO Model	5
3.3	Smart Contracts on Cardano	5
4	OptionFlow	6
4.1	OptionFlow Protocol	6
4.1.1	Option Minting Policy	6
4.1.2	Option Redeemer	6
4.1.3	Equivalence to traditional Call and Put Options	7
4.1.4	Price discovery	8
4.2	OptionFlow Interface	8
4.2.1	Option Creation	9
4.2.2	Option Redemption	9
4.2.3	Option Trading	9
5	OptionFlow Token (OPT)	9
5.1	Utility and Governance	10
5.2	Access to Premium Features	10
6	Roadmap	10
6.1	Phase 1 - Beta Launch and Smart Contract Audits	10
6.2	Phase 2 - Option Minting and Trading	10
6.3	Phase 3 - Premium Features and Partnerships	10
7	Conclusion	11

1 Introduction

OptionFlow aims to revolutionize the way options are issued by offering a decentralized platform on the Cardano blockchain. Our goal is to provide users with the tools they need to leverage the power of financial derivatives in a decentralized environment. This includes managing risk, speculating on asset price movements, and generating income — all without the limitations of traditional financial intermediaries.

2 Our Mission

At OptionFlow, our mission is to empower individuals with financial freedom by providing a cutting-edge, decentralized option protocol on the Cardano blockchain.

Our core mission is driven by three key principles:

- **Accessibility:** We are committed to democratizing finance by breaking down barriers and offering equal access to the options market for all Cardano users. With OptionFlow, anyone can participate in options trading and benefit from the diverse set of financial opportunities it provides.
- **Transparency:** Transparency is at the heart of our protocol. Through open-source smart contracts and on-chain transactions, OptionFlow ensures that every aspect of options trading is visible, auditable, and tamper-proof.
- **Innovation:** As pioneers in the DeFi space, we strive to continuously innovate and improve the options market on Cardano. Our team is dedicated to pushing the boundaries of what is possible, exploring new features, and incorporating community-driven feedback to create an ecosystem that thrives on creativity and adaptability.

Through OptionFlow, we aim to redefine the options market, making it more efficient, flexible, and inclusive than ever before. We envision a future where individuals have the tools they need to take control of their financial destinies, manage risks intelligently, and explore new opportunities for growth.

Join us on this transformative journey as we shape the future of decentralized finance on Cardano, one option at a time. Together, we can unlock the true potential of options.

3 Background

OptionFlow aims to revolutionize the Option trading ecosystem and bring it onto the Cardano blockchain. In this section we provide an overview over traditional Options and the Cardano blockchain.

3.1 Options in traditional Finance

Options trading represents a significant segment of the international financial market, allowing investors to bet on the future movements of stocks, commodities, or other financial instruments, providing greater financial strategy flexibility. Essentially, an option is a financial product allowing investors the right to buy (call option) or sell (put option) an asset at a predetermined price within a specific time frame or on a specified date. By purchasing a call option, the holder purchases the right (but not obligation) to buy the asset within a given period while a put option allows the holder to sell.

Traditionally, options trading was conducted through centralized institutions, mainly stock exchanges or other financial institutions. These platforms acted as intermediaries, overseeing the establishment and enforcement of contracts - accruing both time and cost to transactions. Centralized platforms have been heavily criticized for limited transparency, susceptibility to fraud, and potential for manipulating market prices.

3.2 Cardano Blockchain and eUTxO Model

The advent of blockchain technology and smart contracts has paved way for the modification of how options trading functions, particularly through the decentralisation of the trading platforms. One promising platform is the Cardano blockchain. Cardano is a proof-of-stake blockchain platform, recognized for its exceptional flexibility, security, and scalability, making it an ideal candidate for transforming the way options trading is conducted.

Prominently, the Cardano blockchain uses Extended UTXO (eUTxO) model, a significant departure from traditional models. This model encompasses a hybrid of Ethereum's account-based model and Bitcoin's UTXO model, providing a means of tracking both the ownership and transaction history of each token on-chain seamlessly. The eUTxO model on the Cardano blockchain offers efficient concurrency, making it capable of handling multiple transactions simultaneously and opening up new possibilities for financial smart contracts including in the options trading market.

3.3 Smart Contracts on Cardano

With the Shelley hard fork, Smart Contracts have launched on Cardano, allowing for complex financial products and services to be implemented directly on-chain in a decentralized and trustless way. Smart Contracts on Cardano govern the spending of Funds at specialized so-called Smart Contract Addresses. They can also be used to govern the minting and burning of Cardano native tokens, that

can independently be traded and sent along with the native currency ADA. The address and policy id of the respective address and token governed by the Smart Contract are determined by the hash of the serialization of the contract, making the values unique and deterministic while hard to predict and reproduce (i.e. cause a hash collision). Hence it is impossible to write two separate contracts that explicitly reference each other, as each addition of the other contracts hash would change the original contracts hash.

Beginning of 2023, the smart contract language OpShin was introduced to the Cardano ecosystem. It provided an important innovation to smart contracts - the ability for a single contract to govern both the minting of a token and the spending of funds at a specified address using the same contract hash.

4 OptionFlow

OptionFlow is a cutting-edge protocol built on the Cardano blockchain, revolutionizing decentralized options trading. Our platform is designed to offer users seamless access to a wide range of options contracts, enabling them to efficiently manage risk, speculate on asset prices, and capitalize on financial opportunities. The OptionFlow dApp comprises various technical components that work together to provide a comprehensive and user-friendly experience.

4.1 OptionFlow Protocol

The heart of the OptionFlow protocol lies in its smart contracts, defining the rules and functionalities governing the creation, execution, and settlement of options contracts. These smart contracts ensure the integrity and transparency of the options market on Cardano, enabling users to interact with confidence. An overview of the OptionFlow protocol and its interaction with the MuesliSwap order book is depicted in fig. 1

4.1.1 Option Minting Policy

The Option Minting Policy is a fundamental component that guarantees the proper issuance and locking of deposit tokens when creating options. It ensures that for each option token minted, an equivalent amount of deposit tokens is locked at a the Option Redeemer, maintaining the integrity of the system. At the same time, it allows burning the option token in order to execute the respective option.

4.1.2 Option Redeemer

The Option Redeemer is a Smart Contract address that ensures the execution of options during specified intervals. Option issuers lock the deposited tokens into the Option Redeemer and obtain option

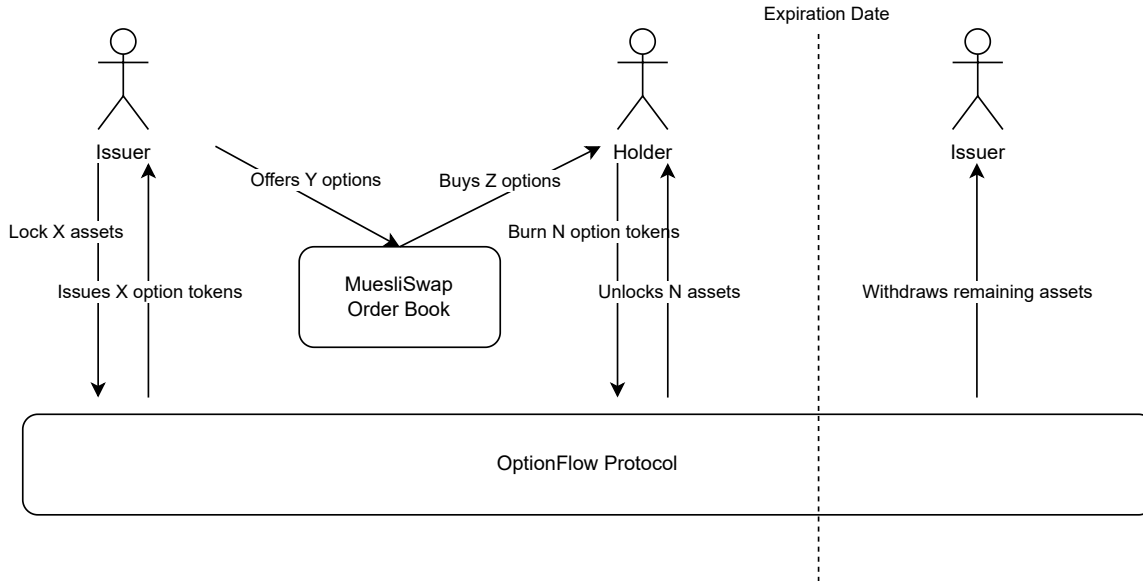


Figure 1: Overview over the OptionFlow protocol and its interaction with the MuesliSwap Order Book.

tokens in return. These option tokens can be traded freely through third party exchanges such as the MuesliSwap order book. After obtaining them from the issuer, holders of option tokens can exchange them for the deposited tokens upon paying the price fixed by the issuer before the expiration date of the option, creating a trustless and secure environment for option execution. When executing an option, the option holder is required to burn the option token. After the expiration date the option issuer is able to unlock the underlying option token in case the option has not been redeemed.

Notably, due to the innovative design of the OpShin smart contract language, both the Option redeemer and the option minting policy are the same contract, allowing for the contracts to reference each other and further making transactions on-chain cheaper by having to provide fewer data.

4.1.3 Equivalence to traditional Call and Put Options

In traditional finance, call options are financial assets that grant the holder the right, but not the obligation to buy a specific other asset at a fixed price until an expiry date. Buying an OptionFlow option token is equivalent to buying a Call option on the traditional market. The token can be exchanged with the other asset at the Option Redeemer. The executability of the option is guaranteed until the expiry date of the token by forcing the option issuer to lock the tokens into the option redeemer smart contract. The holder may thus execute the option at any time until the expiry date, which effectively grants the holder the right to buy the asset at the specified price. The holder may choose to keep or burn the option tokens instead, effectively making use of the non-obligation to buy.

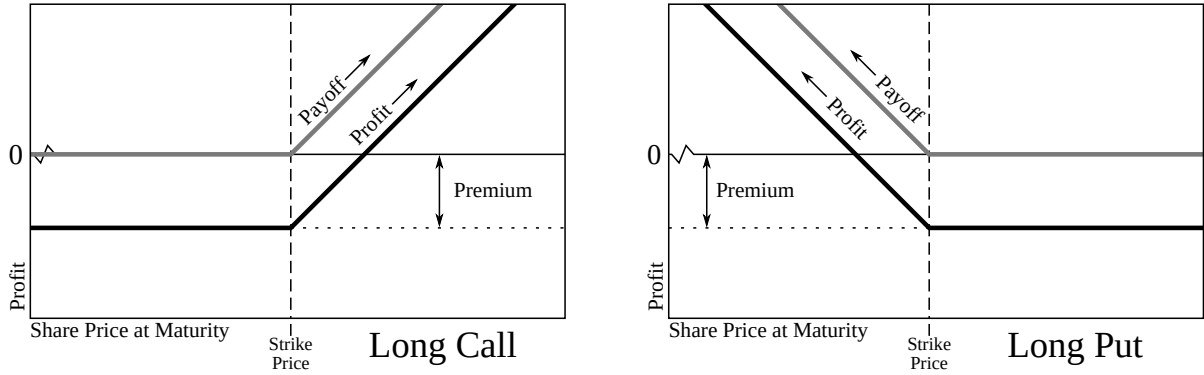


Figure 2: Profits from holding a long call option. Figure 3: Profits from holding a long put option

Put options grant the holder the right, but not the obligation to sell an asset at a fixed price until an expiry date. OptionFlow smart contracts allow specifying any token as buy or sell token when issuing an Option. Effectively this allows to model put options in the same way that call options are modeled, where just the assets that are used to buy and sell are swapped. For example, if a call option would allow to buy MILK at a fixed price in exchange for iUSD which would require locking MILK into the Option Redeemer and paying iUSD to obtain the MILK when executing the call options, the corresponding put option with the same contract would allow to buy iUSD at a fixed price in exchange for MILK, requiring to lock iUSD into the the Option Redeemer and pay MILK to obtain the iUSD when executing the put option. Hence both call and put options are properly modeled by the OptionFlow protocol.

4.1.4 Price discovery

The prices of options are strongly dependent on the expected profits from holding an option tokens, which are depicted in figs. 2 and 3¹. The expected profits vary based on the current price of the asset for which the option was issued and the time until the expiry of the option, allowing for speculative value in the asset. Eventually the prices are highly complex and not necessarily predictable or computable through a fixed algorithm. Moreover, the amount and expiry of options makes it generally difficult to use commonly employed automated market maker protocols for option trading, as users would have to provide and withdraw liquidity from pools every time a new option is issued or an old option expires. Therefore the OptionFlow price discovery will happen on the free market through trades between issuers and holders on the MuesliSwap order book.

4.2 OptionFlow Interface

The OptionFlow User Interface (UI) is a user-friendly platform that facilitates interactions with the decentralized options market. The UI is designed to empower users of all experience levels,

¹By Gxti - Own work, CC BY 3.0, <https://commons.wikimedia.org/w/index.php?curid=6406492>

providing them with intuitive tools to create and manage their options positions seamlessly. The above equivalence of put and call options is not represented in the trading interface in order not to confuse users. Instead they can choose between traditional put and call options as they are used to.

4.2.1 Option Creation

Users can effortlessly create their options contracts through the UI, specifying key parameters such as deposit and payment tokens and expiration date. The UI guides users through the process, making it easy to generate personalized options that suit their trading strategies.

4.2.2 Option Redemption

When the time comes to redeem an option, users can easily access the "Redeem Option" section on the platform. By following a few simple steps, users can bring the required payment tokens and unlock the underlying tokens at the specified price before the expiration date. The interface ensures a seamless process, enabling users to obtain the desired outcome as per the terms of the option contract.

4.2.3 Option Trading

The trading of options on OptionFlow is facilitated through decentralized exchanges (DEXs), providing users with a secure and trustless environment to execute their trades. Among the prominent DEXs enabling options trading is MuesliSwap, which is set to launch the first-ever Option DEX market on the Cardano blockchain.

Through MuesliSwap's innovative platform, users will have the opportunity to explore a wide array of options contracts offered by OptionFlow. The DEX ensures that users can seamlessly interact with various options and execute trades without the need for intermediaries. By leveraging the liquidity and efficiency of DEXs, users can enjoy transparent and efficient options trading while retaining full control over their funds.

MuesliSwap's collaboration with OptionFlow marks a significant milestone in the Cardano ecosystem, ushering into a new era of decentralized finance and options trading. This partnership ensures that users have access to a diverse and thriving options market, contributing to the growth and adoption of decentralized applications on Cardano.

5 OptionFlow Token (OPT)

OptionFlow introduces its native utility token, OptionFlow Token (OPT), which plays a central role in the ecosystem. OPT serves as the primary medium of exchange within the platform, offering a

range of benefits and use cases for its holders.

5.1 Utility and Governance

OPT acts as the fuel that powers the OptionFlow protocol, enabling users to interact with various features and functions seamlessly. Token holders receive discounts when creating and redeeming options while using OPT.

Additionally, OPT holders will have the opportunity to participate in community decisions. As a decentralized and community-driven platform, OptionFlow allows its community to propose and vote on key protocol upgrades, fee structures, and other important parameters. The community decisions are only meant as a guidance for the core team.

5.2 Access to Premium Features

OPT also grants users access to premium features and benefits within the OptionFlow platform. Holders of a certain amount of OPT may receive exclusive access to advanced analytics, market insights, and early access to new features or partnerships.

OptionFlow envisions the continuous development of premium services that provide added value to its users, further enhancing the utility of OPT.

6 Roadmap

OptionFlow is committed to a dynamic and iterative development approach. Our roadmap outlines the key milestones and features that will be rolled out over time, driven by community feedback and emerging market trends. The roadmap includes:

6.1 Phase 1 - Beta Launch and Smart Contract Audits

In this initial phase, OptionFlow will conduct rigorous smart contract audits and security assessments to ensure the protocol's robustness and resilience. We will engage with the community to gather feedback and refine the platform's user interface and experience.

6.2 Phase 2 - Option Minting and Trading

Phase 2 will focus on the successful deployment of option minting, redemption and trading functionalities. Users will be able to create and redeem options using the OptionFlow protocol, and trading will be enabled through decentralized exchanges such as MuesliSwap.

6.3 Phase 3 - Premium Features and Partnerships

As the platform gains traction and user adoption increases, Phase 3 will focus on the introduction of premium features and strategic partnerships. These initiatives will provide added value to OPT

holders and expand the ecosystem's reach and utility.

Additionally, the team will collaborate closely with decentralized exchange partners such as MuesliSwap to provide the full power of options trading strategies (e.g. spreads, straddles, strangles, ...) to users via an easily accessible and straightforward interface. This will open up to world of advanced hedging techniques to every trader — all in a decentralized environment.

7 Conclusion

OptionFlow is set to revolutionize the options market on the Cardano blockchain by offering a decentralized, open-source platform that empowers users with financial freedom and flexibility. By adhering to the core principles of accessibility, transparency, and innovation, OptionFlow aims to become the go-to platform for options in the Cardano decentralized finance space.

Join us on this transformative journey as we usher into a new era of options trading on Cardano. With OptionFlow's cutting-edge protocol, MuesliSwap's pioneering Option DEX market, and the active participation of the community, we are confident that together, we can unlock the true potential of decentralized finance and shape the future of options trading, one option at a time.