



# Litepaper

## Mimic Protocol: Revolutionizing DeFi Automation with AI-Driven Intents

### 1. Abstract

In the dynamic realm of Decentralized Finance, efficiency, security and scalability are paramount. **Mimic** stands as a pioneering DeFi automation protocol, delivering top-tier tools to applications and protocols since 2021. With over **\$4 billion in processed volume**, Mimic has established itself as a trusted partner within the DeFi ecosystem.

Recognizing the escalating demand for user-centric automation solutions, Mimic is set to expand its capabilities by launching a **DeFi automation protocol**. This advanced protocol leverages **intents** and **AI agents** to empower users to deploy custom automation strategies seamlessly. Operating within a **fully self-custodial environment**, Mimic ensures both security and user control, setting new standards for DeFi automation.

This litepaper delves into Mimic's evolution, the challenges it addresses within the DeFi space, its innovative solutions and the technological framework that underpins its success. Additionally, it outlines future developments and highlights the expertise driving Mimic's continued growth.

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### 2. Introduction

Decentralized Finance has revolutionized the financial sector by eliminating intermediaries, enhancing transparency and democratizing access to financial services. Despite its transformative potential, DeFi presents significant challenges, including operational complexity, security vulnerabilities, and scalability issues.

**Mimic**, founded in 2021, aims to simplify and optimize DeFi operations through robust automation. By providing advanced tools and integrating AI-driven technologies, Mimic enables DeFi applications and protocols to operate more efficiently, securely, and at scale.

As DeFi continues to expand, the necessity for **user-friendly, secure, and customizable automation solutions** becomes increasingly critical. Mimic addresses this need by introducing a new version of the protocol that leverages **intents** and **AI agents**, allowing users to design and deploy personalized automation strategies without compromising security or control.

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### 3. Problem Statement

Despite the rapid growth of DeFi, several challenges impede its widespread adoption and operational efficiency:

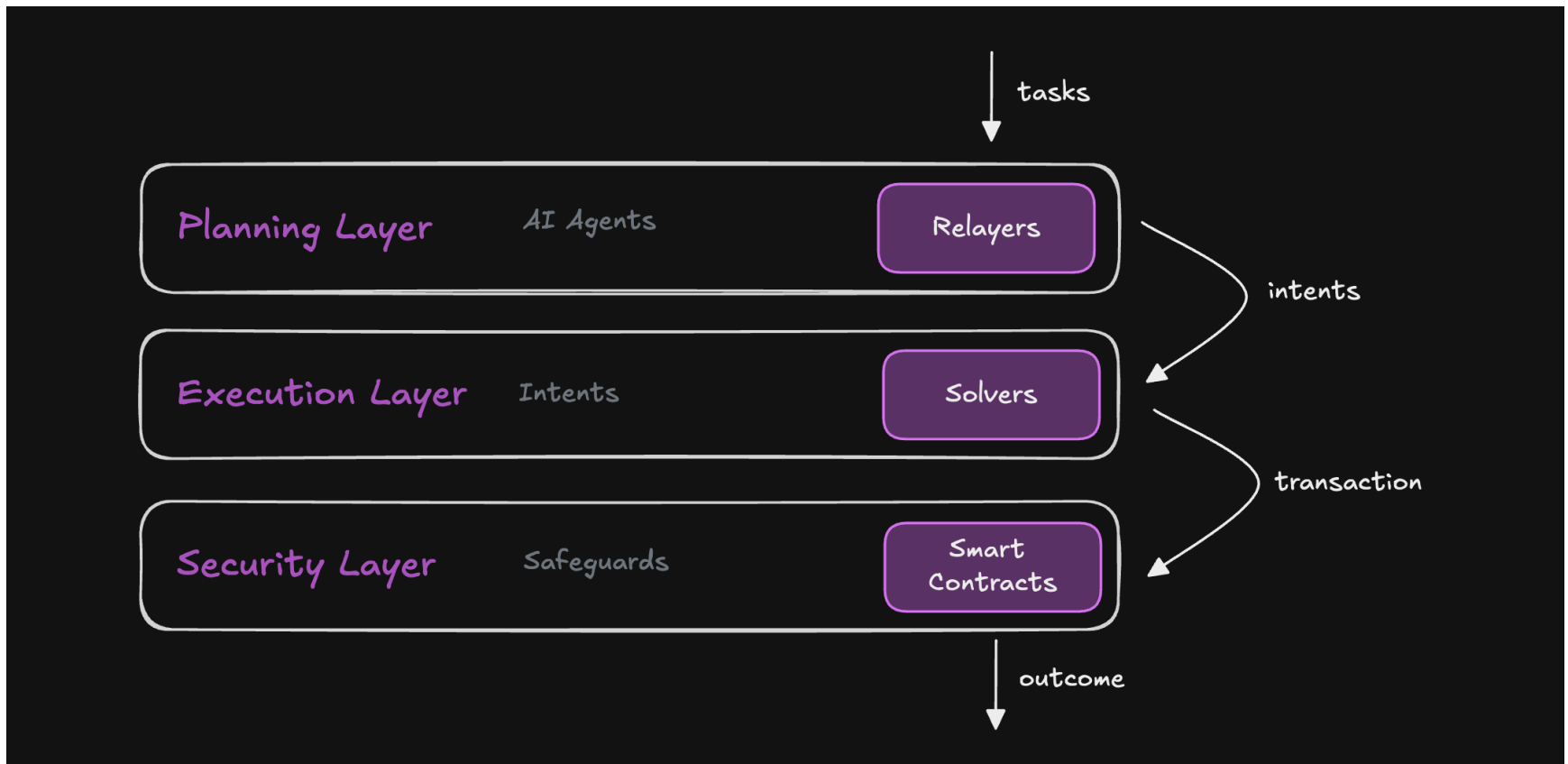
- Operational Complexity:** Managing DeFi tasks manually is time-consuming and error-prone, especially as the number of protocols and applications proliferates.
- Security Vulnerabilities:** Ensuring the security of automated operations is paramount. Vulnerabilities can lead to significant financial losses and erode trust in DeFi protocols.
- Scalability Constraints:** Existing automation solutions struggle to scale effectively, resulting in bottlenecks and reduced performance as DeFi usage intensifies.
- User Accessibility:** Current automation tools often require technical expertise, limiting their accessibility to non-technical users.
- Customization Limitations:** Users and protocols seek tailored automation strategies to meet specific needs, which existing solutions may not adequately support.

Mimic is designed to address these challenges, providing a secure, scalable, and user-friendly automation protocol that caters to both technical and non-technical users.

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### 4. Solution Overview

**Mimic's DeFi automation protocol** offers a comprehensive solution to the challenges outlined above by providing:

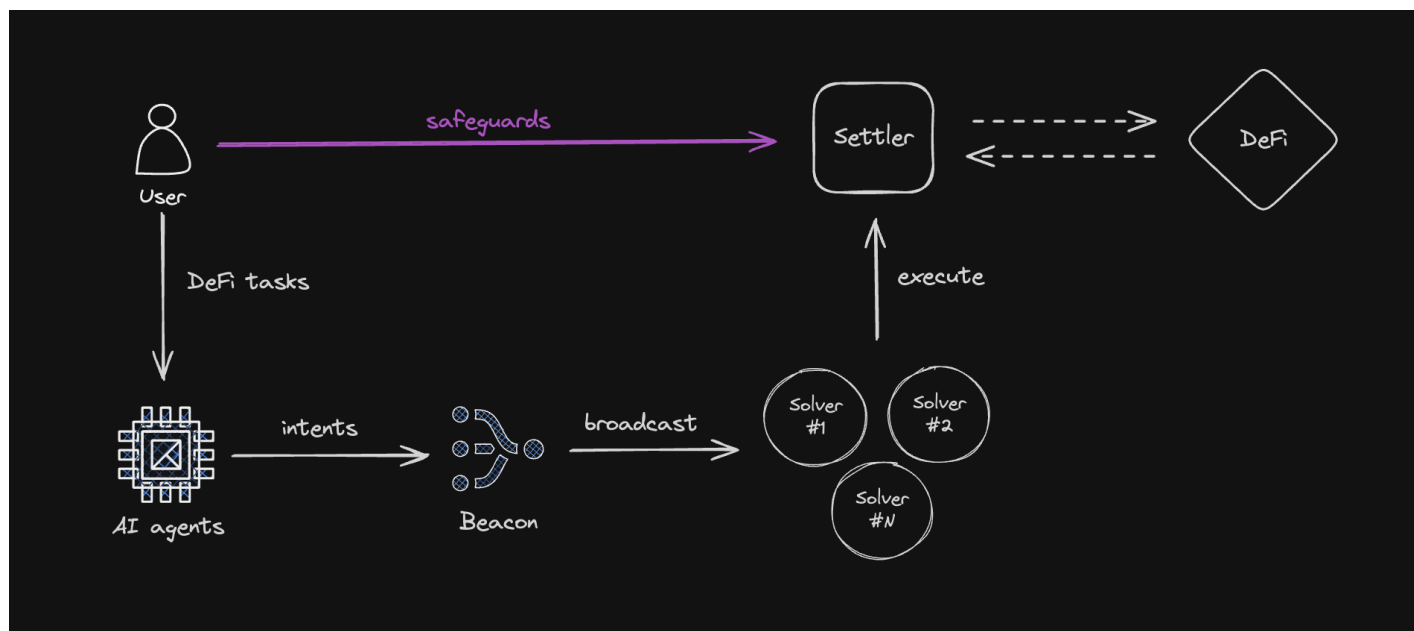


Mimic solution overview

- **AI Agents:** Intelligent entities in charge of creating the best execution plan for DeFi tasks from all possible combinations, adapting themselves to dynamic DeFi environments, enhancing operational efficiency and reliability.
- **Intents:** Structured representations of user instructions to solve specific DeFi tasks, ensuring clarity and precision in their execution. Intents are executed by a decentralized network of solvers.
- **Safeguards:** Ensures that users retain full control over their assets and operations, mitigating security risks associated with third-party delegation and automation.

## 5. How It Works

Mimic's DeFi automation protocol operates through a seamless workflow that transforms user tasks into secure and executable automated intents:



Simple workflow diagram

### 5.1. Tasks Ingestion

Users input their DeFi tasks through an intuitive interface. These tasks are typically expressed in different formats such as natural language, JSON, or any other structured data, detailing specific financial operations such as token swaps, lending, or liquidity provision.

### 5.2. Intent Extraction

Utilizing pre-trained **artificial intelligence models**, Mimic parses the user input to extract structured **intents**. Each intent encapsulates a specific DeFi operation, ensuring clarity and precision.

### 5.3. Data Validation

Each intent undergoes rigorous validation to ensure operational integrity. Invalid or incomplete intents are flagged and excluded from execution, maintaining the protocol's reliability.

## 5.4. Automated Execution

Validated intents are broadcasted to the decentralized network of solvers to be executed within a **self-custodial environment**, ensuring that users retain complete control over their assets and operations.

## 5.5. Safeguards Validation

All executed intents are validated on-chain against the list of safeguards established by the user to ensure they can only be executed if their stated conditions are met.

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# 6. AI Agents

Mimic leverages **AI agents** to autonomously create optimal execution plans for complex DeFi tasks by evaluating all possible combinations. These agents utilize advanced algorithms to assess market conditions, optimize transaction parameters, and ensure compliance with user-defined constraints.

## 6.1. Advanced Algorithms for Optimization

AI agents are powered by sophisticated algorithms that enable them to assess real-time market data, identify opportunities for arbitrage, and manage risks associated with volatility. By employing machine learning, these agents continuously refine their decision-making capabilities based on historical performance and evolving market trends.

## 6.2. Customization and Adaptability

AI agents are highly customizable, allowing users to set specific preferences, such as acceptable risk levels, slippage thresholds, and target yields. The agents adapt to these preferences, ensuring that automation strategies are aligned with user objectives.

## 6.3. AI for Optimal Execution

The main role of AI agents is to determine the best possible combination of actions to fulfill user intents efficiently. By exploring a wide range of potential execution strategies, AI agents ensure that users achieve the most favorable outcomes in terms of cost, speed, and risk. This capability goes beyond translating user input, focusing instead on finding the most effective execution path.

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# 7. Intents

An **intent** encapsulates a user's desire to execute a specific DeFi operation. It comprises parameters such as asset details, transaction amounts, source and destination chains and execution conditions. Intents are designed to be both human-readable and machine-executable, bridging the gap between user instructions and blockchain actions.

## 7.1. Structure

An intent has the following structure:

```
struct Intent {
    address settler;
    address from;
    address recipient;
    uint256 deadline;
    uint256 sourceChain;
    uint256 destinationChain;
    address[] tokensIn;
    uint256[] amountsIn;
    address[] tokensOut;
    uint256[] minAmountsOut;
    bytes data;
    bytes signature;
}
```

- **Settler** — The contract where the intent will be executed
- **From** — The Ethereum address initiating the intent that will provide the initial assets
- **Recipient** — The Ethereum address receiving the assets in return
- **Deadline** — The ultimate deadline the user is willing to accept
- **Source chain** — The chain ID where the intent will be initiated
- **Destination chain** — The chain ID where the intent will end up being fulfilled
- **Tokens in/out** — The list of token addresses being exchanged
- **Amounts in/out** — The list of amounts the user is willing to pay and receive respectively
- **Data** — Arbitrary user or external data required to solve the intent
- **Signature** — The user's signature for all the properties mentioned above

## 7.2. Solvers

Solvers are **off-chain entities** that analyze intents and submit proposals to execute them. They compete to offer the best solutions, ensuring users receive optimal outcomes in terms of fees, slippage and execution efficiency.

To ensure decentralization and prevent monopolistic practices, all solvers must adhere to the same API specifications, promoting interoperability. Mimic implements a bonding mechanism where solvers stake tokens to participate. Malicious actions result in slashing, ensuring solvers act in users' best interests. Solvers receive rewards for successful intent fulfillment, incentivizing high-quality proposals.

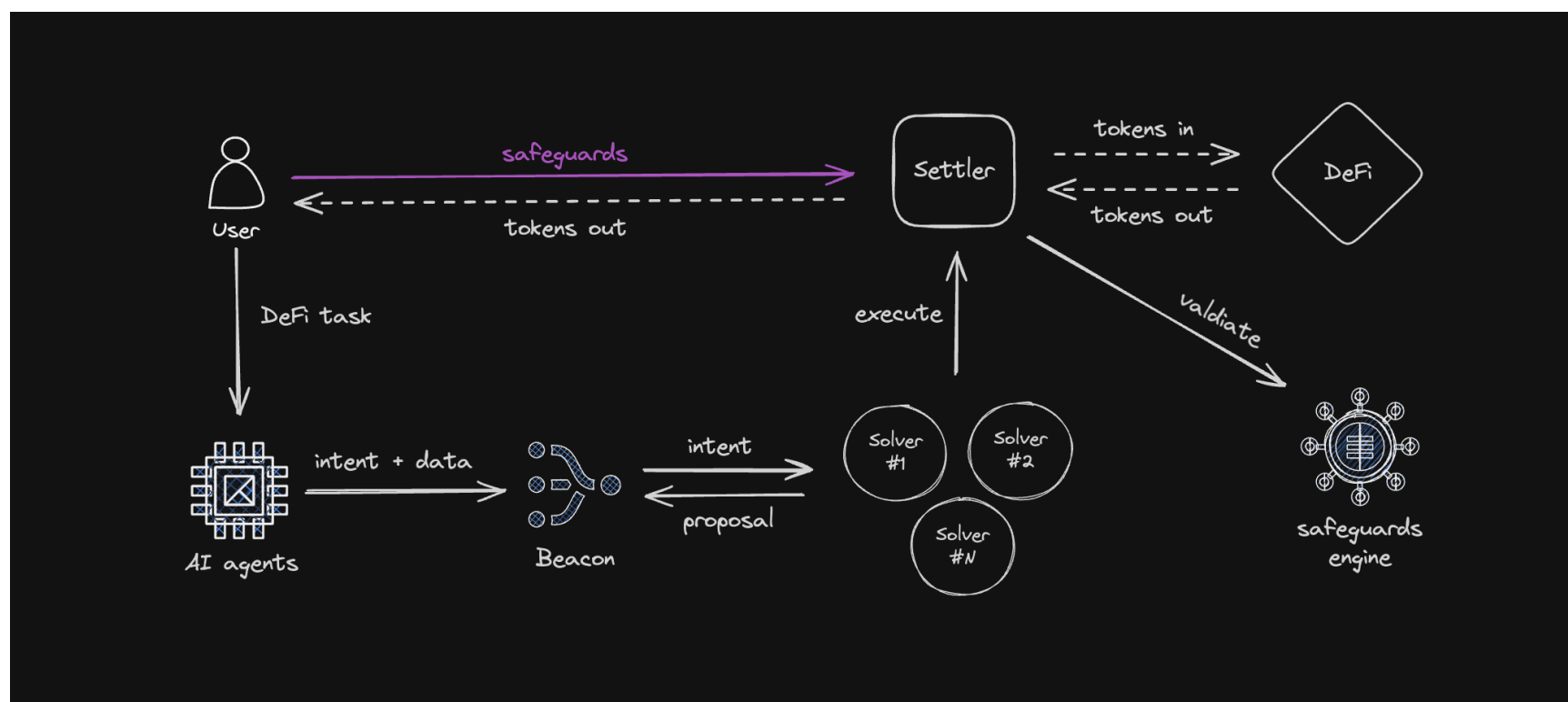
## 7.3. Settler

Intents will be fulfilled by solvers in the context of a settler contract. The user will grant token allowance to this smart contract where the proposal submitted by the solver will be executed to fulfill the user intent.

Even though this contract could be shared between different users, Mimic v4 introduces a bunch of features that require custom user settings to allow them to model more complex intent execution flows. Therefore, having one settler per user is required. Note that this also helps avoid a single honey pot for token allowances that could attract malicious hackers.

## 8. Safe guards

**Safeguards** are customizable rules that users define to control aspects of their intents. These rules are executed within the context of each settler, ensuring that only intents meeting specific criteria are allowed.



Extended workflow diagram

### 8.1. Token Lists

Restrict intents to specific tokens, e.g., allowing only USDC while denying others. Token lists can be customized as allowlists or denylists, enabling users to maintain strict control over which assets are used in their transactions.

### 8.2. Thresholds

Set minimum and maximum transaction amounts to prevent overflows or insufficient executions. Thresholds ensure that intents align with user-defined financial limits, mitigating risks associated with unintended large or small transactions.

### **8.3. Slippage**

Define slippage percentages based on trusted on-chain or off-chain oracles. This helps users ensure that trades are executed within acceptable price ranges, preventing potential losses due to excessive slippage in volatile markets.

### **8.4. Limit Orders**

Set specific prices at which tokens are to be bought or sold. Limit orders enable users to automate their trading strategies, ensuring that they only transact when market conditions meet their specified criteria, thus maximizing value.

### **8.5. Volume Limits**

Impose volume caps over defined time windows to manage exposure and risk. Volume limits are especially useful for users managing large portfolios, as they help prevent excessive exposure to any single asset or market condition.

### **8.6. Execution Windows**

Specify when intents can be executed, such as particular days of the month or specific deadlines. Execution windows provide users with temporal control over their DeFi activities, allowing them to align automated operations with specific market events or personal schedules.

### **8.7. Execution Limits**

Limit the number of times an intent can be executed within a given period. Execution limits are critical for managing recurring transactions, ensuring that automation does not lead to excessive or unintended repeated actions.

### **8.8. Time Locks**

Apply time locks to delay the execution of certain intents. Time locks provide an additional layer of security, giving users the opportunity to review or cancel intents before they are executed, particularly useful for high-value transactions.

### **8.9. Whitelisted Executors**

Restrict which executors are allowed to fulfill an intent. By maintaining a whitelist of trusted executors, users can ensure that only reputable and verified entities are involved in executing their intents, minimizing the risk of malicious activity.

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## **9. Key Features**

Mimic's protocol is distinguished by a range of features designed to deliver unparalleled automation capabilities:

### **9.1. Automated Intent Extraction**

Accurately translates user instructions into structured intents, minimizing errors and enhancing operational efficiency.

### **9.2. Efficient Automation**

Utilizes pre-trained AI models to decide the best path to execute DeFi tasks.

### **9.3. Data Validation**

Implements comprehensive validation mechanisms to ensure that all intents are accurate, complete, and executable, safeguarding against potential operational failures.

### **9.4. Self-Custodial Operations**

Guarantees that all automation activities occur within a user-controlled environment, eliminating the risks associated with third-party custodians.

## 9.5. Scalable Architecture

Designed to handle vast volumes of tasks and users, ensuring consistent performance and reliability as the DeFi ecosystem grows.

## 9.6. Efficient Execution

Utilizes competitive solver auctions and optimization techniques to ensure the most efficient execution of user intents, minimizing costs and maximizing returns.

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# 10. Use Cases

Mimic protocol allows for the development of a wide suite of tailored services addressing diverse DeFi automation needs:

## 10.1. Trading

Automate token swaps across multiple protocols and chains, ensuring optimal rates and minimal slippage. Users can set up custom trading strategies that are executed autonomously based on predefined market conditions.

## 10.2. Bridging

Facilitate seamless asset transfers between different blockchain networks, leveraging trusted bridge protocols. Mimic's AI agents can automatically detect the optimal bridging route, considering factors such as fees and transaction times.

## 10.3. Staking

Offer automated liquid staking services with protocols like **Lido** or **Rocketpool**, optimizing staking yields. Users can automate the process of staking and re-staking their assets to maximize yield with minimal manual intervention.

## 10.4. Lending

Provide automated lending services with **ERC4626**-compliant tokens, incorporating performance fees for optimized returns. Users can deploy their assets across multiple lending platforms, with AI agents reallocating assets to ensure the best interest rates.

## 10.5. Subscriptions

Automate recurring DeFi operations such as subscription payments, ensuring bills remain up-to-date without manual intervention. For example, users can set up automated payments for protocol fees, ensuring their DeFi services remain active without interruption.

## 10.6. Fee Collection

Automate the collection of service fees by consolidating multiple token transactions into a single efficient process. This use case is particularly beneficial for protocols that need to collect fees from multiple users on a recurring basis.

## 10.7. Airdrops

Facilitate mass token distributions to multiple recipients, ensuring accurate and timely airdrops. Mimic can automate the process of airdropping governance tokens or rewards, ensuring they reach the intended recipients efficiently.

## 10.8. Account Refilling

Ensure accounts are consistently funded by automating the refill process based on predefined thresholds. This is useful for maintaining collateral levels in lending protocols or ensuring sufficient gas is available for executing future intents.

## 10.9. Clearing

Optimize transaction efficiency by netting multiple accounts to minimize the number of required transactions. This feature is useful for large organizations managing multiple DeFi positions, reducing gas costs and improving operational efficiency.

## 10.10. Block Trading

Execute large-volume trades within specific timeframes, accepting predefined slippage to ensure trade completion. Mimic's AI agents can break down large trades into smaller chunks to minimize market impact and execute them at optimal times.

### **10.11. Rebalancing**

Automatically adjust asset allocations across different protocols to maximize Annual Percentage Yield (APY). Users can set target allocations and Mimic's AI agents will periodically rebalance their portfolios to align with those targets.

### **10.12. Emergency Exits**

Implement automated exit strategies based on external oracle alarms, such as those from **Aleno**, to protect user assets during market volatility. Mimic can automatically detect adverse market conditions and execute an exit strategy to minimize losses.

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## **11. Conclusion**

**Mimic** is poised to redefine the DeFi automation landscape by merging cutting-edge AI technologies with robust automation frameworks. Our protocol empowers users to navigate the complexities of DeFi with ease, security, and unparalleled efficiency. As the DeFi ecosystem continues to expand, Mimic remains committed to driving innovation, ensuring that our users can harness the full potential of decentralized financial operations.

Investing in Mimic means supporting a future where DeFi automation is accessible, secure, and tailored to individual and protocol-specific needs. Join us in shaping the next generation of DeFi automation and unlocking new possibilities within the decentralized financial world.