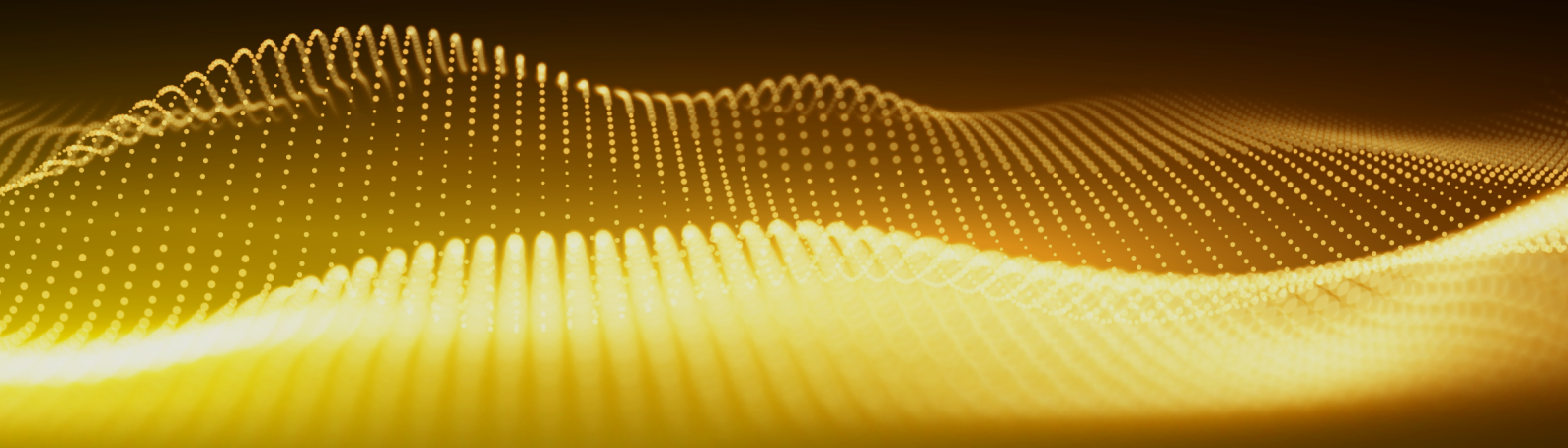
ChainAudits

Smart Contract Audit

Security Assessment

25.09.2024

ApeScreener



ChainAudits

Project Details

CODEBASE	NETWORK	LANGUAGE
Deployed	ETH	Solidity
NAME	**TOTAL SUPPLY**	**SYMBOL**
ApeScreener	Not Applicable	Not Applicable
WEBSITE	**UNIT TESTS**	**FORK**
Active	Not Provided	Not Forked

ABOUT THE PROJECT

ApeScreener is an advanced AI Portfolio Advisor and tracker designed to help you build, grow, and liquidate your cryptocurrency portfolio.
ApeScreener learns from your investor and risk profile to provide personalized recommendations for your next investment moves.
ApeScreener is designed to take the complexity out of investing, offering a user-friendly interface to help you achieve financial goals.

WEBSITE	DEPLOYED CONTRACT
https://apescreener.xyz/	0x8f3281FC68F716a2bf0A0BDE93Ddc9eC11A8D40

Social Media Links

Telegram	https://t.me/apescreener
Twitter	https://x.com/apescreener
dApp	https://dapp.apescreener.xyz/
Instagram	N/A
Github	N/A
Reddit	N/A
Medium	https://medium.com/@apescreener
Discord	https://discord.gg/jtGd4kxy
Youtube	https://www.youtube.com/@Apescreener
TikTok	N/A
LinkedIn	N/A

Version	Delivery Date	Changelog
v1.0	25. September 2024	• Layout Project • Automated- /Manual-Security Testing • Summary

Vulnerability Summary

Critical	Critical risks are those that affect the platform's safe operation and must be resolved before launch. Users should avoid investing in any project with unresolved critical risks.
Major	Major risks include centralization issues and logical errors. These risks can potentially result in the loss of funds or control over the project under certain conditions.
Medium	Medium risks might not directly threaten users' funds, but they can impact the platform's overall functionality.
Minor	Minor risks are similar to the above categories but on a smaller scale. They typically do not compromise the project's overall integrity but may lead to less efficient solutions.
Informational	Informational errors are recommendations aimed at improving code style or aligning operations with industry best practices. These usually do not affect the code's overall functionality.

Note – The provided audit report thoroughly examines the security aspects of the smart contract employed in the project, encompassing potential malicious manipulation of the contract's functions from external sources. However, it's important to note that this analysis does not incorporate functional or unit testing of the contract's logic. Therefore, we cannot ensure the absolute correctness of the contract's logic, including internal calculations within the formulae utilised in the contract.

Overview

In-Scope Files

The team provided us with files to review during security audits. This audit covered the following files listed below with their respective SHA-1 Hash.

SHA-1	File
9bdf963072a5c1e1cfd6bcbafb26288337167c59	DeriskRouter.sol

Please note that files with hash values different from those listed in this table have been changed after security checks, intentionally or unintentionally, as a particular hash value may indicate a changed state or potential vulnerabilities not checked in this scan.

> **Note for Investors:** We only examined agreements indicated in the indicated ratings. No contracts associated with the project beyond this range have been audited, therefore, we cannot provide insight or assume responsibility for their security.

Out-Of-Scope Files

This audit report centres on the contracts outlined in the audit scope above. However, it's important to note that some external contracts, addresses, and files that interact with the audited contracts were not included in the scope of this review. As such, we have not evaluated the security, integrity, or reliability of these external components. The out-of-scope files/addresses are mentioned below

The following addresses and contracts were not reviewed in this audit:

Name	Address
UniswapV2 Router (IDEXRouter)	0x7a250d5630B4cF539739dF2C5dAcb4c659F2488D
Uniswap V2 Factory (IDEXFactory)	0x5C69bEe701ef814a2B6a3EDD4B1652CB9cc5aA6f
WETH Contract (WETH)	0xC02aaA39b223FE8D0A0e5C4F27eAD9083C756Cc2
APES Token (IERC20)	0x09675e24CA1EB06023451AC8088EcA1040F47585
Staking Contract (IStaking)	Currently it is set as the Dead address but it can be changed by the owner.
Fee Collector Address	0x8f3281FC68F716a2bf0A0BDE93Ddc9eC11A8D480 Currently it is set as the Gnosis Multi-Sig wallet address but it can be changed by the owner.

Note for Investors: We only examined agreements indicated in Scope Files and the files mentioned above are the ones that will interact with the audited contract. We advise all investors to do their own research before making and interaction with the Audited Smart Contract

Imported packages

Used code from other Frameworks/Smart Contracts (direct imports).

Dependency/Import Path	Count
@openzeppelin/contracts/utils/Address.sol	1
@openzeppelin/contracts/utils/cryptography/ECDSA.sol	1

External/Public functions

External/public functions can be invoked outside of the contract, i.e., accessed by other contracts or external accounts on the blockchain. These functions are identified using external or public visibility modifiers in the function declaration.

State variables

State variables are stored on the blockchain as part of the contract conditions. They are declared at the contract level and can be accessed and changed by any action in the contract (except with modifiers like onlyOwner, etc.). State transitions can be described using a visibility modifier, such as public, private, or internal, which refers to the access to the transition.

Components

Contracts	1
Libraries	0
Interfaces	1
Abstract	0

Exposed Functions

This section lists functions that are explicitly declared public or payable. Please note that getter methods for public stateVars are not included.

Public	10
Payable	1
External	9
Internal	15
Private	0
Pure	1
View	2

State Variables

Total	14
Public	9

Capabilities

Solidity Versions observed	^0.8.24
Transfers ETH	No
Can Receive Funds	Yes
Uses Hash Functions	Yes
Has Destroyable Contracts	No

Inheritance Graph

An inheritance graph is a graphical representation of the inheritance hierarchy among contracts. In object-oriented programming, inheritance is a mechanism that allows one class (or contract, in the case of Solidity) to inherit properties and methods from another class. It shows the relationships between different contracts and how they are related to each other through inheritance.

N/A

Audit Information

Strategies

While our projects undergo rigorous testing to address all known vulnerabilities, it's important to provide further clarification and understanding by outlining specific vulnerabilities that have been identified. This additional information enhances transparency and helps stakeholders comprehend the security measures taken and any potential risks mitigated.

Title	Issue
Re-entrancy	Improper Enforcement of Behavioral workflow
Unexpected Ether Balance	Improper Locking
Code With No Effects	Irrelevant Code
Flash Loan Attacks	External Oracle Manipulation
Snadwich Attacks	A Form of Front Running
Write to Arbitrary Storage Location	Improper Write to Arbitrary Storage Location
Variable Shadowing	Improper Coding Standards
Unprotected SELF-DESTRUCT	Improper Access Control
Potential Honeypot	Improper Function
Unprotected ETH withdrawal	Improper Access Control
Outdated Compiler Version	Using components with Known vulnerabilities
Weak Sources of Randomness from Chain Attributes	Use of Insufficiently Random values
Unsafe use of libraries	Improper Implementation
Wrong Implementation of Token Standards	Improper Coding Standards

Auditing Strategy and Techniques Applied

All Projects at ChainAudits undergo our in-house developed "4-Eye" method. This process ensures that the code is analyzed not by a single auditor but by our entire technical team. Moreover, this is accomplished most efficiently, leaving no stone unturned.

We manually check every file, line by line. Automated tools are used solely to help us achieve faster and better results.

Code Analysis Methodology

The auditing process follows a routine series of steps:

- Manual Code Review:
  - Evaluate the overall structure and organization of the smart contract code line-by-line.
  - Review the implementation of access control mechanisms to ensure that sensitive functions are appropriately restricted to authorized users.
  - Ensure that critical vulnerabilities are adequately tested and that edge cases and boundary conditions are covered.
- Static Code Analysis:
  - Utilise static analysis tools to scan the codebase for vulnerabilities and security issues.
  - Identify common vulnerabilities like reentrancy, integer overflow/underflow, and unchecked external calls.
  - Evaluate compliance with coding standards and best practices, ensuring adherence to security guidelines.
- Code Structure and Architecture Review:
  - Analyze the overall structure and architecture of the smart contract code.
  - Assess the modularity, readability, and maintainability of the code.
  - Review the separation of concerns and adherence to design patterns for robustness and security.
- Security Best Practices Evaluation:
  - Evaluate the implementation of security best practices, including access control mechanisms and input validation.
  - Verify proper error handling to mitigate potential vulnerabilities and ensure contract robustness.

- Check for gas optimization techniques to enhance efficiency and reduce transaction costs.

- External Dependency Assessment:
  - Assess the integration with external contracts, libraries, or services.
  - Review the security of external dependencies and their impact on the overall security of the smart contract codebase.
  - Ensure secure interactions with external components to prevent vulnerabilities and attack vectors.
- Post-Analysis Support:
  - Offer support and guidance to assist the development team in addressing identified vulnerabilities.
  - Collaborate with stakeholders to ensure effective implementation of recommended security enhancements.
  - Provide ongoing assistance and consultation to maintain the security of the smart contract codebase.

Discovered Issues

Privileges

Centralization emerges when one or multiple entities possess privileged access or authority over a smart contract's functionalities, data, or decision-making processes. This situation may arise if a singular entity exercises complete control over the contract or if certain participants hold unique permissions or capabilities inaccessible to others within the ecosystem.

In the project, some authorities have access to the following functions:

No.:	File	Privileges
1	DeriskRouter.sol	• Set Staking Contract and Fee Collectos Addresses • Set Fees for derisking up to 5% max combining all tiers • Set Executor addresses and only those address can call the “derisk” function • Set Tiers • Transfer Ownership of the contract

Recommendations

To mitigate potential hacking risks, the team must meticulously handle the private key associated with the privileged account. Moreover, we advise bolstering the security measures surrounding centralized privileges or roles within the protocol by implementing decentralized mechanisms or employing smart-contract-based accounts like multi-signature wallets. This approach can enhance security by distributing control among multiple parties and requiring consensus for executing critical actions, thereby reducing the likelihood of unauthorized access or malicious activity.

Here are some suggestions of what the project owners can do:

- **Adopting multi-signature wallets**: Utilize wallets like Gnosis Safe that mandate approval from multiple parties before executing transactions. This additional layer of security helps safeguard against unauthorized actions.
- **Implementing a timelock**: Introduce a timelock feature with a delay of, say, 48-72 hours for sensitive operations. This delay period ensures stakeholders have ample time to review and respond to proposed changes, reducing the risk of impulsive or unauthorized modifications.
- **Incorporating a DAO/Governance/Voting module**: Integrating a decentralized governance system enhances transparency and community involvement. This empowers users to participate in decision-making processes, fostering a sense of ownership and accountability within the community.
- **Renouncing ownership**: Consider relinquishing ownership rights once all necessary configurations are in place. By doing so, the owner forfeits the ability to alter contract variables, enhancing trust and decentralization. It's crucial to ensure all settings are finalized before renouncing ownership to prevent unintended consequences.

- These measures collectively strengthen the security and integrity of the smart contract, mitigating risks and promoting a more resilient and transparent ecosystem.

Upgradeability

Deployer cannot update the contract with new functionalities

The contract is not an upgradeable contract. The deployer is not able to change or add any functionalities to the contract after deploying.

Ownership

Issue-ID	Severity	Location	Status
APE–01	Minor	N/A	Acknowledged

The owner is not renounced and can modify the contract

The owner is able to change the state variables. The contract remains under the control of the owner. This means that the owner can change the state variables at any time and prevent transactions if necessary. In this case, the impact of the ownership is very minor as it doesn't directly impacts or controls the user funds

Note – If the contract remains undeployed, we would regard the ownership as not relinquished. Additionally, without any ownership functionalities, the ownership is presumed to be automatically renounced.

Authorities Permissions

Functions that alter the state and are equipped with access control can pose risks. Recognizing that misuse of these functionalities can result in financial losses is essential. We offer a guide to understand the implications of presence/absence functions further.

Minting tokens

Minting involves creating new tokens within a cryptocurrency or blockchain network. This task is commonly undertaken by the project's owner or an assigned authority, granting them the capability to increase the network's total token supply.

Authorities cannot mint new tokens

Authorities are not able to mint new tokens once the contract is deployed.

Burning Tokens without Allowance

Burning tokens involves permanently removing a specific quantity of tokens from circulation, decreasing the total supply of a cryptocurrency or token. This practice is typically undertaken to enhance the value of the remaining tokens. By reducing the overall supply, burning creates a sense of scarcity, potentially stimulating demand and subsequently driving up the token's value.

Authorities cannot burn tokens without approval

Authorities are not able to burn tokens without any allowances.

Fees and Tax

In specific smart contracts, the individual or entity responsible for creating the contract retains the ability to establish fees for specific actions or functionalities within it. These fees serve various purposes, including covering operational expenses such as gas fees or compensating the contract's creator for their contributions in developing and managing the contract.

Authorities cannot update fees

Authorities are not able to update the fees more than 5%

Lock User Funds

In the context of a smart contract, locking entails confining access to specific tokens or assets for a predetermined duration. While tokens or assets are locked within the smart contract, they become inaccessible for transfer or utilization until the conclusion of the lock-up period or the fulfillment of specific conditions stipulated within the contract.

Authorities cannot lock funds

Authorities are not able to lock investor funds.

Missing Address Validation

Issue-ID	Severity	Location	Status
APE–02	Informational	Setter Functions	Acknowledged

Description

The functions '*setStakingContract*', '*setFeeCollector*, '*setExecutor*', and '*setOwner*' do not validate the input addresses, allowing the assignment of the zero address (address(0)), which can lead to loss of functionality or mismanagement of funds. Additionally, if the feeCollector address is set to an address that cannot receive Ether, transactions involving fee distribution will revert, disrupting contract operations.

Recommendation

Add a require statement to ensure the input addresses are not zero addresses (address(0)) and validate that the feeCollector can receive Ether. This will prevent invalid or non-payable addresses from being set, ensuring the smooth operation of fee transfers.

Missing events

Issue-ID	Severity	Location	Status
APE–03	Informational	Setter Functions	Acknowledged

Description

The functions '*setStakingContract*', '*setFeeCollector*, '*setExecutor*', and '*setOwner*' modify critical contract states, but they do not emit any events to log these changes. Missing event emissions reduce transparency and make it difficult to track state changes on-chain, which is important for monitoring and auditing purposes.

Recommendation

Add event emissions to log changes in the contract state. This will improve the transparency and traceability of key actions within the contract post-deployment.

NatSpec Documentation missing

Issue-ID	Severity	Location	Status
APE–04	Informational	N/A	Acknowledged

Description

If you have started to comment on your code, comment on all other functions, variables, etc.

Contract doesn't import npm packages from source (like OpenZeppelin etc.)

Issue-ID	Severity	Location	Status
APE–05	Informational	L07–10 (Interface Imports)	Acknowledged

Description

We recommend importing all packages from npm directly without flattening the contract. Functions could be modified or susceptible to vulnerabilities.

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