



SMART CONTRACT AUDIT

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PREPARED FOR

MIXCASH AI



INTRODUCTION

Auditing Firm	InterFi Network
Client Firm	MixCash AI
Methodology	Automated Analysis, Manual Code Review
Language	Solidity
Contract	0x32c755da2F04828B10655677f3455E1Fac20B6d4
Blockchain	Ethereum Chain
Centralization	Active Ownership
Commit	3052773ee0e2511a0463e5d330f864e75a309380
Website	https://mixcash.tech/
Telegram	https://t.me/MixcashAi/
X (Twitter)	https://x.com/MixcashAI/
Report Date	June 10, 2024


 Verify the authenticity of this report on our website: <https://www.github.com/interfinetwork>



EXECUTIVE SUMMARY

InterFi has performed the automated and manual analysis of solidity codes. Solidity codes were reviewed for common contract vulnerabilities and centralized exploits. Here's a quick audit summary:

Status	Critical 🔴	Major 🟡	Medium 🟠	Minor 🟢	Unknown 🟤
Open	0	0	1	4	0
Acknowledged	0	0	1	2	1
Resolved	0	0	0	1	0
Smart contract ownership is renounced. onLyOwner privileged roles are inaccessible					
<div><div>_taxWallet Privileges</div><div>manualSwap, clear</div></div>					
manualSwap function, as it is callable by _taxWallet, can potentially be used to manipulate price					

 Please note that smart contracts deployed on blockchains aren't resistant to exploits, vulnerabilities and/or hacks. Blockchain and cryptography assets utilize new and emerging technologies. These technologies present a high level of ongoing risks. For a detailed understanding of risk severity, source code vulnerability, and audit limitations, kindly review the audit report thoroughly.


 Please note that centralization privileges regardless of their inherited risk status - constitute an elevated impact on smart contract safety and security.



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SCOPE OF WORK

InterFi was consulted by MixCash AI to conduct the smart contract audit of their solidity source codes.

The audit scope of work is strictly limited to mentioned solidity file(s) only:

- MixcashAI.sol

 If source codes are not deployed on the main net, they can be modified or altered before main-net deployment. Verify the contract's deployment status below:

Public Contract Link	
https://etherscan.io/token/0x32c755da2f04828b10655677f3455elfac20b6d4#code	
Contract Name	MixcashAI
Compiler Version	0.8.20
License	MIT



AUDIT METHODOLOGY

Smart contract audits are conducted using a set of standards and procedures. Mutual collaboration is essential to performing an effective smart contract audit. Here's a brief overview of InterFi's auditing process and methodology:

CONNECT

- The onboarding team gathers source codes, and specifications to make sure we understand the size, and scope of the smart contract audit.

AUDIT

- Automated analysis is performed to identify common contract vulnerabilities. We may use the following third-party frameworks and dependencies to perform the automated analysis:
 - Remix IDE Developer Tool
 - Open Zeppelin Code Analyzer
 - SWC Vulnerabilities Registry
 - DEX Dependencies, e.g., Pancakeswap, Uniswap
- Simulations are performed to identify centralized exploits causing contract and/or trade locks.
- A manual line-by-line analysis is performed to identify contract issues and centralized privileges.

We may inspect below mentioned common contract vulnerabilities, and centralized exploits:

Centralized Exploits	<ul style="list-style-type: none">○ Token Supply Manipulation○ Access Control and Authorization○ Assets Manipulation○ Ownership Control○ Liquidity Access○ Stop and Pause Trading○ Ownable Library Verification
----------------------	---



Common Contract Vulnerabilities

- Integer Overflow
- Lack of Arbitrary limits
- Incorrect Inheritance Order
- Typographical Errors
- Requirement Violation
- Gas Optimization
- Coding Style Violations
- Re-entrancy
- Third-Party Dependencies
- Potential Sandwich Attacks
- Irrelevant Codes
- Divide before multiply
- Conformance to Solidity Naming Guides
- Compiler Specific Warnings
- Language Specific Warnings

REPORT

- The auditing team provides a preliminary report specifying all the checks which have been performed and the findings thereof.
- The client's development team reviews the report and makes amendments to solidity codes.
- The auditing team provides the final comprehensive report with open and unresolved issues.

PUBLISH

- The client may use the audit report internally or disclose it publicly.

 It is important to note that there is no pass or fail in the audit, it is recommended to view the audit as an unbiased assessment of the safety of solidity codes.



RISK CATEGORIES

A successful external attack may allow the external attacker to directly exploit. A successful centralization-related exploit may allow the privileged role to directly exploit. All risks which are identified in the audit report are categorized:

Risk Type	Definition
Critical 🚫	These risks pose immediate and severe threats, such as asset theft, data manipulation, or complete loss of contract functionality. They are often easy to exploit and can lead to significant, irreparable damage. Immediate fix is required.
Major 🟡	These risks can significantly impact code performance and security, and they may indirectly lead to asset theft and data loss. They can allow unauthorized access or manipulation of sensitive functions if exploited. Fixing these risks are important.
Medium 🟡	These risks may create attack vectors under certain conditions. They may enable minor unauthorized actions or lead to inefficiencies that can be exploited indirectly to escalate privileges or impact functionality over time.
Minor 🟢	These risks may include inefficiencies, lack of optimizations, code-style violations. These should be addressed to enhance overall code quality and maintainability.
Unknown 🟤	These risks pose uncertain severity to the contract or those who interact with it. Immediate fix is required to mitigate risk uncertainty.

All statuses which are identified in the audit report are categorized here:

Status Type	Definition
Open	Risks are open.
Acknowledged	Risks are acknowledged, but not fixed.
Resolved	Risks are acknowledged and fixed.



CENTRALIZED PRIVILEGES

Centralization risk is the most common cause of cryptography asset loss. When a smart contract has a privileged role, the risk related to centralization is elevated.

There are some well-intended reasons have privileged roles, such as:

- Privileged roles can be granted the power to pause() the contract in case of an external attack.
- Privileged roles can use functions like, `include()`, and `exclude()` to add or remove wallets from fees, swap checks, and transaction limits. This is useful to run a presale and to list on an exchange.

Authorizing privileged roles to externally-owned-account (EOA) is dangerous. Lately, centralization-related losses are increasing in frequency and magnitude.

- The client can lower centralization-related risks by implementing below mentioned practices:
- Privileged role's private key must be carefully secured to avoid any potential hack.
- Privileged role should be shared by multi-signature (multi-sig) wallets.
- Authorized privilege can be locked in a contract, user voting, or community DAO can be introduced to unlock the privilege.
- Renouncing the contract ownership, and privileged roles.
- Remove functions with elevated centralization risk.













 Understand the project's initial asset distribution. Assets in the liquidity pair should be locked. Assets outside the liquidity pair should be locked with a release schedule.



AUTOMATED ANALYSIS

Symbol	Definition
	Function modifies state
	Function is payable
	Function is internal
	Function is private
	Function is important

```

| **Context** | Implementation |   | | |
| L | _msgSender | Internal  |   |
|||||
| **IERC20** | Interface |   |
| L | totalSupply | External  | |NO|
| L | balanceOf | External  | |NO|
| L | transfer | External  |  |NO|
| L | allowance | External  | |NO|
| L | approve | External  |  |NO|
| L | transferFrom | External  |  |NO|
|||||
| **SafeMath** | Library |   |
| L | add | Internal  |   |
| L | sub | Internal  |   |
| L | sub | Internal  |   |
| L | mul | Internal  |   |
| L | div | Internal  |   |
| L | div | Internal  |   |

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| ****Ownable**** | Implementation | Context |||| ^L | <Constructor> | Public ! | 🚫 | NO ! || ^L | owner | Public ! | | NO ! || ^L | **renounceOwnership** | Public ! | 🚫 | onlyOwner |

|||||

| ****IUniswapV2Factory**** | Interface | |||| ^L | createPair | External ! | 🚫 | NO ! |

|||||

| ****IUniswapV2Router02**** | Interface | |||| ^L | swapExactTokensForETHSupportingFeeOnTransferTokens | External ! | 🚫 | NO ! || ^L | factory | External ! | | NO ! || ^L | WETH | External ! | | NO ! || ^L | addLiquidityETH | External ! | 💰 | NO ! |

|||||

| ****MixcashAI**** | Implementation | Context, IERC20, Ownable |||| ^L | <Constructor> | Public ! | 🚫 | NO ! || ^L | name | Public ! | | NO ! || ^L | symbol | Public ! | | NO ! || ^L | decimals | Public ! | | NO ! || ^L | totalSupply | Public ! | | NO ! || ^L | balanceOf | Public ! | | NO ! || ^L | transfer | Public ! | 🚫 | NO ! || ^L | allowance | Public ! | | NO ! || ^L | approve | Public ! | 🚫 | NO ! || ^L | transferFrom | Public ! | 🚫 | NO ! || ^L | _approve | Private 💰 | 🚫 | || ^L | _transfer | Private 💰 | 🚫 | |TERFI
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```

| L | min | Private 🔒 | | |
| L | swapTokensForEth | Private 🔒 | 🔴 | lockTheSwap |
| L | RemoveLimits | External ! | 🔴 | onlyOwner |
| L | sendETHToFee | Private 🔒 | 🔴 | |
| L | OpenTrading | External ! | 🔴 | onlyOwner |
| L | <Receive Ether> | External ! | 💰 | NO ! |
| L | manualSwap | External ! | 🔴 | NO ! |
| L | Clear | External ! | 🔴 | NO ! |
| L | manualSend | External ! | 🔴 | onlyOwner |

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INHERITANCE GRAPH



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MANUAL REVIEW

Identifier	Definition	Severity
CEN-01	Centralized privileges	Minor 

Important onlYowner centralized privileges are listed below:

```
renounceOwnership()  
RemoveLimits()  
OpenTrade()  
manualSend()
```

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RECOMMENDATION

Securing private keys or access credentials of deployers, contract owners, operators, and other roles with privileged access is crucial to prevent single points of failure that can compromise contract security.

Use of multi-signature wallets is recommended – These wallets require multiple authorizations to execute sensitive contract functions, reducing the risk associated with single-party control.

RESOLUTION

MixCash AI team has renounced contract ownership.



Identifier	Definition	Severity
CEN-02	Initial token allocation	Medium 🟡

Upon deployment, all initially minted tokens are transferred to the contract deployer. It could be an issue as the deployer can distribute tokens without consulting the community.

```
uint256 private constant _tTotal = 2000000000 * 10**_decimals;
emit Transfer(address(0), _msgSender(), _tTotal);
```

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RECOMMENDATION

Establish transparent tokenomics model that involves community input in the decision-making process regarding token allocation.

ACKNOWLEDGEMENT

MixCash AI team has clarified that initial token allocation will adhere strictly to pre-determined tokenomics outlined in project documentation.



Identifier	Definition	Severity
CEN-07	Authorizations and access control	Medium 🟡
MIX-01	Market manipulation risk	

`_taxWallet` only controlled privileges are listed below:

```
clear()
manualSwap()
```

Market manipulation risk:

`manualSwap` function, as it is callable by `_taxWallet` - can potentially be used to drain liquidity and manipulate token price.

`swapTokensForEth` function transfers ETH to `_taxWallet`. This operation decreases contract's token balance by `requiredBalance` and increases its ETH balance.

RECOMMENDATION

Marketing wallet's private-keys should be secured carefully. This address can have a single point of failure that compromises the security of the project. Manage privileged roles carefully.

Implement multi-signature wallets: Require multiple signatures from different parties to execute certain sensitive functions within contracts. This spreads control and reduces the risk of a single party having complete authority.



Identifier	Definition	Severity
LOG-02	Potential front-running	Minor 

Potential front-running happens when an attacker observes a transaction swapping tokens or adding liquidity without setting restrictions on slippage or minimum output amount. The attacker can manipulate the exchange rate by front-running a transaction to purchase assets and make profits by back-running a transaction to sell assets. Below mentioned function is called without setting restrictions on slippage or minimum output:

```
swapExactTokensForETHSupportingFeeOnTransferTokens()
```

RECOMMENDATION


Functions that execute critical state changes should enforce minimum output thresholds. Setting these minimums above zero can deter malicious actors by reducing the predictability and profitability of front-running strategies.

Implement commit-reveal schemes or transaction ordering to protect against front-running.

ACKNOWLEDGEMENT

Front-running is not avoidable on public blockchains. MixCash AI team commented that, most EVM chains are prone to some sort of front-running and external manipulation.



Identifier	Definition	Severity
COD-01	Authorization through tx.origin	Minor 

Using tx.origin for authorization could make the contract vulnerable as it refers to the original external account that started the transaction.

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RECOMMENDATION

Avoid authorizations via global variables wherever necessary.



Identifier	Definition	Severity
COD-02	Timestamp dependence	Minor ●

Be aware that the timestamp of the block can be manipulated by miners. Since miners can slightly adjust the timestamp, they may influence contract outcomes to their advantage.


RECOMMENDATION

Avoid relying solely on timestamp of the block for critical contract functions. Follow 15 seconds rule, and scale time dependent events accordingly.

ACKNOWLEDGEMENT

Timestamp of the block is not used to generate random numbers.



Identifier	Definition	Severity
COD-04	Missing or inaccurate error messages	Minor 

Below mentioned functions have missing or inaccurate error messages:

```
_transfer()  
clear()  
manualSwap()
```

RECOMMENDATION

Provide accurate information strings for require related errors.



Identifier	Definition	Severity
COD-10	Third Party Dependencies	Unknown 🟡
COD-11	Reliance on DEX Router and ERC20 token contracts	
COD-12	Reliance on <i>OpenZeppelin</i> tools	

Smart contract is interacting with third party protocols e.g., market makers, front-end decentralized applications, open zeppelin tools. The scope of the audit treats third party entities as black boxes and assumes their functional correctness. However, in the real world, third parties can be compromised, and exploited. Moreover, upgrades in third parties can create severe impacts, e.g., increased transactional fees, deprecation of previous routers, etc.

RECOMMENDATION

Inspect third party dependencies regularly, and mitigate severe impacts whenever necessary.

ACKNOWLEDGEMENT

MixCash AI team will inspect third party dependencies regularly, and push updates as required.



Identifier	Definition	Severity
COD-12	Lack of event-driven architecture	Minor ●

Smart contract uses function calls to update state, which can make it difficult to track and analyze changes to the contract over time.

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RECOMMENDATION

Use events to track state changes. Events improve transparency and provide a more granular view of contract activity.



Identifier	Definition	Severity
VOL-01	Irrelevant code	Minor ●

Redundant code in SafeMath

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RECOMMENDATION

Remove redundant and dead code.



DISCLAIMERS

InterFi Network provides the easy-to-understand audit of solidity source codes (commonly known as smart contracts).

The smart contract for this particular audit was analyzed for common contract vulnerabilities, and centralization exploits. This audit report makes no statements or warranties on the security of the code. This audit report does not provide any warranty or guarantee regarding the absolute bug-free nature of the smart contract analyzed, nor do they provide any indication of the client's business, business model or legal compliance. This audit report does not extend to the compiler layer, any other areas beyond the programming language, or other programming aspects that could present security risks. Cryptographic tokens are emergent technologies, they carry high levels of technical risks and uncertainty. You agree that your access and/or use, including but not limited to any services, reports, and materials, will be at your sole risk on an as-is, where-is, and as-available basis. This audit report could include false positives, false negatives, and other unpredictable results.

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ABOUT INTERFI NETWORK

InterFi Network provides intelligent blockchain solutions. We provide solidity development, testing, and auditing services. We have developed 150+ solidity codes, audited 1000+ smart contracts, and analyzed 500,000+ code lines. We have worked on major public blockchains e.g., Ethereum, Binance, Cronos, Doge, Polygon, Avalanche, Metis, Fantom, Bitcoin Cash, Velas, Oasis, etc.

InterFi Network is built by engineers, developers, UI experts, and blockchain enthusiasts. Our team currently consists of 4 core members, and 6+ casual contributors.

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