InterFi NETWORK

SMART CONTRACT AUDIT

interfinetwork

hello@interfi.network

https://interfi.network

PREPARED FOR

SEEDEX

INTRODUCTION

Auditing Firm	InterFi Network
Client Firm	Seedex
Methodology	Automated Analysis, Manual Code Review
Language	Solidity
Contract	0x651976C4985bA10C995Fa7Ef27D46f583d1B8cD9
Blockchain	Ethereum
Centralization	**Renounced**
Commit	2da08080778eeb463306b443e19fdc34b5e14641
Website	https://www.seedex.io
Telegram	https://t.me/seedex_io
X (Twitter)	https://x.com/seedex_io
Report Date	February 13, 2024

ℹ️ 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	0	0	0
Acknowledged	0	0	0	1	1
Resolved	0	0	1	2	0
Noteworthy Privileges	**Ownership Renounced** `createPair, removeLimits, setBT, setST, openTrading, clearStuckETH`				

ℹ️ 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.

ℹ️ Please note that the absence of public KYC verification of the project owners, team members, or deployers associated with Seedex. Typically, third-party KYC processes are instrumental in ensuring the transparency and accountability of a project's leadership, thereby enhancing user trust and regulatory compliance. Without external KYC verification by reputable providers, users may face increased risks related to rug pull.

TABLE OF CONTENTS

SCOPE OF WORK

InterFi was consulted by Seedex 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:

- Seedex.sol

ℹ️ 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/address/0x651976C4985bA10C995Fa7Ef27D46f583d1B8cD9#code	
Contract Name	Seedex
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	○ 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.

ℹ️ 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.

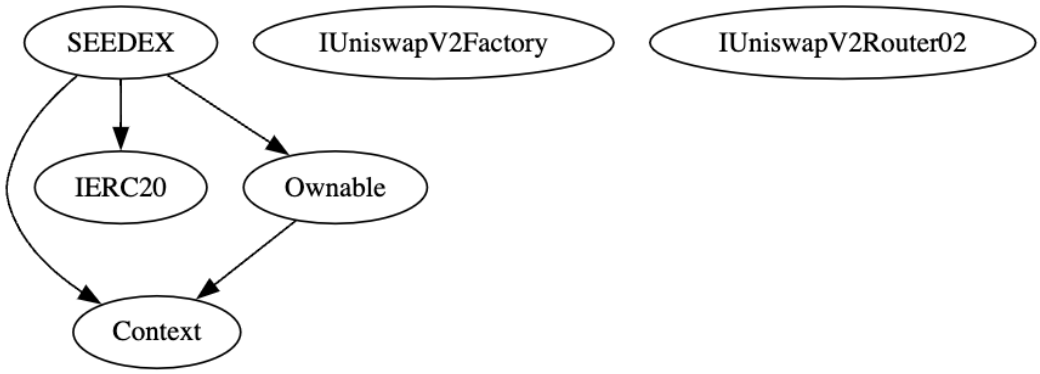
AUTOMATED ANALYSIS

Symbol	Definition
🛑	Function modifies state
💵	Function is payable
🔒	Function is internal
🔐	Function is private
!	Function is important

Context	Implementation			
└	_msgSender	Internal 🔒		
IERC20	Interface			
└	totalSupply	External !		NO!
└	balanceOf	External !		NO!
└	transfer	External !	🛑	NO!
└	allowance	External !		NO!
└	approve	External !	🛑	NO!
└	transferFrom	External !	🛑	NO!
Ownable	Implementation	Context		
└	<Constructor>	Public !	🛑	NO!
└	owner	Public !		NO!
└	renounceOwnership	Public !	🛑	onlyOwner
IUniswapV2Factory	Interface			
└	createPair	External !	🛑	NO!
IUniswapV2Router02	Interface			
└	swapExactTokensForETHSupportingFeeOnTransferTokens	External !	🛑	NO!
└	factory	External !		NO!
└	WETH	External !		NO!
└	addLiquidityETH	External !	💵	NO!

SEEDEX	Implementation	Context, IERC20, Ownable		
└	<Constructor>	Public ❗	🛑	NO❗
└	name	Public ❗		NO❗
└	symbol	Public ❗		NO❗
└	decimals	Public ❗		NO❗
└	totalSupply	Public ❗		NO❗
└	balanceOf	Public ❗		NO❗
└	transfer	Public ❗	🛑	NO❗
└	allowance	Public ❗		NO❗
└	approve	Public ❗	🛑	NO❗
└	transferFrom	Public ❗	🛑	NO❗
└	_approve	Private 🔐	🛑	
└	_transfer	Private 🔐	🛑	
└	_minimum	Private 🔐		
└	_sendETHToFee	Private 🔐	🛑	
└	_swapTokensForEth	Private 🔐	🛑	lockTheSwap
└	createPair	External ❗	🛑	onlyOwner
└	removeLimits	External ❗	🛑	onlyOwner
└	setBT	External ❗	🛑	onlyOwner
└	setST	External ❗	🛑	onlyOwner
└	openTrading	External ❗	🛑	onlyOwner
└	clearStuckETH	External ❗	🛑	onlyOwner
└	<Receive Ether>	External ❗	💸	NO❗

INHERITANCE GRAPH



MANUAL REVIEW

Identifier	Definition	Severity
CEN-01	Centralized privileges	Medium 🟡
CEN-01-01	Privileged role has authority to create pair and open initial trade	

Important `onlyOwner` centralized privileges are listed below:

```
renounceOwnership
createPair
removeLimits
setBT
setST
openTrading
clearStuckETH
```


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

Seedex team has renounced token ownership.

Identifier	Definition	
COD-00	Initial token characteristics and parameters	

```
uint256 private _initBT             = 25;
uint256 private _initST             = 27;
uint256 private _endBT              = 10;
uint256 private _endST              = 25;
uint256 private _reduceBTThreshold  = 30;
uint256 private _reduceSTThreshold  = 45;
uint256 private _manageSwapThreshold= 40;
uint256 private _buyTransactionCount= 0;

// ----------------------
// Token Characteristics
// ----------------------
uint8 private constant _decimals    = 9;
uint256 private constant _tTotal    = 10000000 * 10**_decimals;
string private constant _name       = unicode"SEEDEX";
string private constant _symbol     = unicode"SEE";

// ----------------------
// Limits & Thresholds
// ----------------------
uint256 public _maxTx           = 100000 * 10**_decimals;
uint256 public _maxWallet       = 100000 * 10**_decimals;
uint256 public _tSwapThreshold  = 10000 * 10**_decimals;
uint256 public _maxTSwap        = 100000 * 10**_decimals;
```

NOTE

Smart contract ownership is renounced. Most transactional limits and constraints are removed.

Identifier	Definition	Severity
CEN-02	Initial token allocation	Minor

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    = 10000000 * 10**_decimals;
    emit Transfer(address(0), _msgSender(), _tTotal);
```


RECOMMENDATION

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

RESOLUTION

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

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 functions are called without setting restrictions on slippage or minimum output:

```
swapExactTokensForETHSupportingFeeOnTransferTokens
addLiquidityETH
```


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. Seedex team commented that, most EVM chains are prone to some sort of front-running and external manipulation.

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.

RESOLUTION

Timestamp of the block is not being used to generate random numbers, or calculate chances.

Identifier	Definition	Severity
COD-10	Direct and indirect dependencies	Unknown

Smart contract is interacting with third party protocols e.g., DEX routers, external contracts, web3 applications, *OpenZeppelin* upgradeable and ERC20 libraries. The scope of the audit treats these entities as black boxes and assumes their functional correctness. However, in the real world, all of them can be compromised, and exploited. Moreover, upgrades in these entities 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

Seedex team will inspect third party dependencies regularly, and push upgrades whenever required.

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.

CONFIDENTIALITY

This report is subject to the terms and conditions (including without limitations, description of services, confidentiality, disclaimer and limitation of liability) outlined in the scope of the audit provided to the client. This report should not be transmitted, disclosed, referred to, or relied upon by any individual for any purpose without InterFi Network's prior written consent.

NO FINANCIAL ADVICE

This audit report does not indicate the endorsement of any particular project or team, nor guarantees its security. No third party should rely on the reports in any way, including to make any decisions to buy or sell a product, service or any other asset. The information provided in this report does not constitute investment advice, financial advice, trading advice, or any other sort of advice and you should not treat any of the report's content as such. This audit report should not be used in any way

to make decisions around investment or involvement. This report in no way provides investment advice, nor should be leveraged as investment advice of any sort.

FOR AVOIDANCE OF DOUBT, SERVICES, INCLUDING ANY ASSOCIATED AUDIT REPORTS OR MATERIALS, SHALL NOT BE CONSIDERED OR RELIED UPON AS ANY FORM OF FINANCIAL, TAX, LEGAL, REGULATORY, OR OTHER ADVICE.

TECHNICAL DISCLAIMER

ALL SERVICES, AUDIT REPORTS, SMART CONTRACT AUDITS, OTHER MATERIALS, OR ANY PRODUCTS OR RESULTS OF THE USE THEREOF ARE PROVIDED "AS IS" AND "AS AVAILABLE" AND WITH ALL FAULTS AND DEFECTS WITHOUT WARRANTY OF ANY KIND. TO THE MAXIMUM EXTENT PERMITTED UNDER APPLICABLE LAW, INTERFI NETWORK HEREBY DISCLAIMS ALL WARRANTIES, WHETHER EXPRESSED, IMPLIED, STATUTORY, OR OTHERWISE WITH RESPECT TO SERVICES, AUDIT REPORT, OR OTHER MATERIALS. WITHOUT LIMITING THE FOREGOING, INTERFI NETWORK SPECIFICALLY DISCLAIMS ALL IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, TITLE AND NON-INFRINGEMENT, AND ALL WARRANTIES ARISING FROM THE COURSE OF DEALING, USAGE, OR TRADE PRACTICE.

WITHOUT LIMITING THE FOREGOING, INTERFI NETWORK MAKES NO WARRANTY OF ANY KIND THAT ALL SERVICES, AUDIT REPORTS, SMART CONTRACT AUDITS, OR OTHER MATERIALS, OR ANY PRODUCTS OR RESULTS OF THE USE THEREOF, WILL MEET THE CLIENT'S OR ANY OTHER INDIVIDUAL'S REQUIREMENTS, ACHIEVE ANY INTENDED RESULT, BE COMPATIBLE OR WORK WITH ANY SOFTWARE, SYSTEM, OR OTHER SERVICES, OR BE SECURE, ACCURATE, COMPLETE, FREE OF HARMFUL CODE, OR ERROR-FREE.

TIMELINESS OF CONTENT

The content contained in this audit report is subject to change without any prior notice. InterFi Network does not guarantee or warrant the accuracy, timeliness, or completeness of any report you access using the internet or other means, and assumes no obligation to update any information following the publication.

LINKS TO OTHER WEBSITES

This audit report provides, through hypertext or other computer links, access to websites and social accounts operated by individuals other than InterFi Network. Such hyperlinks are provided for your reference and convenience only and are the exclusive responsibility of such websites' and social accounts' owners. You agree that InterFi Network is not responsible for the content or operation of such websites and social accounts and that InterFi Network shall have no liability to you or any other person or entity for the use of third-party websites and social accounts. You are solely responsible for determining the extent to which you may use any content at any other websites and social accounts to which you link from the report.

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.

Website: https://interfi.network

Email: hello@interfi.network

GitHub: https://github.com/interfinetwork

Telegram (Engineering): https://t.me/interfiaudits

Telegram (Onboarding): https://t.me/interfisupport

interfinetwork

hello@interfi.network

https://interfi.network

SMART CONTRACT AUDITS | SOLIDITY DEVELOPMENT AND TESTING

RELENTLESSLY SECURING PUBLIC AND PRIVATE BLOCKCHAINS