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SMART CONTRACT SECURITY AUDIT

KsfSwap Finance

August, 2021

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Disclaimer

This is a comprehensive report based on our automated and manual examination of cybersecurity vulnerabilities and framework flaws. We took into consideration smart contract based algorithms, as well. Reading the full analysis report is essential to build your understanding of project's security level. It is crucial to take note, though we have done our best to perform this analysis and report, that you should not rely on the our research and cannot claim what it states or how we created it. Before making any judgments, you have to conduct your own independent research. We will discuss this in more depth in the following disclaimer - please read it fully.

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Security analysis is based only on the smart contracts. No applications or operations were reviewed for security. No product code has been reviewed.

Procedure

Our analysis contains following steps:

1. Project Analysis;

2. Manual analysis of smart contracts:
- Deploying smart contracts on any of the network(Ropsten/Rinkeby) using Remix IDE
- Hashes of all transaction will be recorded
- Behaviour of functions and gas consumption is noted, as well.

3. Unit Testing:
- Smart contract functions will be unit tested on multiple parameters and under multiple conditions to ensure that all paths of functions are functioning as intended.
- In this phase intended behaviour of smart contract is verified.
- In this phase, we would also ensure that smart contract functions are not consuming unnecessary gas.
- Gas limits of functions will be verified in this stage.

4. Automated Testing:
- Mythril
- Oyente
- Manticore
- Solgraph

Terminology

We categorize the finding into 4 categories based on their vulnerability:

- Low-severity issue — less important, must be analyzed
- Medium-severity issue — important, needs to be analyzed and fixed
- High-severity issue —important, might cause vulnerabilities, must be analyzed and fixed
- Critical-severity issue —serious bug causes, must be analyzed and fixed.

Limitations

The security audit of Smart Contract cannot cover all vulnerabilities. Even if no vulnerabilities are detected in the audit, there is no guarantee that future smart contracts are safe. Smart contracts are in most cases safeguarded against specific sorts of attacks. In order to find as many flaws as possible, we carried out a comprehensive smart contract audit. Audit is a document that is not legally binding and guarantees nothing.

Token Contract Details for 22.08.2021

Contract Name: **KsfSwapFactory, KsfSwapRouter**

Deployer address: **0x60c48b5232a43306c16d492cf1562c7398518170, 0x81148af4a2c4a4857cc56fabec83b672fc073888**

Token Tracker: **KSF**

Decimals: **18**

Token holders: **188**

Transactions count: **40,579**

Top 100 holders dominance: **100%**

Contract deployer address: **0x60c48b5232a43306c16d492cf1562c7398518170, 0x81148af4a2c4a4857cc56fabec83b672fc073888**

Audit Details

Project Name: **KsfSwap Finance**

Language: **Solidity**

Blockchain: **Kucoin Community Chain**

Project Website: **ksfswap.finance**

KSF Top 10 Holders

Rank	Address	Number of Transactions	Amount	Percentage
1	burn-address	2	840,765.3493157032 KSF	78.95%
2	0xc25830cc6ace29e5dedfab773da64…	1	100,000 KSF	9.39%
3	0x092c51b4736dee895eb5b64892dc8…	2,222	50,171.61024512523 KSF	4.71%
4	0x9d5da4b9968376b333263f6202bde…	141	17,092.406471186629 KSF	1.61%
5	0x3d15ac92c270b9c3c3bec77fb1f0f…	11,434	17,033.784030400352 KSF	1.60%
6	0x24806dc6bfe905292093e095d7d70…	116	11,150.927616608989 KSF	1.05%
7	0xcde3aa78955023408bf859105795c…	2,218	5,323.076816592039 KSF	0.50%
8	0xd1986c80cac4dd55add6c4b30d19b…	3,189	3,690.4880847403593 KSF	0.35%
9	0xa94d08724261978cb7d375a831732…	26,917	3,593.851931641218 KSF	0.34%
10	0xf9cfabd904bfd807772bd5cf98020…	4,282	3,113.2545567867976 KSF	0.29%

Contract Function Details

+ [Int] IKsfSwapFactory
- [Ext] feeTo
- [Ext] feeToSetter
- [Ext] getPair
- [Ext] allPairs
- [Ext] allPairsLength
- [Ext] createPair #
- [Ext] setFeeTo #
- [Ext] setFeeToSetter #

+ [Int] IKsfSwapPair
- [Ext] name
- [Ext] symbol
- [Ext] decimals
- [Ext] totalSupply
- [Ext] balanceOf
- [Ext] allowance
- [Ext] approve #
- [Ext] transfer #
- [Ext] transferFrom #
- [Ext] DOMAIN_SEPARATOR
- [Ext] PERMIT_TYPEHASH
- [Ext] nonces
- [Ext] permit #
- [Ext]_LIQUIDITY
- [Ext] factory
- [Ext] token0
- [Ext] token1
- [Ext] getReserves
- [Ext] price0CumulativeLast
- [Ext] price1CumulativeLast
- [Ext] kLast
- [Ext] mint
- [Ext] burn #
- [Ext] swap #
- [Ext] skim #
- [Ext] sync #
- [Ext] initialize #

+ [Int] IKsfSwapPair
- [Ext] name
- [Ext] symbol

- [Ext] decimals
- [Ext] totalSupply
- [Ext] balanceOf
- [Ext] allowance
- [Ext] approve #
- [Ext] transfer #
- [Ext] transferFrom #
- [Ext] DOMAIN_SEPARATOR
- [Ext] PERMIT_TYPEHASH
- [Ext] nonces
- [Ext] permit #

+ [Lib] SafeMath
- [Int] add
- [Int] sub
- [Int] mul

+ KsfSwapERC20 is IKsfSwapERC20
- [Int] _mint
- [Int] _burn
- [Int] _approve
- [Int] _transfer
- [Ext] approve
- [Ext] transfer
- [Ext] transferFrom
- [Ext] permit

+ [Lib] Math
- [Int] min
- [Int] sqrt

+ [Lib] UQ112x112
- [Int] encode
- [Int] uqdiv

+ [Int] IERC20
- [Ext] name
- [Ext] symbol
- [Ext] decimals
- [Ext] totalSupply
- [Ext] balanceOf
- [Ext] allowance
- [Ext] approve
- [Ext] transfer
- [Ext] transferFrom

+ [Int] IKsfSwapCallee
- [Ext] ksfswapCall

+ KsfSwapPair is IKsfSwapPair, KsfSwapERC20
- [Pub] getReserves
- [Prv] _safeTransfer
- [Ext] initialize
- [Prv] _update
- [Prv] _mintFee
- [Ext] mint
- [Ext] burn
- [Ext] swap
- [Ext] skim
- [Ext] sync

+ KsfSwapFactory is IKsfSwapFactory
- [Ext] allPairsLength
- [Ext] createPair
- [Ext] setFeeTo
- [Ext] setFeeToSetter

+ [Lib] TransferHelper
- [Int] safeApprove
- [Int] safeTransferFrom
- [Int] safeTransferETH
- [Int] safeTransfer

+ [Int] IKsfSwapRouter01
- [Ext] factory
- [Ext] WETH
- [Ext] addLiquidity #
- [Ext] addLiquidityETH ($)
- [Ext] removeLiquidity #
- [Ext] removeLiquidityETH #
- [Ext] removeLiquidityWithPermit #
- [Ext] removeLiquidityETHWithPermit #
- [Ext] swapExactTokensForTokens #
- [Ext] swapTokensForExactTokens #
- [Ext] swapExactETHForTokens ($)
- [Ext] swapTokensForExactETH #
- [Ext] swapExactTokensForETH #
- [Ext] swapETHForExactTokens ($)
- [Ext] quote
- [Ext] getAmountOut
- [Ext] getAmountIn

- [Ext] getAmountsOut
- [Ext] getAmountsIn

+ [Int] IKsfSwapRouter02 is IKsfSwapRouter01
- [Ext] removeLiquidityETHSupportingFeeOnTransferTokens #
- [Ext] removeLiquidityETHWithPermitSupportingFeeOnTransferTokens #
- [Ext] swapExactTokensForTokensSupportingFeeOnTransferTokens #
- [Ext] swapExactETHForTokensSupportingFeeOnTransferTokens ($)
- [Ext] swapExactTokensForETHSupportingFeeOnTransferTokens #

+ [Lib] KsfSwapLibrary
- [Int] sortTokens
- [Int] pairFor
- [Int] getReserves
- [Int] quote
- [Int] getAmountOut
- [Int] getAmountIn
- [Int] getAmountsOut
- [Int] getAmountsIn

+ [Int] IWETH
- [Ext] deposit $
- [Ext] transfer
- [Ext] withdraw

+ KsfSwapRouter is IKsfSwapRouter02
- [Int] _addLiquidity
- [Ext] addLiquidity #
- [Ext] addLiquidityETH ($)
- [Pub] removeLiquidity #
- [Pub] removeLiquidityETH #
- [Ext] removeLiquidityWithPermit #
- [Ext] removeLiquidityETHWithPermit #
- [Int] _swap
- [Ext] swapExactTokensForTokens #
- [Ext] swapTokensForExactTokens #
- [Ext] swapExactETHForTokens ($)
- [Ext] swapTokensForExactETH #
- [Ext] swapExactTokensForETH #
- [Ext] swapETHForExactTokens ($)
- [Pub] quote
- [Pub] getAmountOut
- [Pub] getAmountIn
- [Pub] getAmountsOut
- [Pub] getAmountsIn

- [Pub] removeLiquidityETHSupportingFeeOnTransferTokens #
- [Ext] removeLiquidityETHWithPermitSupportingFeeOnTransferTokens #
- [Ext] swapExactTokensForTokensSupportingFeeOnTransferTokens #
- [Ext] swapExactETHForTokensSupportingFeeOnTransferTokens ($)
- [Ext] swapExactTokensForETHSupportingFeeOnTransferTokens #

($) = payable function
= non-constant function

Vulnerabilities checking

Issue Description	Checking Status
Compiler Errors	Completed
Delays in Data Delivery	Completed
Re-entrancy	Completed
Transaction-Ordering Dependence	Completed
Timestamp Dependence	Completed
Shadowing State Variables	Completed
DoS with Failed Call	Completed
DoS with Block Gas Limit	Completed
Outdated Complier Version	Low-issues
Assert Violation	Completed
Use of Deprecated Solidity Functions	Completed
Integer Overflow and Underflow	Completed
Function Default Visibility	Completed
Malicious Event Log	Completed
Math Accuracy	Completed
Design Logic	Completed
Fallback Function Security	Completed
Cross-function Race Conditions	Completed
Safe Zeppelin Module	Completed

Security Issues

1) Outdated complier version issue:

The ABI specification uses pointers to data areas for everything that is dynamically-sized. Fixed in Solidity ^0.8.4.

2) Dynamic Array Cleanup issue:

When assigning a dynamically-sized array with types of size at most 16 bytes in storage causing the assigned array to shrink, some parts of deleted slots were not zeroed out. Fixed in version > 0.7.3.

Conclusion

Smart contracts are free from any critical or high-severity issues.

NOTE: Please check the disclaimer above and note, that audit makes no statements or warranties on business model, investment attractiveness or code sustainability.