

Security Assessment **ZKELON**

Vital Block Verified on June 21ST, 2023





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INTRODUCTION

Auditing Company	VITAL BLOCK SECURITY
Client Project	ZKELON
Methodology	Automated Analysis, Manual Code Review
Zksolc Version	v1.3.9
Compiler Version	0.8.9
Contract Address	0xecAE5905A3F13eBEAfAb243D409423e223F4cCd7
Network	ZKSYNC CHAIN
Token Type	ERC20
Website	https://zkelon.com/
Telegram	https://t.me/zk_elon
Twitter	https://twitter.com/zk_elon
Discord	https://discord.gg/qaWebwDsZA
Medium	https://medium.com/@zkelon
Github	https://github.com/zkelon
Prelim Report Date	June 20 th , 2023
Final Report Date	June 21 ST , 2023

i Verify the authenticity of this report on our GitHub Repo: https://www.github.com/vital-block





EXECUTIVE SUMMARY

Vital Block has performed the automated and manual analysis of the ZKELON.Sol code. The code was reviewed for common contract vulnerabilities and centralized exploits. Here's a quick audit summary:

Status	Critical !	Major " 🛑	Medium # 🛑	Minor \$	Unknown %
Open	0	0	0	2	0
Acknowledged	0	0	1	2	0
Resolved	0	0	0	0	0
Noteworty OnlyOwner Privileges Set Taxes and Ratios, Airdrop, Set Protection Settings, Set Reward Properties, Set Reflector Settings, Set Swap Settings, Set Pair and Router					ard Properties,

ZKELON Smart contract has achieved the following score: 92.5



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.





SCOPE OF WORK

Vital Block was consulted by ZKELON to conduct the smart contract audit of its .Sol source code. <u>The audit scope of work is strictly limited to mentioned .SOL file only:</u>

O ZKELON.Sol

External contracts and/or interfaces dependencies are not checked due to being out of scope.

Verify audited contract's contract address and deployed link below:

Public Contract.

0xecAE5905A3F13eBEAfAb243D409423e223F4cCd7

Contract Name	zkELON
Token Symbol	ZKELON
Total Supply	1,000,000,000
Blockchain	ZKSYNC CHAIN





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 Vital Block 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:

	 Token Supply Manipulation
	 Access Control and Authorization
	 Assets Manipulation
Centralized Exploits	Ownership Control
ocitianzed Explois	o Liquidity Access
	○ Stop and Pause Trading
	Ownable Library Verification





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

Common Contract Vulnerabilities

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

PUBLISH

o 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

Smart contracts are generally designed to hold, approve, and transfer tokens. This makes them very tempting attack targets. 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 here for the reader to review:

Risk Type	Definition
Critical !	These risks could be exploited easily and can lead to asset loss, data loss, asset, or data manipulation. They should be fixed right away.
Major "	These risks are hard to exploit but very important to fix, they carry an elevated risk of smart contract manipulation, which can lead to high-risk severity.
Medium #	These risks should be fixed, as they carry an inherent risk of future exploits, and hacks which may or may not impact the smart contract execution. Low-risk reentrancy-related vulnerabilities should be fixed to deterexploits.
Minor \$	These risks do not pose a considerable risk to the contract or those who interact with it. They are code-style violations and deviations from standard practices. They should be highlighted and fixed nonetheless.
Unknown %	These risks pose uncertain severity to the contract or those who interact with it. They should be fixed immediately to mitigate the riskuncertainty.

All statuses which are identified in the audit report are categorized here for the reader to review:

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:

- o 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.

- o The client can lower centralization-related risks by implementing below mentioned practices:
- o 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.
- o Renouncing the contract ownership, and privileged roles.
- o Remove functions with elevated centralization risk.
- Understand the project's initial asset distribution. Assets in the liquidity pair should be locked.

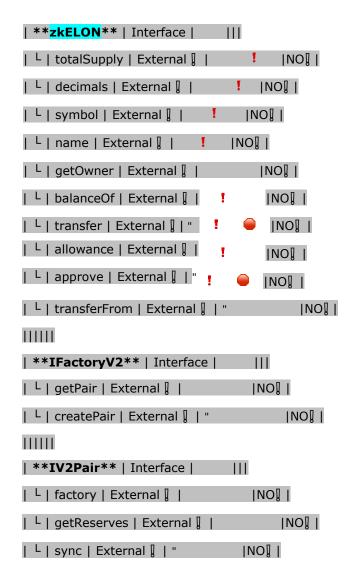
 Assets outside the liquidity pair should be locked with a release schedule.





AUTOMATED ANALYSIS

Symbol	Definition
<u> </u>	Function modifies state
#	Function is payable
Şì	Function is internal
8	Function is private
	Function is important







```
\Pi\Pi\Pi\Pi
| **IRouter01** | Interface | | | | | | | | | | | | |
| L | factory | External | | NO | |
| L | ETH | External [ | | | | | | | | | | | |
| L | addLiquidityETH| External [ | # |NO[ |
I L | addLiquidity | External | | " | NO| |
| L | swapExacETHForTokens | External | | # |NO|| | | | | | | | |
| L | getAmountsOut | External | | | | | | | | | | | | |
| L | getAmountsIn | External | | NO| |
111111
| **IRouter02** | Interface | IRouter01 |||
| L | swapExactTokensForETHSupportingFeeOnTransferTokens | External | | | "
                                                                                INO] I
L | swapExactETHForTokensSupportingFeeOnTransferTokens | External | | # |NO| |
| L | swapExactTokensForTokensSupportingFeeOnTransferTokens | External | | "
                                                                               ■ INOI I
| L | swapExactTokensForTokens | External | | " | NO | |
\Pi\Pi\Pi\Pi
| **Protections** | Interface | | | |
| L | checkUser | External | | "
      | L | setLaunch | External | | " | NO | |
                    | External | | " | INO | |
| L | setLpPair
| L | ZKELON
                      | External | | " | NO | |
| L | removeSniper | External | | " | NO | |
\Pi\Pi\Pi\Pi
| **Cashier** | Interface | | | |
| L | setRewardsProperties | External | | "
                                                 INOI
| L | tally
            | External | | " | NO | |
| L | load
           | External | | # |NO|| | |
| L | cashout | External [ | " | NO[ |
| L | giveMeWelfarePlease | External | | " | NO | |
| L | getTotalDistributed | External | | NO | |
| L | getUserInfo | External | | NO | |
| L | getUserRealizedRewards | External | |
                                                 INOI
```





```
| L | getPendingRewards | External | | NO | |
| L | initialize | External [ | " | NO[ |
| L | getCurrentReward | External | | NO| |
\Pi\Pi\Pi\Pi
| **ETH** | Implementation | SafeMath ||| | |
| L | <Constructor> | Public | | # |NO| |
| L | transferOwner | External | | " | onlyOwner |
| L | renounceOwnership | External | | " | NO!
| L | setOperator | Public [ | " | NO[ |
| L | renounceOriginalDeployer | External | | "
                                              INOI
| L | <Receive Ether> | External [ | # |NO[ | |
| L | totalSupply | External [ | | NO[ |
| L | decimals | External | | NO| |
| L | name | External | | NO | |
                              INO] I
| L | getOwner | External ] |
                             INOI
| L | balanceOf | Public | |
                               INO] I
| L | allowance | External [ |
                              INOI
| L | approve | External | | "
| L | approve | Internal $ | " | | | |
| L | transfer | External | | " | NO | |
| L | transferFrom | External [ | " | NO[ |
| L | setNewRouter | External [ | " | onlyOwner |
| L | setLpPair | External | | " | onlyOwner |
| L | setInitializers | External | | " | onlyOwner |
| L | isExcludedFromFees | External | | NO| |
| L | isExcludedFromDividends | External | | NO | |
| L | isExcludedFromProtection | External | | NO | |
| L | setDividendExcluded
                        | Public | | " | onlyOwner |
| L | setExcludedFromFees
                        | Public 🛛 | "
                                      | onlyOwner |
```





GZT-02 POSSIBLE OVERFLOW

Category	Severity •	Location	Status
Status Mathematical Operations	Minor	contracts/code/ZKELON.sol	Acknowledged

Description

In **updateForMinter**, the following equation is used inside an unchecked block

Mint function: ZkELON.mint(address,uint256) (zkELON.sol 13-15) - in internal call: _mint(to,amount) - In expression: _balances[account] += amount

Minter can issue more **ZKELON** tokens indefinitely.

Note that as of the date of publishing, the above review reflects the current understanding of known security patterns as they relate to the ZKELON contract.

Recommendation

We recommend either checking for overflow in this case, or ensuring that the PairsIn is close enough it will never cause an overflow.





Identifier	Definition	Severity
CEN-02	Initial asset distribution	Minor 🏐

Blacklisted function: ERC20Upgradeable.increaseAllowance(address,uint256) (ERC20Upgradeable.sol#186-190) - in internal call: TokenERC20._msgSender() (TokenERC20.sol#272-280) - in expression _trustedForwarder[forwarder]

Description:

Blacklist Floating point can vary across different architectures.

Recommendation: Replace with sdk.Dec. (Wallets can not be blacklisted from being able to transfer, swap or sell this token)

Alleviation:

This exhibit was acknowledged and ultimately discarded by the **ZKELON**" team due to low severity. We consider the exhibit fully attended to as it doesn't impose any meaningful security concerns.

RECOMMENDATION

Project stakeholders should be consulted during the initial asset distribution process.



Vulnerability Run check

Risk Analysis

Contract source code verified

This token contract is open source. You can check the contract code for details. Unsourced token contracts are likely to have malicious functions to defraud their users of their assets.

No mint function

Mint function is transparent or non-existent. Hidden mint functions may increase the amount of tokens in circulation and effect the price of the token.

Owner cant change balance

The contract owner does not have the authority to modify the balance of tokens at other addresses.

Honeypot Risk

This does not appear to be a honeypot

We are not aware of any code that prevents the sale of tokens.

No Anti Whale

There is no limit to the number of token transactions. The number of scam token transactions may be limited (honeypot risk).

No whitelist function

Whitelist function found

No Proxy

There is no proxy in the contract. The proxy contract means contract owner can modify the function of the token and possibly effect the price.

No function to retrieve ownership

If this function exists, it is possible for the project owner to regain ownership even after relinquishing it.



No trading cooldown

The token contract has no trading cooldown function. If there is a trading cooldown function, the user will not be able to sell the token within a certain time or block after buying.

No blacklist function

No blacklist function is included.





OPTIMIZATIONS | ZKELON

ID	Title	Category	Status
ZKE- 237	Logarithm Refinement Optimization	Gas Optimization	Acknowledged
ZKE- 423	Checks Can Be Performed Earlier	Gas Optimization	Acknowledged
ZKE- 502	Unnecessary Use Of SafeMath	Gas Optimization	• Acknowledged
ZKE- 522	Struct Optimization	Gas Optimization	• Acknowledged
ZKE- 667	Unused State Variable	Gas Optimization	• Acknowledged





General Detectors

Public Functions Should be Declared External

Some functions in this contract should be declared as external in order to save gas.



Numeric Notation Best Practices

The numeric notation used in this contract is unconventional, possibly worsening the reading/debugging experience



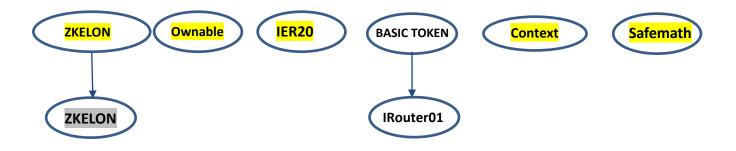
- No compiler version inconsistencies found
- No unchecked call responses found
- No vulnerable self-destruct functions found
- No assertion vulnerabilities found
- No old solidity code found
- No external delegated calls found
- ✓ No external call dependency found
- No vulnerable authentication calls found
- No invalid character typos found
- No RTL characters found
- No dead code found
- No risky data allocation found
- No uninitialized state variables found
- No uninitialized storage variables found
- No vulnerable initialization functions found
- No risky data handling found
- No number accuracy bug found
- No out-of-range number vulnerability found
- No map data deletion vulnerabilities found

- No tautologies or contradictions found
- No faulty true/false values found
- No innacurate divisions found
- No redundant constructor calls found
- No vulnerable transfers found
- No vulnerable return values found
- No uninitialized local variables found
- No default function responses found
- No missing arithmetic events found
- No missing access control events found
- No redundant true/false comparisons found
- No state variables vulnerable through function calls found
- No buggy low-level calls found
- No expensive loops found
- No bad numeric notation practices found
- ✓ No missing constant declarations found
- No missing external function declarations found
- No vulnerable payable functions found
- No vulnerable message values found





INHERITANCE GRAPH



Identifier	Definition	Severity
CEN-12	Centralization privileges of ZKELON	Medium # 🛑

Vulnerability 0 : No important security issue detected.

Threat level: Low





MANUAL REVIEW

ZKELON: is a community-driven meme token on ZkSync. The team is dedicated to ensuring the project's success and fostering a vibrant community of token holders..

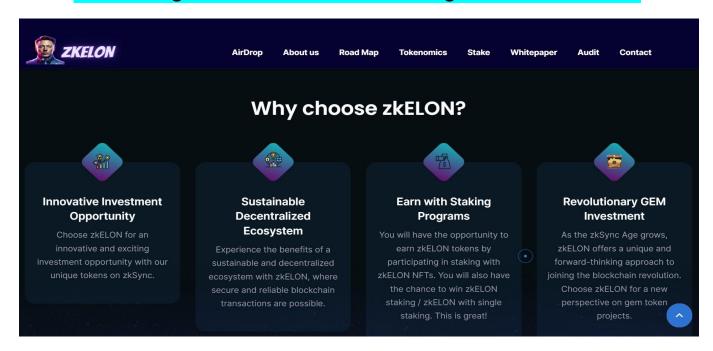
ARBISHIELD: ZKELON

Ticker: ZKELON

Total Supply: 1,000,000,000,000 Chain/Standard: ZKSYNC Network



Outstanding Features of ZKELON Launching On ZKSYNC Network









issues checking status

Issue Description Checking Status

1.	Compiler errors.	PASSED
2.	Race Conditions and reentrancy. Cross-Function Race Conditions.	PASSED
3.	Possible Delay In Data Delivery.	PASSED
4.	Oracle calls.	PASSED
5.	Front Running.	PASSED
6.	Sol Dependency.	PASSED
7.	Integer Overflow And Underflow.	PASSED
8.	DoS with Revert.	PASSED
9.	Dos With Block Gas Limit.	PASSED
10.	Methods execution permissions.	PASSED
11.	Economy Model of the contract.	PASSED
12.	The Impact Of Exchange Rate On the solidity Logic.	PASSED
13.	Private use data leaks.	PASSED
14.	Malicious Event log.	PASSED
15.	Scoping and Declarations.	PASSED
16.	Uninitialized storage pointers.	PASSED
17.	Arithmetic accuracy.	PASSED
18.	Design Logic.	PASSED
19.	Cross-Function race Conditions	PASSED
20.	Save Upon solidity contract Implementation and Usage.	PASSED
21.	Fallback Function Security	PASSED





Vulnerability Scan

REENTRANCY

Severity Major

Confidence Parameter Certain

Vulnerability Description

NOTE: In a re-entrance attack, a malicious contract calls back into the calling contract before the first invocation of the function is finished. This may cause the different invocations of the function to interact in undesirable ways, especially in cases where the function is updating state variables after the external calls.

Scanning Line:

```
function _burn(address account, uint256 amount)
internal virtual {
        require(account != address(0), "ERC20: burn
rom the zero address");
         beforeTokenTransfer(account, address(0),
amount);
        uint256 accountBalance = _balances[account];
        require(accountBalance >= amount, "ERC20:
burn amount exceeds balance");
        unchecked {
             balances[account] = accountBalance -
amount;
            // Overflow not possible: amount <=</pre>
accountBalance <= totalSupply.</pre>
             _totalSupply -= amount;
        emit Transfer(account, address(0), amount);
         afterTokenTransfer(account, address(0),
amount);
```



Repository:

https://github.com/ZKELON

All Audited Files

ZKELON.sol

Contract Owner

0xe570330547b6cc083c199ef089d9747c33f357c0

Creator Tnx Hash

0xff28f3ceccd39a45c33f52192ef0b42290101db5fbca4a9039f6b83db61e301e

Contracts:

Contract:

TOKEN: 0xecAE5905A3F13eBEAfAb243D409423e223F4cCd7





Identifier	Definition	Severity
CEN-02	Initial asset distribution	Minor 🌑



```
Different versions of Solidity is used:
- Version used: ['^0.8.0', '^0.8.9']
- ^0.8.0 (Ownable.sol#4)
- ^0.8.0 (ERC20.sol#4)
- ^0.8.0 (IERC20.sol#4)
- ^0.8.0 (ERC20Burnable.sol#4)
- ^0.8.0 (IERC20Metadata.sol#4)
- ^0.8.0 (Context.sol#4)
- ^0.8.9 (zkELON.sol#2)
```

Description:

This contract may not function as expected due to inconsistent solidity compiler versions being specified

Alleviation:

This exhibit was acknowledged and ultimately discarded by the **ZKELON** team due to low severity. We consider the exhibit fully attended to as it doesn't impose any meaningful security concerns.

RECOMMENDATION

Project stakeholders should be consulted during the initial asset distribution process.





RECOMMENDATION

Deployer and/or contract owner private keys are secured carefully.

Please refer to PAGE-09 CENTRALIZED PRIVILEGES for a detailed understanding.

ALLEVIATION

ZKELON project team understands the centralization risk. Some functions are provided privileged access to ensure a good runtime behaviour in the project





Identifier	Definition	Severity
COD-10	Third Party Dependencies	Minor 🌑

A smart contract is interacting with third-party protocols e.g., Uniswap, Pancakeswap router, cashier contract,

And protections contract. 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 and validate third party dependencies regularly, and mitigate severe impacts whenever necessary.





CERTIFICATE BY VITAL BLOCK SECURITY









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Vital Block Security provides the easy-to-understand audit of Solidity, Move, and Raw 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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casual contributors.

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