



# Security Assessment zkSwap Finance

Vital Block **Verified** on June 30<sup>TH</sup>, 2023

 @Vital-Block

 @VB\_Audit

 info@vitalblock.org




 www.vitalblock.org



PREPARED FOR:  
zkSwap Finance



## INTRODUCTION

Auditing Company	 <b>VITAL BLOCK SECURITY</b>
Client Project	 <b>ZKSWAP FINANCE</b>
Methodology	Automated Analysis, Manual Code Review
Language	Solidity
License	MIT
Contracts Address	<b>ZFFactory:</b> 0x3a76e377ED58c8731F9DF3A36155942438744Ce3 <b>ZFRouter:</b> 0x18381c0f738146Fb694DE18D1106BdE2BE040Fa4
Network	 <b>ZKSYNC ERA</b>
Compiler Version	0.8.16
Zksolc Version	v1.3.8
Website	<a href="https://zkswap.finance/">https://zkswap.finance/</a>
Telegram	<a href="https://t.me/zkSwap_Announcement">https://t.me/zkSwap_Announcement</a>
Twitter	<a href="https://twitter.com/zkSwap_finance">https://twitter.com/zkSwap_finance</a>
Discord	<a href="https://discord.gg/4eHMumaJDA">https://discord.gg/4eHMumaJDA</a>
Doc	<a href="https://zkswapfinance.gitbook.io/zkswap/">https://zkswapfinance.gitbook.io/zkswap/</a>
Prelim Report Date	June 28 <sup>TH</sup> 2023
Final Report Date	June 30 <sup>th</sup> 2023



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

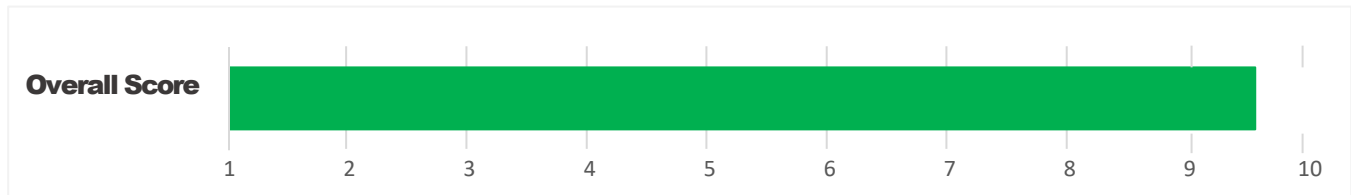



## EXECUTIVE SUMMARY

Vital Block has performed the automated and manual analysis of the ZKSWAP FINANCE 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	2	3	1
Resolved	0	0	0	0	0
Noteworthy OnlyOwner Privileges	Set Taxes and Ratios, Airdrop, Set Protection Settings, Set Reward Properties, Set Reflector Settings, Set Swap Settings, Set Pair and Router				

ZKSWAP FINANCE Smart contract has achieved the following score: **95.0**



 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 ZKSWAP FINANCE to conduct the smart contract audit of its .Sol source code. The audit scope of work is strictly limited to mentioned .SOL file only:

- O ZFFactory.Sol
- O ZFRouter.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:

**Contract Address:**

**0x3a76e377ED58c8731F9DF3A36155942438744Ce3**

**0x18381c0f738146Fb694DE18D1106BdE2BE040Fa4**

**Contract Code:** ZFFactory.Sol  
ZFRouter.Sol

**Project Name**



**ZKSWAP FINANCE**

**Blockchain**



**ZKSYNC ERA**

## 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:

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



### 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 the 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

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
<b>Critical</b> ! 	These risks could be exploited easily and can lead to asset loss, data loss, asset, or data manipulation. They should be fixed right away.
<b>Major</b> " 	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.
<b>Medium</b> # 	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 re-entrancy-related vulnerabilities should be fixed to deter exploits.
<b>Minor</b> \$ 	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.
<b>Unknown</b> % 	These risks pose uncertain severity to the contract or those who interact with it. They should be fixed immediately to mitigate the risk uncertainty.

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

Status Type	Definition
<b>Open</b>	Risks are open.
<b>Acknowledged</b>	Risks are acknowledged, but not fixed.
<b>Resolved</b>	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.**

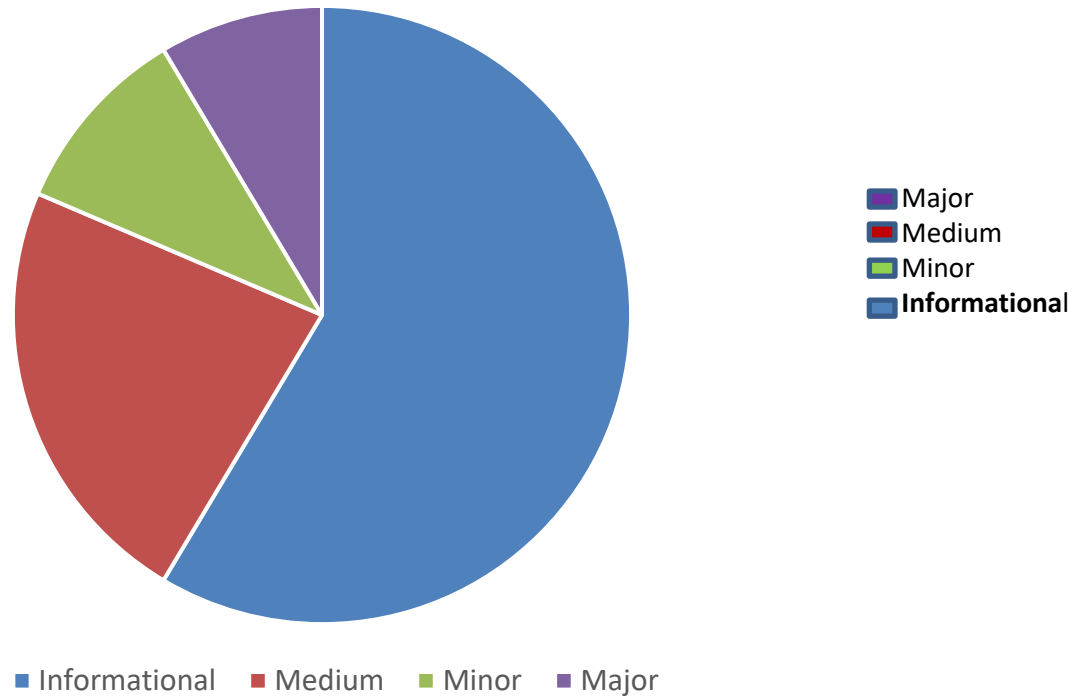
- **The client can lower centralization-related risks by implementing below mentioned practices:**
- **Privileged role's private key must be carefully secured to avoid any potential hack.**
- **Privileged role should be shared by multi-signature (multi-sig) wallets.**
- **Authorized privilege can be 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.**











## Finding Summary








## Status Icon Definitions

	Resolved		In Progress		Ignored (pro)
	Not Resolved		Incorrect		Ignored (con)

## Contract Ownership

**0x13BD7a61b46950fF0e9b41571Dc4C503eE854042** Is The Owner Of The Contracts.

## Summary

-  Owner is not able to change or set taxes
-  Owner is not able to set a max amount for buys/sells/transfer
-  Owner is not able to pause trades
-  Owner is not able to mint new tokens
-  Owner is not able to blacklist an arbitrary address

## Issues Found

Vital Block Security found that the **ZKSWAP FINANCE** contracts contain no critical issue, no major issues, and 3 minor issue, in addition to 4 informational notes.

We recommend all issues are amended, while the notes are up to the team's discretion, as it refers to best practices.



```
|||||
```

```

**IRouter01** | Interface | |||
| L | factory | External ¶ | |NO¶|
| L | ETH | External ¶ | |NO¶|
| L | addLiquidityETH | External ¶ | # |NO¶|
| L | addLiquidity | External ¶ | " |NO¶|
| L | swapExactAPTForTokens | External ¶ | # |NO¶|
| L | getAmountsOut | External ¶ | |NO¶|
| L | getAmountsIn | External ¶ | |NO¶|

```

```
|||||
```

```

**IRouter02** | Interface | IRouter01 |||
| L | swapExactTokensForETHSupportingFeeOnTransferTokens | External ¶ | " |NO¶|
| L | swapExactETHForTokensSupportingFeeOnTransferTokens | External ¶ | # |NO¶|
| L | swapExactTokensForTokensSupportingFeeOnTransferTokens | External ¶ | " ! 🔴 |NO¶|
| L | swapExactTokensForTokens | External ¶ | " |NO¶|

```

```
|||||
```

```

**Protections** | Interface | |||
| L | checkUser | External ¶ | " ! 🔴 |NO¶|
| L | setLaunch | External ¶ | " |NO¶|
| L | setLpPair | External ¶ | " |NO¶|
| L | ZFRouter | External ¶ | " |NO¶|
| L | removeSniper | External ¶ | " |NO¶|

```

```
|||||
```

```

**Cashier** | Interface | |||
| L | setRewardsProperties | External ¶ | " |NO¶|
| 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 ¶ | |NO¶|

```



```

| L | getPendingRewards | External | | | NO |
| L | initialize | External | | " | NO |
| L | getCurrentReward | External | | | NO |
|||||
| **SOL** | Implementation | SafeMath | |||
| L | <Constructor> | Public | | # | NO |
| L | transferOwner | External | | " | onlyOwner |
| L | renounceOwnership | External | | " | NO |
| L | setOperator | Public | | " | NO |
| L | renounceOriginalDeployer | External | | " | NO |
| L | <Receive Ether> | External | | # | NO |
| L | totalSupply | External | | | NO |
| L | decimals | External | | | NO |
| L | symbol | External | | | NO |
| L | name | External | | | NO |
| L | getOwner | External | | ! | NO |
| L | balanceOf | Public | | ! | NO |
| L | allowance | External | | ! | NO |
| L | approve | External | | " ! | NO |
| L | _approve | Internal | $ | " | |
| L | approveContractContingency | Public | | " ! | onlyOwner |
| 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 |

```



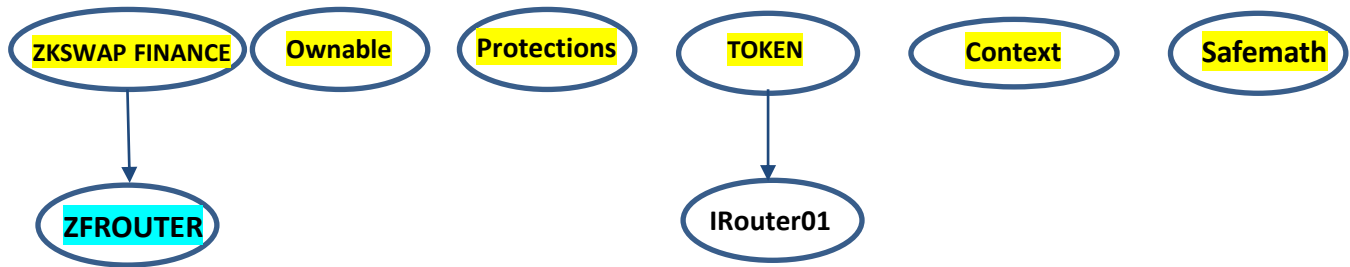
# AUDIT SCOPE

## ZKSWAP.FINANCE

ID	Repo	Comment	File	SHM211 Checksum
FTM	contracts/ZkSwapFactory.sol	cC51D65	Strings.sol	85f15802c6be0fd50f8632d8433cccc9d b6f4b39f9e566d1fa78de54b84bdr54
FRY	contracts/ZkSwapFactory.sol	cC51D53	MetadataHelper.sol	8oipppkjjk96be0fd50f8632d8433cccc9 db6f4b39f9e566d1yhhg8765ffckiuybb
FTV	contracts/ZkSwapFactory.sol	cC51D61	ERC20WithPermit.sol	3666778uj908766362fvyga98jdkl8864 8yhfbqt37409owehbgwhuyyyg223738
FML	contracts/ZkSwapFactory.sol	cC51D76	ReentrancyGuard.sol	98uuyriy399787390uhbiiuhghdg7guu 30oi7799u9359ydfgdgygeigi3ioueyy78
FTR	contracts/ZkSwapFactory.sol	cC51D22	ECDSA.sol	4566efgywqtfeuh87872t1537883798 3639293763hhegetgjfwjk89336668862
FOP	contracts/ZkSwapFactory.sol	cC51D44	IUniswapV2Callee.sol	546363ttebnve88329973mrvdsggct47 8153ytdgfdxy792635fgdjgi1900990908
FDP	contracts/ZkSwapFactory.sol	cC51D21	IERC20Permit.sol	835656990327hudbinnjnr6729dchjld0 993ytyy3vq63235727879889073
FWY	contracts/ZkSwapFactory.sol	cC51D97	ZFPair.so	cc089692343d1cc36eaf196046d7a528 d153abd55ba20e82f1d57c22fcd92675
FKB	contracts/ZkSwapRouter.sol	cC51D76	Math.sol	8448b3af42497f5f74e53424ee3e6c55 1f51356945108d22a893d608a7990542
FXY	contracts/ZkSwapRouter.sol	cC51D23	IUniswapV2Factory.sol	5c86aa1dd3889db5fcd17a80214b226f c784f268ab9db82df97c1d2459467831
FCB	contracts/ZkSwapRouter.sol	cC51D63	IZFPair.sol	b8244da33db171e5533d77bef4a3570 3df1de2cebea5f35cb38ce6a26c778cf1
FWO	contracts/ZkSwapRouter.sol	cC51D60	IWETH.sol	3d408b8f2cc56f9699a402b5151de906 71de089c3007afc9e4fc867c04152e7c
FGT	contracts/ZkSwapRouter.sol	cC51D54	IERC20Permit.sol	9d751621c3501102e4b50005ca3314ec 6e04e6ff8bbb30852d1c7edfff3f8cef
FDF	contracts/ZkSwapRouter.sol	cC51D78	ZFRouterInternal.sol	455687gfsadjknlpuihhg774580vgfxr ki9876dhgvb990lkjhde444566788
FTY	contracts/ZkSwapRouter.sol	cC51D94	IERC20Metadata.sol	566HFFertyuijdsfggtyyykhgdrst gioprduyuiyyt446789ysghn



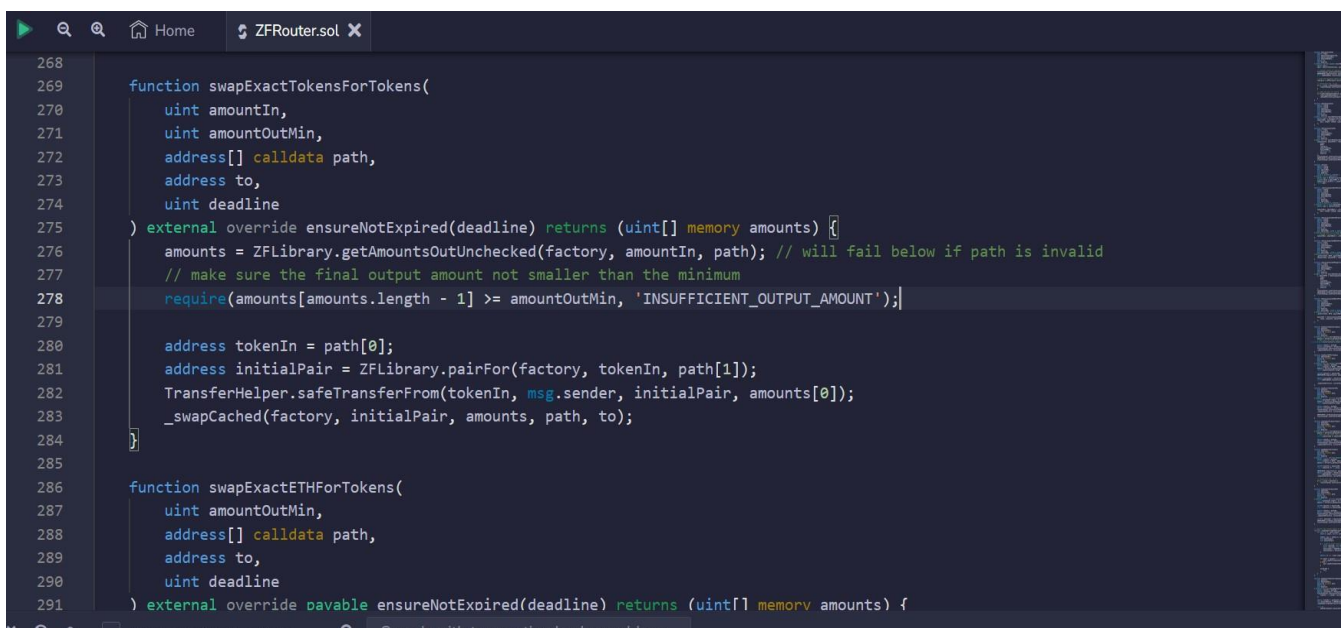
## INHERITANCE GRAPH



Identifier	Definition	Severity
CEN-12	Centralization privileges of ZKROUTER	Medium # 🟡

Vulnerability 0 : No important security issue detected.

Threat level: Low



```

268
269
270     uint amountIn,
271     uint amountOutMin,
272     address[] calldata path,
273     address to,
274     uint deadline
275 ) external override ensureNotExpired(deadline) returns (uint[] memory amounts) {
276     amounts = ZFLibrary.getAmountsOutUnchecked(factory, amountIn, path); // will fail below if path is invalid
277     // make sure the final output amount not smaller than the minimum
278     require(amounts[amounts.length - 1] >= amountOutMin, 'INSUFFICIENT_OUTPUT_AMOUNT');
279
280     address tokenIn = path[0];
281     address initialPair = ZFLibrary.pairFor(factory, tokenIn, path[1]);
282     TransferHelper.safeTransferFrom(tokenIn, msg.sender, initialPair, amounts[0]);
283     _swapCached(factory, initialPair, amounts, path, to);
284 }
285
286 function swapExactETHForTokens(
287     uint amountOutMin,
288     address[] calldata path,
289     address to,
290     uint deadline
291 ) external override payable ensureNotExpired(deadline) returns (uint[] memory amounts) {
  
```

## FTV-01 POSSIBLE OVERFLOW

Category	Severity ●	Location	Status
Status Mathematical Operations	Minor	contracts/ZkSwapRouter.sol	Acknowledged

### Description

In `updateForLiquidity`, the following equation is used inside an unchecked block

```
) external payable ensureNotExpired(deadline) returns (uint
amountTokenInActual, uint amountETHInActual, uint liquidity) {
    address pair;
    (pair, amountTokenInActual, amountETHInActual) = _addLiquidity(token, WETH,
amountTokenInExpected, msg.value, amountTokenInMin, amountETHInMin);
```

Where parameters: `Liquidity` less Used is a this and lessride In is a this.  
As these two are multiplied together in an unchecked block, they may overflow.

### Recommendation

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

## FZT-02 POSSIBLE OVERFLOW

Category	Severity <span>●</span>	Location	Status
Status Mathematical Operations	Minor	contracts/ZkSwapRouter.sol	Acknowledged

### Description

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

```
liquidity = IZFPair(pair).mint(to);  
  
if (msg.value > amountETHInActual) {  
    TransferHelper.safeTransferETH(msg.sender, msg.value - amountETHInActual);  
}  
} public fun mint_allowed<CoinType>(minter: address, _mint_amount: u64): u64 {  
    assert(!storage::mint_guardian_paused<CoinType>(), EMINT_PAUSED);
```

Minter can not issue more `ZKSWAP` 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 `ZFROUTER` 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.





## FTZ-03 POSSIBLE OVERFLOW

Category	Severity ●	Location	Status
Status Mathematical Operations	Minor	contracts/code/zfactory.sol	Acknowledged

### Description

There seems to be no way to disable a particular fee by setting spacing to 0. Probably not an issue.

```
function _swapSupportingFeeOnTransferTokens(address initialPair, address[] calldata
path, address _to) internal virtual {
    for (uint i; i < path.length - 1; ) {
        (address input, address output) = (path[i], path[i + 1]);
```

### Recommendation

This should be a named constant being equal to 1e6, which occurs in other contracts.



## FTZ-04 POSSIBLE OVERFLOW

Category	Severity ●	Location	Status
Bad datatype	Minor	contracts/code/ZKSWAPFINANCE.sol	Acknowledged

### Description

The name **mapping** is confusing. It would be fine for a getter function but not for a property.

```
mapping(address => mapping(address => bool)) public override isPairIndexed;
mapping(address => address[]) public override indexedPairs;

function indexedPairsOf(address account) external view override returns (address[]
memory) {
    return indexedPairs[account];
}
```

### Recommendation

Consider renaming to just "pool" or to something like "poolByTokenPair"



## FTZ-05 POSSIBLE OVERFLOW

Category	Severity <span>●</span>	Location	Status
Bad naming	Minor	Contract/ZkSwapFactory.sol	INFORMATIONAL

### Description

State **Token** variables can be declared as constant using the constant keyword. This means that the value of the state variable cannot be changed after it has been set. Additionally, the constant variables decrease gas consumption of the corresponding transaction.

```
internal virtual returns (address pair, uint amountAInActual, uint amountBInActual) {  
    address _factory = factory;  
    pair = ZFLibrary.pairFor(_factory, tokenA, tokenB);  
    if (pair == address(0)) {
```

### Recommendation

Constant state **Token** variables can be useful when the contract wants to ensure that the **value** of a state Token variable cannot be changed by any function in the contract. This can be useful for storing values that are important to the contract's behavior, such as the contract's address or the maximum number of times a certain function can be called. The team is advised to add the constant keyword to state variables that never change.

## 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 indexedPairsRange(address account,  
uint256 start, uint256 counts) external view  
override returns (address[] memory) {  
    require(counts != 0, "Counts must greater  
than zero");  
  
    address[] memory pairs =  
indexedPairs[account];  
    require(start + counts <= pairs.length, "Out  
of bound");  
  
    address[] memory result = new  
address[](counts);  
    for (uint256 i = 0; i < counts; i++) {  
        result[i] = pairs[start + i];  
    }  
    return result;  
}
```

## General Detectors



### Incorrect Solidity Version

This contract uses an unconventional or very old version of Solidity.



Attention  
Required



### Public Functions Should be Declared External

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



Attention  
Required



### State Variables Should be Declared Constant

Some state variables in this contract should be declared as constant








Attention  
Required

- |   |  |
|---|--|
| ✓ No vulnerable withdrawal functions found                  | ✓ No dumping risks found                       |
| ✓ No reentrancy risk found                                  | ✓ No compiler version inconsistencies found    |
| ✓ No locks detected   | ✓ No unchecked call responses found            |
| ✓ Verified source code found                                | ✓ No vulnerable self-destruct functions found  |
| ✓ No mintable risks found                                   | ✓ No assertion vulnerabilities found           |
| ✓ Users can always transfer their tokens                    | ✓ No old solidity code found                   |
| ✓ Contract cannot be upgraded                               | ✓ No external delegated calls found            |
| ✓ Wallets cannot be blacklisted from transferring the token | ✓ No external call dependency found            |
| ✓ No transfer fees found                                    | ✓ No vulnerable authentication calls found     |
| ✓ Token can be sold through regular AMMs                    | ✓ No invalid character typos found             |
| ✓ No transfer limits found                                  | ✓ No RTL characters found                      |
| ✓ No ERC20 approval vulnerability found                     | ✓ No dead code found                           |
| ✓ Contract owner cannot abuse ERC20 approvals               | ✓ No risky data allocation found               |
| ✓ No ERC20 interface errors found                           | ✓ No uninitialized state variables found       |
| ✓ No blocking loops found                                   | ✓ No uninitialized storage variables found     |
| ✓ No centralized balance controls found                     | ✓ No vulnerable initialization functions found |
| ✓ No transfer cooldown times found                          | ✓ No risky data handling found                 |
| ✓ No approval restrictions found                            | ✓ No number accuracy bug found                 |
| ✓ No external calls detected                                | ✓ No out-of-range number vulnerability found   |



## OPTIMIZATIONS | ZKSWAP FINANCE

ID	Title	Category	Status
GZT- 007	Logarithm Refinement Optimization	Gas Optimization	Acknowledged 
GZT- 323	Checks Can Be Performed Earlier	Gas Optimization	Acknowledged 
GZT- 679	Unnecessary Use Of SafeMath	Gas Optimization	Acknowledged 
GZT- 122	Struct Optimization	Gas Optimization	Acknowledged 
GZT-067	Unused State Variable	Gas Optimization	Acknowledged 

## Repository:

<https://github.com/ZKSwapfinance/>

## All Audited Files

ZKROUTER.SOL  
ZKFACTORY.SOL

## Contracts:

### Contract:

Router:: 0x18381c0f738146Fb694DE18D1106BdE2BE040Fa4  
factory:: 0x3a76e377ED58c8731F9DF3A36155942438744Ce3



## MANUAL REVIEW

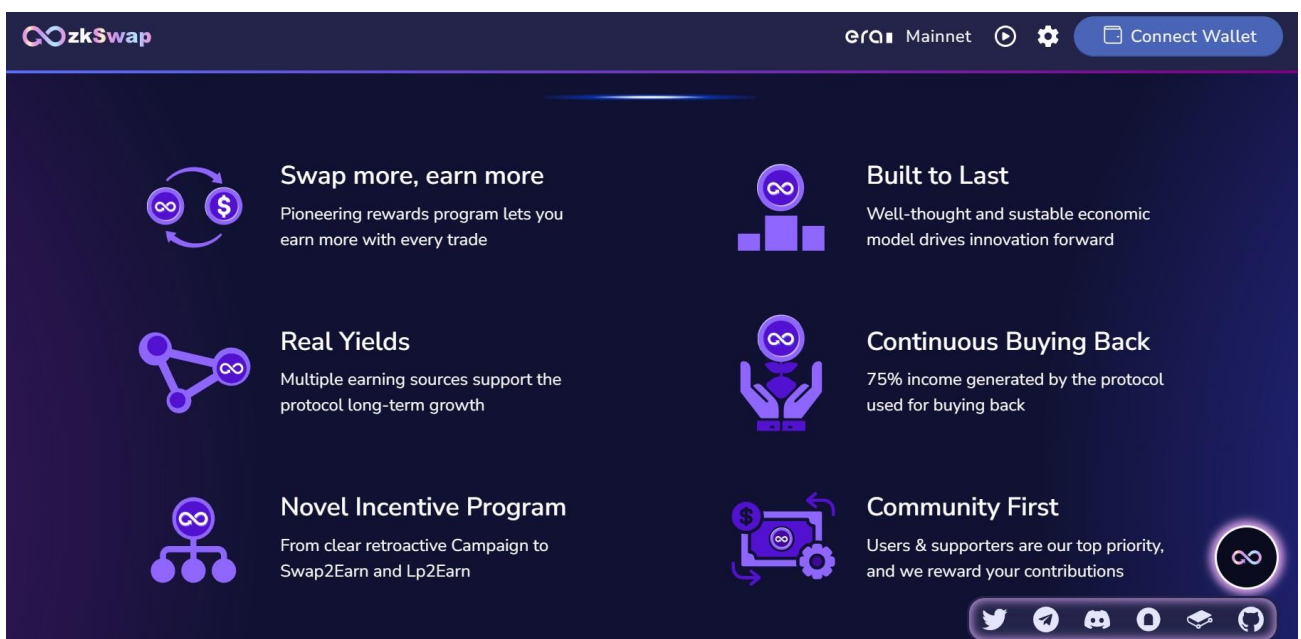
**ZKSWAP.FINANCE:** is the first decentralized Swap-to-Earn DeFi DEX that pioneers a unique incentive model rewarding both liquidity providers and traders. We also have juicy retroactive rewards for early supporters.

**Project: ZKSWAP FINANCE**

**Chain/Standard: ZKSYNC NETWORK**



### Outstanding Features of ZKSWAP FINANCE Is Launching On ZKSYNC ERA 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



**AUDIT RESULT**

**PASSED**

SMART CONTRACT AUDIT OF ZKSWAP FINANCE

Identifier	Definition	Severity
TEN-02	Transfers User's Tokens	Minor 

```
address tokenIn = path[0];
address initialPair = ZFLibrary.pairFor(factory, tokenIn, path[1]);
TransferHelper.safeTransferFrom(tokenIn, msg.sender, initialPair, amounts[0]);
_swapCached(factory, initialPair, amounts, path, to);
}
```

**Location:** ZFROUTER/IERC20.sol

## Alleviation:

Any user has the authority to transfer the balance of a user's address if the user has granted allowance. The contract does not subtract the allowance in the `transferFrom()` method, as a result, the transfer can be repeated until the user's balance go to zero.

## RECOMMENDATION

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

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

## ALLEVIATION

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



Identifier	Definition	Severity
TDB-12	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.



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**Website:** <https://www.Vitalblock.org>

**Email:** [info@vitalblock.org](mailto:info@vitalblock.org)

**GitHub:** <https://github.com/vital-block>

**Telegram (Engineering):** [https://t.me/vital\\_block](https://t.me/vital_block)

**Telegram (Onboarding):** [https://t.me/vitalblock\\_cmo](https://t.me/vitalblock_cmo)







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**info@vitalblock.org**



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