CONTRACT WOLF

Security Assessment

zkSwap

Verified on 04/25/2023

SUMMARY

Project	CHAIN	METHODOLOGY
zkSwap	zkSync	Manual & Automatic Analysis

FILES	DELIVERY	TYPE
Single	04/25/2023	Standard Audit

3	0	0	1	0	2
Total Findings	Critical	Major	Medium	Minor	Informational

🟥 0 Critical	0 Pending	An exposure that can affect the contract functions in several events that can risk and disrupt the contract
🟧 0 Major	0 Pending	An exposure that can affect the outcome when using the contract that can serve as an opening in manipulating the contract in an unwanted manner
🟧 1 Medium	1 Pending	An opening that could affect the outcome in executing the contract in a specific situation
⬜ 0 Minor	0 Pending	An opening but doesn't have an impact on the functionality of the contract
🟦 2 Informational	2 Pending	An opening that consists information but will not risk or affect the contract
STATUS	✔️ **AUDIT PASSED**	

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DISCLAIMER | zkSwap

ContractWolf audits and reports should not be considered as a form of project's "Advertisement" and does not cover any interaction and assessment from "Project Contract" to "External Contracts" such as PancakeSwap, UniSwap, SushiSwap or similar.

ContractWolf does not provide any warranty on its released report and should not be used as a decision to invest into audited projects.

ContractWolf provides a transparent report to all its "Clients" and to its "Clients Participants" and will not claim any guarantee of bug-free code within its **SMART CONTRACT**.

ContractWolf's presence is to analyze, audit and assess the Client's Smart Contract to find any underlying risk and to eliminate any logic and flow errors within its code.

Each company or project should be liable to its security flaws and functionalities.

SCOPE OF WORK | zkSwap

zkSwap team has agreed and provided us with the files that need to be tested (*Github, BSCscan, Etherscan, Local files etc*). The scope of audit is the main contract.

The goal of this engagement is to identify if there is a possibility of security flaws in the implementation of smart contract and its systems.

ContractWolf will be focusing on contract issues and functionalities along with the project claims from smart contract to their website, whitepaper, repository which has been provided by **zkSwap**.

AUDITING APPROACH | zkSwap

Every line of code along with its functionalities will undergo manual review to check for security issues, quality of logic and contract scope of inheritance. The manual review will be done by our team that will document any issues that they discovered.

METHODOLOGY

The auditing process follows a routine series of steps :

1. Code review that includes the following :
   - Review of the specifications, sources and instructions provided to ContractWolf to make sure we understand the size, scope and functionality of the smart contract.
   - Manual review of code. Our team will have a process of reading the code line-by-line with the intention of identifying potential vulnerabilities, underlying and hidden security flaws.

2. Testing and automated analysis that includes :
   - Testing the smart contract function with common test cases and scenarios to ensure that it returns the expected results.

3. Best practices and ethical review. The team will review the contract with the aim to improve efficiency, effectiveness, clarifications, maintainability, security and control within the smart contract.

4. Recommendations to help the project take steps to eliminate or minimize threats and secure the smart contract.

TOKEN DETAILS | zkSwap

Our goal is to create a comprehensive ecosystem for decentralized exchange users that fulfills all their needs in one convenient location.

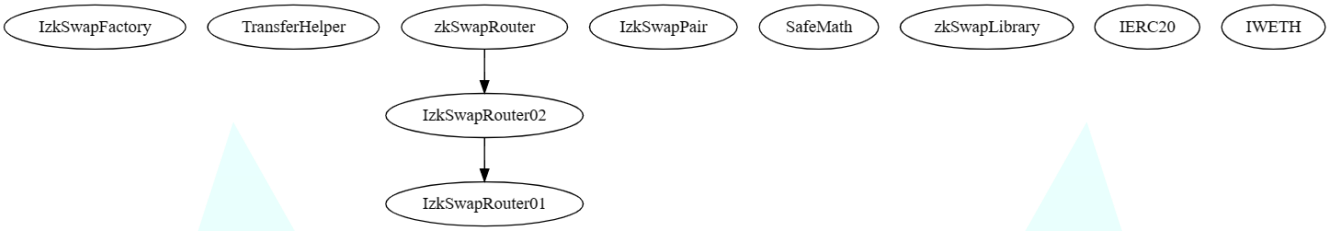
Token Name	Symbol	Decimal	Max/Total Supply	Chain
ZKS	ZKS	18	-	zkSync

SOURCE

Source	*0xAbdb137D013b8B328FA43Fc04a6fA340D1CeA733*

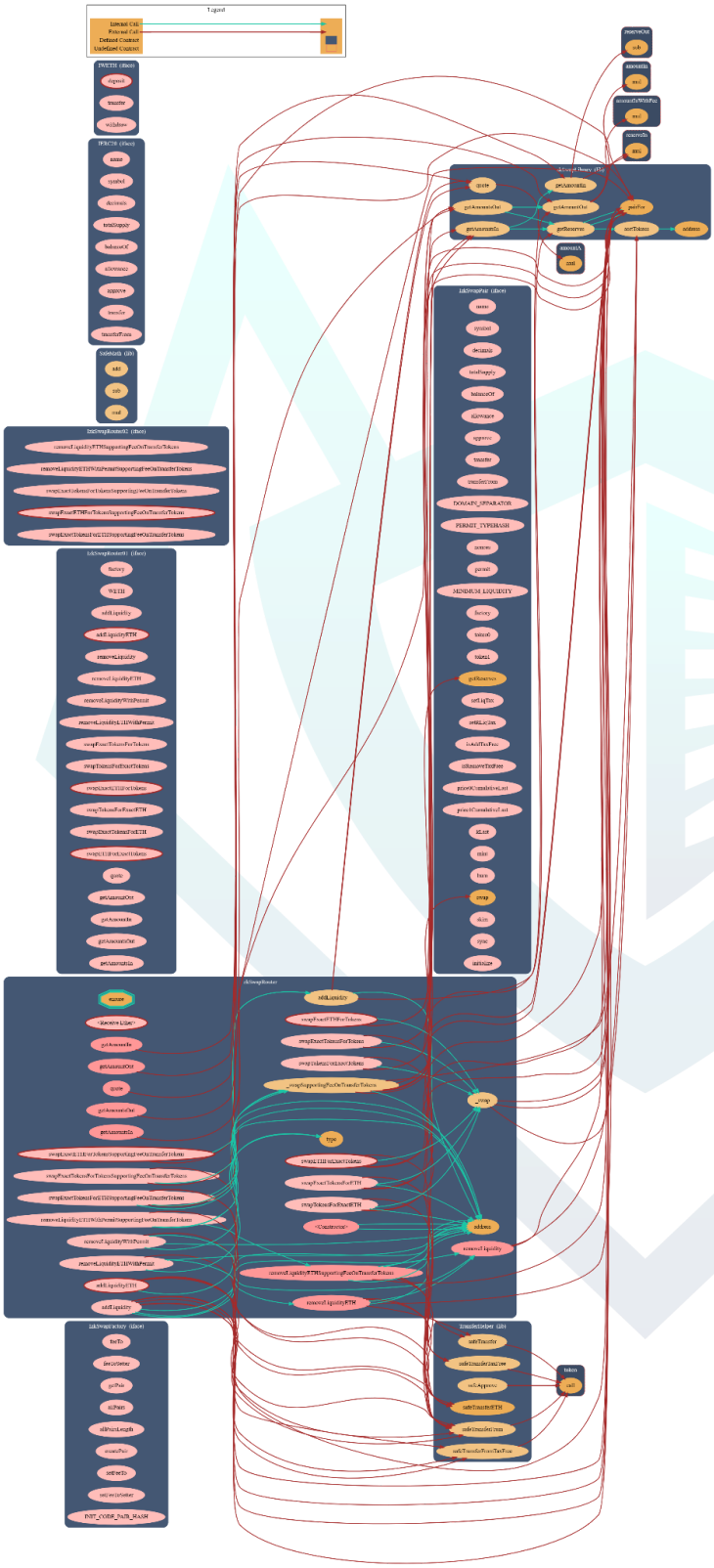
INHERITANCE GRAPH | zkSwap

Inheritance Graph of Contract Functions



CALL GRAPH | zkSwap

Call Graph of Contract Functions



FINDINGS | zkSwap

10	0	0	1	0	2
Total Findings	Critical	Major	Medium	Minor	Informational

This report has been prepared to state the issues and vulnerabilities for zkSwap through this audit. The goal of this report findings is to identify specifically and fix any underlying issues and errors

ID	Title	File & Line #	Severity	Status
SWC-103	Floating Pragma is set	zkSwapRouter.sol L: 6	Informational	• Pending
SWC-104	Unchecked return value	zkSwapRouter.sol L: 485	Medium	• Pending
CW-012	Safemath Override	zkSwapRouter.sol L: 256	Informational	• Pending

SWC ATTACKS | zkSwap

Smart Contract Weakness Classification and Test Cases

ID	Description	Status
SWC-100	Function Default Visibility	Passed
SWC-101	Integer Overflow and Underflow	Passed
SWC-102	Outdated Compiler Version	Passed
SWC-103	Floating Pragma	Not Passed
SWC-104	Unchecked Call Return Value	Not Passed
SWC-105	Unprotected Ether Withdrawal	Passed
SWC-106	Unprotected SELF DESTRUCT Instruction	Passed
SWC-107	Reentrancy	Passed
SWC-108	State Variable Default Visibility	Passed
SWC-109	Uninitialized Storage Pointer	Passed
SWC-110	Assert Violation	Passed
SWC-111	Use of Deprecated Solidity Functions	Passed
SWC-112	Delegatecall to Untrusted Callee	Passed
SWC-113	DoS with Failed Call	Passed
SWC-114	Transaction Order Dependence	Passed
SWC-115	Authorization through tx.origin	Passed
SWC-116	Block values as a proxy for time	Passed
SWC-117	Signature Malleability	Passed
SWC-118	Incorrect Constructor Name	Passed
SWC-119	Shadowing State Variables	Passed
SWC-120	Weak Sources of Randomness from Chain Attributes	Passed
SWC-121	Missing Protection against Signature Replay Attacks	Passed
SWC-122	Lack of Proper Signature Verification	Passed

ID	Description	Status
SWC-123	Requirement Violation	Passed
SWC-124	Write to Arbitrary Storage Location	Passed
SWC-125	Incorrect Inheritance Order	Passed
SWC-126	Insufficient Gas Griefing	Passed
SWC-127	Arbitrary Jump with Function Type Variable	Passed
SWC-128	DoS With Block Gas Limit	Passed
SWC-129	Typographical Error	Passed
SWC-130	Right-To-Left-Override control character(U+202E)	Passed
SWC-131	Presence of unused variables	Passed
SWC-132	Unexpected Ether balance	Passed
SWC-133	Hash Collisions With Multiple Variable Arguments	Passed
SWC-134	Message call with hardcoded gas amount	Passed
SWC-135	Code With No Effects	Passed
SWC-136	Unencrypted Private Data On-Chain	Passed

CW ASSESSMENT | zkSwap

ContractWolf Vulnerability and Security Tests

ID	Name	Description	Status
CW-001	Multiple Version	Presence of multiple compiler version across all contracts	✔
CW-002	Incorrect Access Control	Additional checks for critical logic and flow	✔
CW-003	Payable Contract	A function to withdraw ether should exist otherwise the ether will be trapped	✔
CW-004	Custom Modifier	major recheck for custom modifier logic	✔
CW-005	Divide Before Multiply	Performing multiplication before division is generally better to avoid loss of precision	✔
CW-006	Multiple Calls	Functions with multiple internal calls	✔
CW-007	Deprecated Keywords	Use of deprecated functions/operators such as block.blockhash() for blockhash(), msg.gas for gasleft(), throw for revert(), sha3() for keccak256(), callcode() for delegatecall(), suicide() for selfdestruct(), constant for view or var for actual type name should be avoided to prevent unintended errors with newer compiler versions	✔
CW-008	Unused Contract	Presence of an unused, unimported or uncalled contract	✔
CW-009	Assembly Usage	Use of EVM assembly is error-prone and should be avoided or double-checked for correctness	✔
CW-010	Similar Variable Names	Variables with similar names could be confused for each other and therefore should be avoided	✔
CW-011	Commented Code	Removal of commented/unused code lines	✔
CW-012	SafeMath Override	SafeMath is no longer needed starting Solidity v0.8+. The compiler now has Built in overflow checking.	✘

FIXES & RECOMMENDATION

SWC-103 | A Floating Pragma is Set

Code

```
pragma solidity ^0.8.17;
```

The compiler version should be a fixed one to avoid undiscovered compiler bugs. Fixed version sample below

```
pragma solidity 0.8.17;
```

SWC-104 | Unchecked Call Return Value

It's important to check the return value of token transfer functions like transferFrom in Solidity. These functions return a boolean value indicating whether the transfer was successful or not, and failing to check the return value could result in the loss of funds due to insufficient balances or faulty token contracts.

```
 function removeLiquidity(
        address tokenA,
        address tokenB,
        uint liquidity,
        uint amountAMin,
        uint amountBMin,
        address to,
        uint deadline
    ) public virtual override ensure(deadline) returns (uint amountA, uint amountB)
{
        address pair = zkSwapLibrary.pairFor(factory, tokenA, tokenB);
        IzkSwapPair(pair).transferFrom(msg.sender, pair, liquidity); // send
liquidity to pair
        (uint amount0, uint amount1) = IzkSwapPair(pair).burn(to);
        (address token0,) = zkSwapLibrary.sortTokens(tokenA, tokenB);
        (amountA, amountB) = tokenA == token0 ? (amount0, amount1) : (amount1,
amount0);
        require(amountA >= amountAMin, 'zkSwapRouter: INSUFFICIENT_A_AMOUNT');
        require(amountB >= amountBMin, 'zkSwapRouter: INSUFFICIENT_B_AMOUNT');
}
```

Recommendation

To ensure the security and integrity of your transactions and reduce the risk of vulnerabilities, always check the return value of token transfer functions and handle any errors appropriately in your smart contract code.

CW-012 | SafeMath Override

```
library SafeMath
```

SafeMath is no longer needed starting Solidity v0.8+. The compiler now has Built-in overflow checking.

AUDIT COMMENTS | zkSwap

Smart Contract audit comment for a non-technical perspective

- 🟢 Users can add/remove liquidity
- 🟢 Users can swap between ETH and native tokens
- 🟢 Owner cannot renounce and transfer ownership
- 🟢 Owner cannot burn tokens
- 🟢 Owner cannot mint after initial deployment
- 🟢 Owner cannot set max transaction limit
- 🟢 Owner cannot block users
- 🟢 Owner cannot pause contract

CONTRACTWOLF

Blockchain Security - Smart Contract Audits