



CONTRACT WOLF

Blockchain Security - Smart Contract Audits



Security Assessment

April 3, 2022

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ContractWolf provides 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 presence is to analyze, audit and assess the client's smart contract's code.

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

Scope of Work

Fairy AI team agreed and provided us with the files that needs to be tested (Github, Bscscan, Etherscan, files, etc.). The scope of the audit is the main contract.

The goal of this engagement was to identify if there is a possibility of security flaws in the implementation of the contract or system.

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

Description

AI Fairy is a free and globally available AI Chat. She can help you solve problems in daily life, study, and work.

AI Fairy redefines the concept of NFT market. Instead of holding NFT, AI Fairy project creates a unique fairy to every NFT. Imagine that your Bored Ape and Azuki have their own mind and soul, it changes the entire NFT eco-system.



Risk Level Classification

Risk Level represents the classification or the probability that a certain function or threat that can exploit vulnerability and have an impact within the system or contract.

Risk Level is computed based on CVSS Version 3.0

| Level | Value | Vulnerability |
|---------------|-----------|---|
| Critical | 9 - 10 | An Exposure that can affect the contract functions in several events that can risk and disrupt the contract |
| High | 7 - 8.9 | 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 |
| Medium | 4 - 6.9 | An opening that could affect the outcome in executing the contract in a specific situation |
| Low | 0.1 - 3.9 | An opening but doesn't have an impact on the functionality of the contract |
| Informational | 0 | An opening that consists of information's but will not risk or affect the contract |

Auditing Approach

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

2. Testing and automated analysis that includes:

- Testing the smart contract functions with common test cases and scenarios, to ensure that it returns the expected results.

3. Best practices 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 secure the smart contract.

Used Code from other Frameworks/Smart Contracts (Direct Imports)

Imported Packages

- SafeMath
- IBEP20
- Context
- Ownable
- IDEXFactory
- IDEXRouter
- AIF

Description

Optimization enabled: No

Decimal: 18

Symbol: AIF

Max / Total Supply: 100,000,000

Capabilities

Components

| Version | Contracts | Libraries | Interfaces | Abstract |
|---------|-----------|-----------|------------|----------|
| 1.0 | 1 | 1 | 3 | 1 |

Exposed Functions

| Version | Public | Private | External | Internal |
|---------|--------|---------|----------|----------|
| 1.0 | 7 | 1 | 34 | 15 |

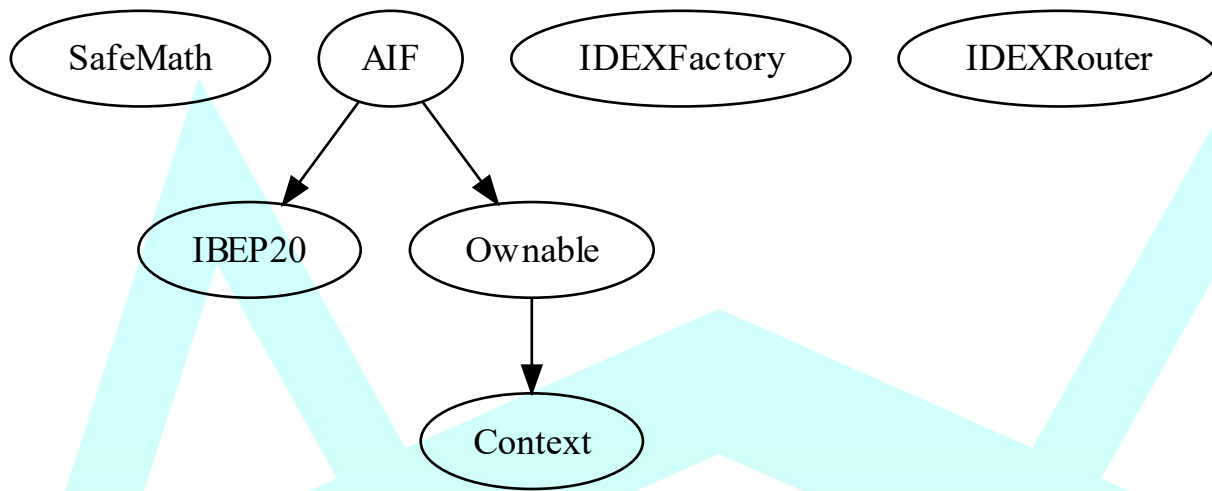
State Variables

| Version | Total | Public |
|---------|-------|--------|
| 1.0 | 22 | 1 |

Capabilities

| Version | Solidity Versions Observed | Experimental Features | Can Receive Funds | Uses Assembly | Has Destroyable Contracts |
|---------|----------------------------|-----------------------|-------------------|---------------|---------------------------|
| 1.0 | v0.8.17 | | Yes | No | No |

Inheritance Graph



Correct implementation of Token Standard

| Tested | Verified |
|--------|----------|
| ✓ | ✓ |

Overall Checkup (Smart Contract Security)

| Tested | Verified |
|--------|----------|
| ✓ | ✓ |

| Function | Description | Exist | Tested | Verified |
|--------------|--|-------|--------|----------|
| TotalSupply | Information about the total coin or token supply | ✓ | ✓ | ✓ |
| BalanceOf | Details on the account balance from a specified address | ✓ | ✓ | ✓ |
| Transfer | An action that transfers a specified amount of coin or token to a specified address | ✓ | ✓ | ✓ |
| TransferFrom | An action that transfers a specified amount of coin or token from a specified address | ✓ | ✓ | ✓ |
| Approve | Provides permission to withdraw specified number of coin or token from a specified address | ✓ | ✓ | ✓ |

Verify Claims

| Statement | Exist | Tested | Owner |
|--------------------|-------|--------|-------|
| Renounce Ownership | ✓ | ✓ | ✓ |
| Mint | — | — | — |
| Burn | ✓ | ✓ | ✗ |
| Block | — | — | — |
| Pause | — | — | — |

Legend

| Attribute | Symbol |
|--------------------------|--------|
| Verified / Can | ✓ |
| Verified / Cannot | ✗ |
| Unverified / Not checked | 🚩 |
| Not Available | — |

Write Functions of Contract

1. approve

2. clearStuckBalance

3. renounceOwnership

4. setCheckBuySell

5. setFees

6. setIsFeeExempt

7. setSwapBackSettings

8. setmarketingFeeReceivers

9. setrewardFeeReceivers

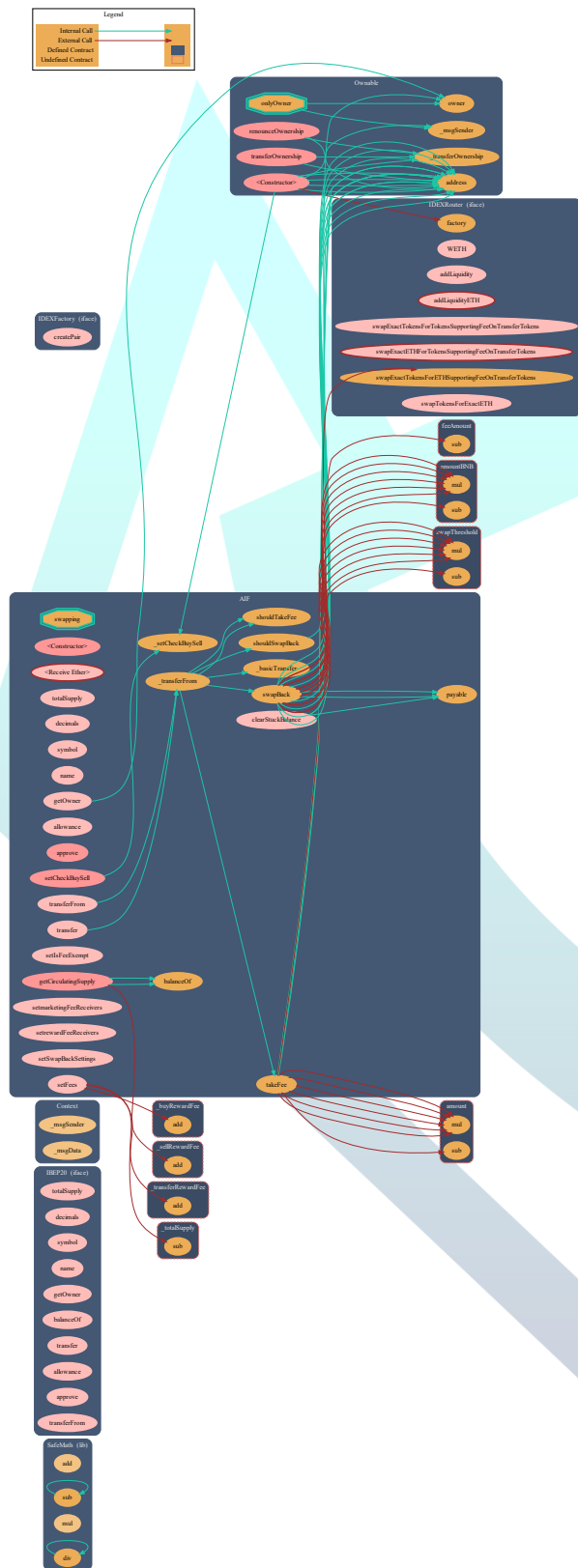
10. transfer

11. transferFrom

12. transferOwnership



Call Graph



SWC Attacks

| ID | Title | Status |
|-------------------------|---|--------|
| SWC-136 | Unencrypted Private Data On-Chain | PASSED |
| SWC-135 | Code With No Effects | PASSED |
| SWC-134 | Message call with hardcoded gas amount | PASSED |
| SWC-133 | Hash Collisions with Multiple Variable Length Arguments | PASSED |
| SWC-132 | Unexpected Ether balance | PASSED |
| SWC-131 | Presence of unused variables | PASSED |
| SWC-130 | Right-To Left Override control character (U+202E) | PASSED |
| SWC-129 | Typographical Error | PASSED |
| SWC-128 | DoS With Block Gas Limit | PASSED |
| SWC-127 | Arbitrary Jump with Function Type Variable | PASSED |
| SWC-126 | Insufficient Gas Griefing | PASSED |
| SWC-125 | Incorrect Inheritance Order | PASSED |
| SWC-124 | Write to Arbitrary Storage Location | PASSED |
| SWC-123 | Requirement Violation | PASSED |
| SWC-122 | Lack of Proper Signature Verification | PASSED |
| SWC-121 | Missing Protection against Signature Replay Attacks | PASSED |
| SWC-120 | Weak Sources of Randomness from Chain Attributes | PASSED |
| SWC-119 | Shadowing State Variables | PASSED |
| SWC-118 | Incorrect Constructor Name | PASSED |
| SWC-117 | Signature Malleability | PASSED |
| SWC-116 | Block values as a proxy for time | PASSED |
| SWC-115 | Authorization through tx.origin | PASSED |
| SWC-114 | Transaction Order Dependence | PASSED |
| SWC-113 | DoS with Failed Call | PASSED |
| SWC-112 | Delegate call to Untrusted Callee | PASSED |
| SWC-111 | Use of Deprecated Solidity Functions | PASSED |

| | | |
|--------------------------------|--------------------------------------|------------------|
| <u>SWC-110</u> | Assert Violation | PASSED |
| <u>SWC-109</u> | Uninitialized Storage Pointer | PASSED |
| <u>SWC-108</u> | State Variable Default Visibility | LOW ISSUE |
| <u>SWC-107</u> | Reentrancy | PASSED |
| <u>SWC-106</u> | Unprotected SELFDESTRUCT Instruction | PASSED |
| <u>SWC-105</u> | Unprotected Ether Withdrawal | PASSED |
| <u>SWC-104</u> | Unchecked Call Return Value | PASSED |
| <u>SWC-103</u> | Floating Pragma | LOW ISSUE |
| <u>SWC-102</u> | Outdated Compiler Version | PASSED |
| <u>SWC-101</u> | Integer Overflow and Underflow | PASSED |
| <u>SWC-100</u> | Function Default Visibility | PASSED |

Audit Result

AUDIT PASSED

Low Issues

| | |
|--|--|
| A floating pragma is set (SWC-103) | L: 11 |
| State variable visibility is set (SWC-108) | L: 249, 252, 253, 259, 261, 263, 264, 265, 308 |

Findings

Owner can set total buy, total sell, and total transfer fee up to 19% each

```
function setFees(
  uint256 _sellRewardFee!,
  uint256 _sellMarketingFee!,
  uint256 _sellLiquidityFee!,
  uint256 _buyRewardFee!,
  uint256 _buyMarketingFee!,
  uint256 _buyLiquidityFee!,
  uint256 _transferRewardFee!,
  uint256 _transferMarketingFee!,
  uint256 _transferLiquidityFee!,
  uint256 _burnFee!
) external onlyOwner {
  sellRewardFee = _sellRewardFee!;
  sellMarketingFee = _sellMarketingFee!;
  sellLiquidityFee = _sellLiquidityFee!;
  buyRewardFee = _buyRewardFee!;
  buyMarketingFee = _buyMarketingFee!;
  buyLiquidityFee = _buyLiquidityFee!;
  transferRewardFee = _transferRewardFee!;
  transferMarketingFee = _transferMarketingFee!;
  transferLiquidityFee = _transferLiquidityFee!;
  burnFee = _burnFee!;

  totalFeeBuy = _buyRewardFee!
    .add(_buyMarketingFee!)
    .add(_buyLiquidityFee!)
    .add(_burnFee!);
  require(totalFeeBuy < 20, "Buy Fees cannot be more than 20%");

  totalFeeSell = _sellRewardFee!
    .add(_sellMarketingFee!)
    .add(_sellLiquidityFee!)
    .add(_burnFee!);
  require(totalFeeSell < 20, "Sell Fees cannot be more than 20%");

  totalFeeTransfer = _transferRewardFee!
    .add(_transferMarketingFee!)
    .add(_transferLiquidityFee!)
    .add(_burnFee!);
  require(totalFeeTransfer < 20, "Transfer Fees cannot be more than 20%");
}
```

Description:

State variable visibility is not set (SWC-108)

Suggestion:

Variables can be specified as being public, internal, or private. Explicitly define visibility for all state variables.

Description:

A floating pragma is set (SWC-103)

Suggestion:

Specific version to ensure that the bytecode produced does not vary between builds.

Audit Comments

- Owner can renounce and transfer ownership
- Owner can toggle and change pair address
- Owner can collect BNB from contract
- Owner can exclude/include addresses from fees
- Owner can set total buy, total sell, and total transfer fee up to 19% each
- Owner can change marketing fee address
- Owner can change reward fee address
- Owner can toggle swap and threshold amount
- Owner cannot mint after initial deployment
- Owner cannot burn
- Owner cannot pause
- Owner cannot block users



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