TechRate

Blockchain solutions and consulting

Smart Contract Security Audit

Audit details:

Audited project: **Moonpirate**

Deployer address: **0x410e372657e088d5b7db76346cd958b1b642b984**

Client contacts: **Moonpirate team**

Blockchain: **Binance Smart Chain**

Project website: **https://www.moonpirate.finance**

April, 2021
TechRate

Disclaimer

This is a limited report on our findings based on our analysis, in accordance with good industry practice as at the date of this report, in relation to cybersecurity vulnerabilities and issues in the framework and algorithms based on smart contracts, the details of which are set out in this report. In order to get a full view of our analysis, it is crucial for you to read the full report. While we have done our best in conducting our analysis and producing this report, it is important to note that you should not rely on this report and cannot claim against us on the basis of what it says or doesn't say, or how we produced it, and it is important for you to conduct your own independent investigations before making any decisions. We go into more detail on this in the below disclaimer below – please make sure to read it in full.

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The analysis of the security is purely based on the smart contracts alone. No applications or operations were reviewed for security. No product code has been reviewed.

Background

TechRate was commissioned by Moonpirate to perform an audit of smart contracts:

- *https://bscscan.com/address/0xf09b7B6bA6dAb7CccC3AE477a174b164c39f4C66#code*

The purpose of the audit was to achieve the following:

- Ensure that the smart contract functions as intended.
- Identify potential security issues with the smart contract.

The information in this report should be used to understand the risk exposure of the smart contract, and as a guide to improve the security posture of the smart contract by remediating the issues that were identified.
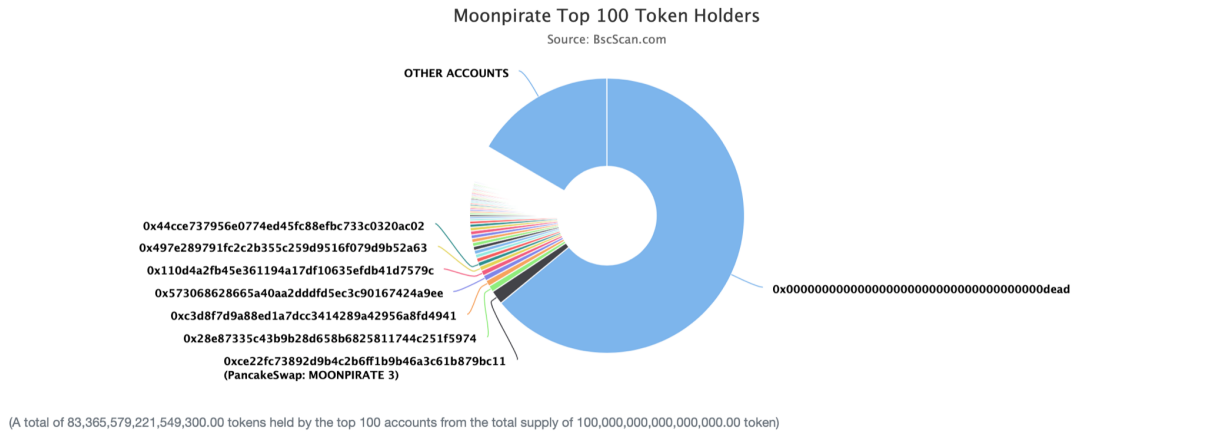
Contracts details

Token contract details for 27.04.2021.

Contract name:	**Moonpirate**
Contract address:	**0xf09b7B6bA6dAb7CccC3AE477a174b164c39f4C66**
Total supply:	**100_000_000_000_000_000_000_000_000**
Token ticker:	**MOONPIRATE**
Decimals:	**9**
Token holders:	**46292**
Transactions count:	**120446**
Top 100 holders dominance:	**83.37 %**
Liquidity fee:	**2**
Tax fee:	**2**
Total fees:	**7_146_066_502_851_686_905_999_115**
Uniswap V2 pair:	**0xce22fc73892d9b4c2b6ff1b9b46a3c61b879bc11**
Contract deployer address:	**0x410e372657e088d5b7db76346cd958b1b642b984**
Contract's current owner address:	**0x0000000000000000000000000000000000000000**

Moonpirate token distribution

Moonpirate Top 100 Token Holders
Source: BscScan.com

OTHER ACCOUNTS

0x44cce737956e0774ed45fc88efbc733c0320ac02
0x497e289791fc2c2b355c259d9516f079d9b52a63
0x110d4a2fb45e361194a17df10635efdb41d7579c
0x573068628665a40aa2dddfd5ec3c90167424a9ee
0xc3d8f7d9a88ed1a7dcc3414289a42956a8fd4941
0x28e87335c43b9b28d658b6825811744c251f5974
0xce22fc73892d9b4c2b6ff1b9b46a3c61b879bc11
(PancakeSwap: MOONPIRATE 3)

0x0000000000000000000000000000000000000dead

(A total of 83,365,579,221,549,300.00 tokens held by the top 100 accounts from the total supply of 100,000,000,000,000,000.00 token)

Moonpirate contract interaction details

Time Series: Token Contract Overview   Fri 16, Apr 2021 - Mon 26, Apr 2021

Token Contract 0xf09b7B6bA6dAb7CccC3AE477a174b164c39f4C66 (Moonpirate)
Source: BscScan.com

Zoom 1m 6m 1y All   From Apr 15, 2021 To Apr 26, 2021

● Transfer Amount ●- Transfers Count -●- Unique Receivers -■- Unique Senders -▲- Total Uniques
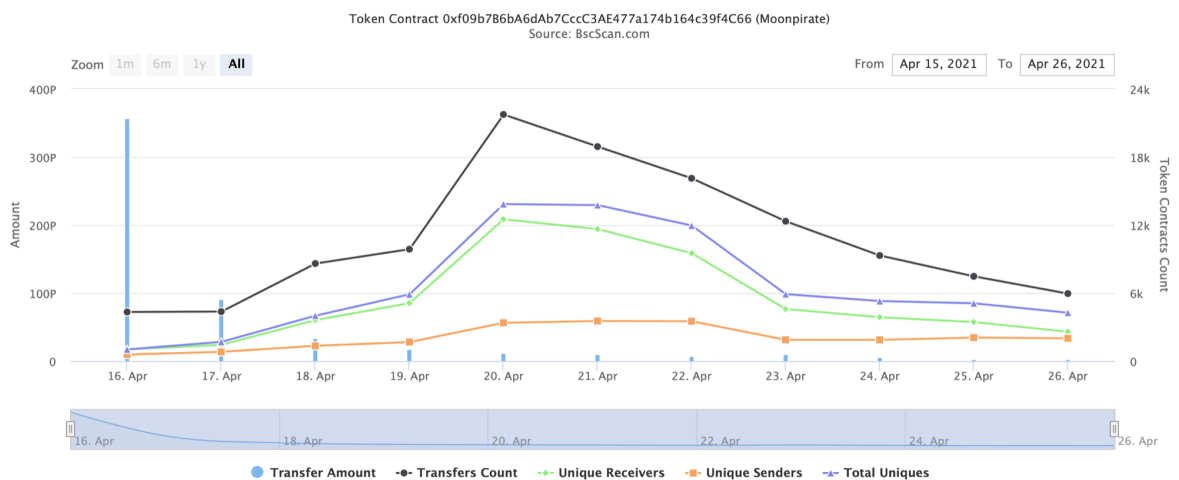
Moonpirate top 10 token holders

Rank	Address	Quantity (Token)	Percentage
1	0x000000000000000000000000000000000000dead	64,064,470,998,137,900.18438855	64.0645%
2	📄 PancakeSwap: MOONPIRATE 3	1,618,786,516,242,500.838635262	1.6188%
3	0x28e87335c43b9b28d658b6825811744c251f5974	764,127,958,203,733.032563588	0.7641%
4	0xc3d8f7d9a88ed1a7dcc3414289a42956a8fd4941	717,630,999,279,791.901811272	0.7176%
5	0x573068628665a40aa2dddfd5ec3c90167424a9ee	641,069,162,055,059.79128865	0.6411%
6	0x110d4a2fb45e361194a17df10635efdb41d7579c	633,526,990,816,366.335196345	0.6335%
7	0x497e289791fc2c2b355c259d9516f079d9b52a63	528,015,238,773,653.022521171	0.5280%
8	0x44cce737956e0774ed45fc88efbc733c0320ac02	518,044,805,624,841.437641217	0.5180%
9	0xcdc162e71e7517e94c0c72de16ca6315349d47fc	500,102,629,807,523.297036354	0.5001%
10	0xfe63b36ca9a63bff12f3fcd163482a5c772df526	474,682,983,959,246.798690975	0.4747%

Moonpirate LP token holders

Rank	Address	Quantity	Percentage
1	📄 0x0000000000000000000000000000000000000000	34,569.662604861906475521	84.3042%
2	0x000000000000000000000000000000000000dead	5,842.999540858455683077	14.2492%
3	0x9e2c4933d6228a69149e3011cb1302f3e46a4263	579.977157078618851808	1.4144%
4	0x895790dcf58152fd34329b42c4bfc5a202b3d708	7.55274820114840101	0.0184%
5	0x535214817649fda435d083fe8795392e7fc28240	3.579494608758596063	0.0087%
6	0xa652d2560065dfdae862d085d43b96f3943a9e9a	1.676761763282485572	0.0041%
7	0x6ba3014f372bedfb7861ce4076504f606f0d3d4f	0.228677938096987945	0.0006%
8	0x3801108e815b391f2c0c73f0dd4811843ec1b101	0.166354373252840923	0.0004%
9	0xf2ea21a36063b61d85331ff716e0bd4bd050dbdc	0.000712514115018352	0.0000%

Contract functions details

+ [Int] IERC20
  - [Ext] totalSupply
  - [Ext] balanceOf
  - [Ext] transfer #
  - [Ext] allowance
  - [Ext] approve #
  - [Ext] transferFrom #

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

+ Context
  - [Int] _msgSender
  - [Int] _msgData

+ [Lib] Address
  - [Int] isContract
  - [Int] sendValue #
  - [Int] functionCall #
  - [Int] functionCall #
  - [Int] functionCallWithValue #
  - [Int] functionCallWithValue #
  - [Prv] _functionCallWithValue #

+ Ownable (Context)
  - [Int] <Constructor> #
  - [Pub] owner
  - [Pub] renounceOwnership #
     - modifiers: onlyOwner
  - [Pub] transferOwnership #
     - modifiers: onlyOwner
  - [Pub] geUnlockTime
  - [Pub] lock #
     - modifiers: onlyOwner
  - [Pub] unlock #

+ [Int] IUniswapV2Factory

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

+ [Int] IUniswapV2Pair
  - [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] MINIMUM_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] IUniswapV2Router01
  - [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] IUniswapV2Router02 (IUniswapV2Router01)
- [Ext] removeLiquidityETHSupportingFeeOnTransferTokens #
- [Ext] removeLiquidityETHWithPermitSupportingFeeOnTransferTokens #
- [Ext] swapExactTokensForTokensSupportingFeeOnTransferTokens #
- [Ext] swapExactETHForTokensSupportingFeeOnTransferTokens ($)
- [Ext] swapExactTokensForETHSupportingFeeOnTransferTokens #

+ Moonpirate (Context, IERC20, Ownable)
- [Pub] <Constructor> #
- [Pub] name
- [Pub] symbol
- [Pub] decimals
- [Pub] totalSupply
- [Pub] balanceOf
- [Pub] transfer #
- [Pub] allowance
- [Pub] approve #
- [Pub] transferFrom #
- [Pub] increaseAllowance #
- [Pub] decreaseAllowance #
- [Pub] isExcludedFromReward
- [Pub] totalFees
- [Pub] deliver #
- [Pub] reflectionFromToken
- [Pub] tokenFromReflection
- [Pub] excludeFromReward #
   - modifiers: onlyOwner
- [Ext] includeInReward #
   - modifiers: onlyOwner
- [Prv] _transferBothExcluded #
- [Pub] excludeFromFee #
   - modifiers: onlyOwner
- [Pub] includeInFee #
   - modifiers: onlyOwner
- [Ext] setTaxFeePercent #

- modifiers: onlyOwner
 - [Ext] setLiquidityFeePercent #
   - modifiers: onlyOwner
 - [Ext] setMaxTxPercent #
   - modifiers: onlyOwner
 - [Pub] setSwapAndLiquifyEnabled #
   - modifiers: onlyOwner
 - [Ext] <Fallback> ($)
 - [Prv] _reflectFee #
 - [Prv] _getValues
 - [Prv] _getTValues
 - [Prv] _getRValues
 - [Prv] _getRate
 - [Prv] _getCurrentSupply
 - [Prv] _takeLiquidity #
 - [Prv] calculateTaxFee
 - [Prv] calculateLiquidityFee
 - [Prv] removeAllFee #
 - [Prv] restoreAllFee #
 - [Pub] isExcludedFromFee
 - [Prv] _approve #
 - [Prv] _transfer #
 - [Prv] swapAndLiquify #
   - modifiers: lockTheSwap
 - [Prv] swapTokensForEth #
 - [Prv] addLiquidity #
 - [Prv] _tokenTransfer #
 - [Prv] _transferStandard #
 - [Prv] _transferToExcluded #
 - [Prv] _transferFromExcluded #

($) = payable function
= non-constant function

Issues Checking Status

№	Issue description.	Checking status
1	Compiler errors.	Passed
2	Race conditions and Reentrancy. Cross-function race conditions.	Passed
3	Possible delays in data delivery.	Passed
4	Oracle calls.	Passed
5	Front running.	Passed
6	Timestamp dependence.	Passed
7	Integer Overflow and Underflow.	Passed
8	DoS with Revert.	Passed
9	DoS with block gas limit.	Low issues
10	Methods execution permissions.	Passed
11	Economy model of the contract.	Passed
12	The impact of the exchange rate on the logic.	Passed
13	Private user 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	Safe Open Zeppelin contracts implementation and usage.	Passed
21	Fallback function security.	Passed

Security Issues

High Severity Issues

No high severity issues found.

Medium Severity Issues

No medium severity issues found.

Low Severity Issues

1. Out of gas

Issue:

- ❏ The function **includeInReward()** uses the loop to find and remove addresses from the **_excluded** list. Function will be aborted with **OUT_OF_GAS** exception if there will be a long excluded addresses list.

```
function includeInReward(address account⬆) external onlyOwner() {
    require(_isExcluded[account⬆], "Account is already excluded");
    for (uint256 i = 0; i < _excluded.length; i++) {
        if (_excluded[i] == account⬆) {
            _excluded[i] = _excluded[_excluded.length - 1];
            _tOwned[account⬆] = 0;
            _isExcluded[account⬆] = false;
            _excluded.pop();
            break;
        }
    }
}
```

- ❏ The function **_getCurrentSupply** also uses the loop for evaluating total supply. It also could be aborted with **OUT_OF_GAS** exception if there will be a long excluded addresses list.

```
function _getCurrentSupply() private view returns (uint256, uint256) {
    uint256 rSupply = _rTotal;
    uint256 tSupply = _tTotal;
    for (uint256 i = 0; i < _excluded.length; i++) {
        if (
            _rOwned[_excluded[i]] > rSupply ||
            _tOwned[_excluded[i]] > tSupply
        ) return (_rTotal, _tTotal);
        rSupply = rSupply.sub(_rOwned[_excluded[i]]);
        tSupply = tSupply.sub(_tOwned[_excluded[i]]);
    }
    if (rSupply < _rTotal.div(_tTotal)) return (_rTotal, _tTotal);
    return (rSupply, tSupply);
}
```

Recommendation:

Use EnumerableSet instead of array or do not use long arrays.

Conclusion

Smart contracts contain only low severity issues. LP pair contract security is not checked.

Techrate note:
Please check the disclaimer above and note, the audit makes no statements or warranties on business model, investment attractiveness or code sustainability. The report is provided for the only contract mentioned in the report and does not include any other potential contracts deployed by Owner.