Smart Contract Security Audit

Audit details:

Audited project:	Pegazus Finance
Deployer address:	0x5380e869d0d53bf25a68b51ac0effc998ddc7641
Client contacts:	Pegazus Finance team
Blockchain:	Binance Smart Chain
Project website:	http://pegazus.finance

May, 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 Pegazus Finance to perform an audit of smart contracts:

- *https://bscscan.com/address/0xd585f9c5953ca97da3551f20725a274c9e442ff3#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

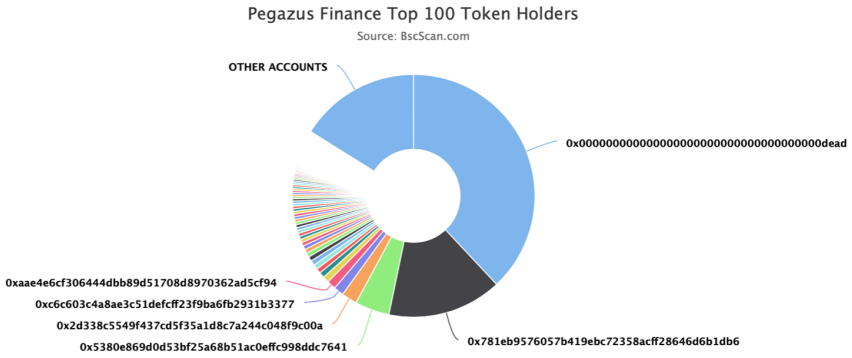
Token contract details for 15.05.2021.

Contract name:	Pegazus Finance
Contract address:	0xd585f9c5953ca97da3551f20725a274c9e442ff3
Total supply:	849195980656101191198480
Token ticker:	PEG
Decimals:	9
Token holders:	2752
Transactions count:	6827
Top 100 holders dominance:	83.88 %
Donation fee:	3
Tax fee:	1
Burn fee	6
Total fees:	25134003223983134798461
Total donations BNB:	84779596606641160215
Pancake V2 pair:	0x781eb9576057b419ebc72358acff28646d6b1db6
Contract deployer address:	0x5380e869d0d53bf25a68b51ac0effc998ddc7641
Contract’s current owner address:	0x5380e869d0d53bf25a68b51ac0effc998ddc7641

Pegazus Finance token distribution

The top 100 holders collectively own 83.88% (712,347,114,353,410.00 Tokens) of Pegazus Finance

Token Total Supply: 849,195,980,656,101.19 Token | Total Token Holders: 2,752

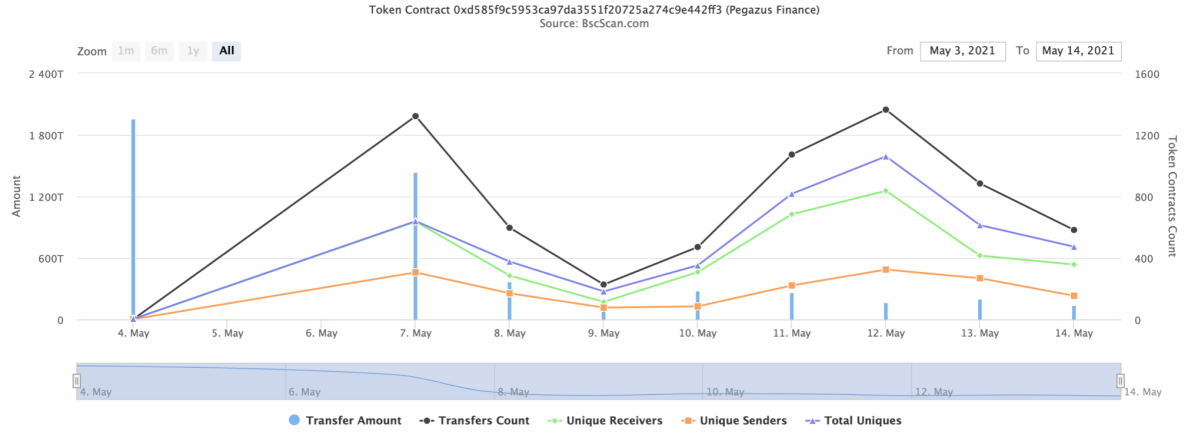


(A total of 712,347,114,353,410.00 tokens held by the top 100 accounts from the total supply of 849,195,980,656,101.19 token)

Pegazus Finance contract interaction details

Time Series: Token Contract Overview

Tue 4, May 2021 - Fri 14, May 2021



Pegazus Finance top 10 token holders

Rank	Address	Quantity (Token)	Percentage
1	0x000000000000000000000000000000000000dead	322,913,748,013,320.149704861	38.0258%
2	0x781eb9576057b419ebc72358acff28646d6b1db6	129,582,954,742,635.586615937	15.2595%
3	0x5380e869d0d53bf25a68b51ac0effc998ddc7641	38,906,200,295,481.225893784	4.5815%
4	0x2d338c5549f437cd5f35a1d8c7a244c048f9c00a	17,733,057,767,637.457380071	2.0882%
5	0xc6c603c4a8ae3c51defcff23f9ba6fb2931b3377	11,306,800,516,009.250789247	1.3315%
6	0xaae4e6cf306444dbb89d51708d8970362ad5cf94	9,974,739,327,244.7538587	1.1746%
7	0x0d9b1e53cbb251572d982d9f96520e8d40d22bb0	7,200,952,632,052.446805293	0.8480%
8	0x146a63eea493c46487ecd1eb9432f9a0a2b8e2a1	6,309,467,236,218.493721684	0.7430%
9	0xe3bca00c94abfed54af6606bcda78425e93420af	5,507,626,761,324.288273666	0.6486%
10	0x1fd76da9383bd7cc9f5f7dd0362d25f1fa89a33f	5,502,657,575,231.022502082	0.6480%

Pegazus Finance LP token holders

Rank	Address	Quantity	Percentage
1	0xc765bddb93b0d1c1a88282ba0fa6b2d00e3e0c83	5,774.454592485077286095	98.3001%
2	0xaa3d85ad9d128dfecb55424085754f6dfa643eb1	58.327824166515932182	0.9929%
3	0x07d80ae6f36a5e08dca74ce884a24d39db9934ed	41.388524208182039413	0.7046%
4	0x1b5d95e35d274c6bd0134b3c7a5c9ee6e42c6ec8	0.142420905541076512	0.0024%
5	0x0000000000000000000000000000000000000000	0.000000000000001	0.0000%

Contract functions details

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

+ [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

+ [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] getUnlockTime
  - [Pub] getTime
  - [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] 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 #

+ PegazusFinance (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] totalBurn
- [Pub] totalDonationBNB
- [Pub] minimumTokensBeforeSwapAmount
- [Pub] deliver #
- [Pub] reflectionFromToken
- [Pub] tokenFromReflection
- [Pub] excludeFromReward #
  - modifiers: onlyOwner
- [Ext] includeInReward #
  - modifiers: onlyOwner
- [Prv] _approve #
- [Prv] _transfer #
- [Prv] swapAndLiquify #

  - modifiers: lockTheSwap
- [Prv] swapTokensForBNB #
- [Prv] _tokenTransfer #
- [Prv] _transferStandard #
- [Prv] _transferToExcluded #
- [Prv] _transferFromExcluded #
- [Prv] _transferBothExcluded #
- [Prv] _reflectFee #
- [Prv] _getValues
- [Prv] _getTValues
- [Prv] _getRValues
- [Prv] _getRate
- [Prv] _getCurrentSupply
- [Prv] _takeLiquidity #
- [Prv] calculateTaxFee
- [Prv] calculateBurnFee
- [Prv] calculateLiquidityFee
- [Prv] removeAllFee #
- [Prv] restoreAllFee #
- [Pub] isExcludedFromFee
- [Pub] excludeFromFee #
  - modifiers: onlyOwner
- [Pub] includeInFee #
  - modifiers: onlyOwner
- [Ext] setTaxFeePercent #
  - modifiers: onlyOwner
- [Ext] setBurnFeePercent #
  - modifiers: onlyOwner
- [Ext] setDonationFeePercent #
  - modifiers: onlyOwner
- [Ext] setDonationAddress1 #
  - modifiers: onlyOwner
- [Ext] setDonationAddress2 #
  - modifiers: onlyOwner
- [Ext] setDonationAddress3 #
  - modifiers: onlyOwner
- [Ext] setMaxTxPercent #
  - modifiers: onlyOwner
- [Pub] getUnlockTimeSeconds
- [Pub] getUnlockTimeDays
- [Ext] setNumTokensSellToAddToLiquidity #
  - modifiers: onlyOwner
- [Pub] setSwapAndLiquifyEnabled #
  - modifiers: onlyOwner
- [Prv] TransferCharityBNB #
- [Ext] <Fallback> ($)

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.

Owner privileges (In the period when the owner is not renounced)

- ❏ Owner can change the tax, burn and donation fee.
- ❏ Owner can change the maximum transaction amount.
- ❏ Owner can exclude from the fee.
- ❏ Owner can change the charity addresses to any addresses. By the way, all the liquidity will be transferred to the charity wallet, so the charity address could become any non charity address and this will be a false info.
- ❏ Owner can lock and unlock. By the way, using these functions the owner could leave as owner even after the ownership was renounced.

Conclusion

Smart contracts do not contain high severity issues! Liquidity pair contract's security is not checked due to out of scope.

Liquidity locking details provided by the team -
https://unicrypt.network/amm/pancakev2/token/0xD585F9C5953CA97DA3551f20725a274c9e442ff3

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.