



# Smart Contract Security Audit

## Audit details:

Audited project:	Raven X
Deployer address:	0xb8e2a584f5d697640411c100e2750ed6d04327fd
Client contacts:	Raven X team
Blockchain:	Binance Smart Chain
Project website:	<a href="https://ravenx.finance">https://ravenx.finance</a>

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 Raven X to perform an audit of smart contracts:

- <https://bscscan.com/address/0x8891de345808e77228677f0efb56125db1e93a49#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 15.04.2021.

Contract name:	Raven X
Contract address:	0x8891de345808e77228677f0efb56125db1e93a49
Total supply:	460_062_634_379_658_583
Token ticker:	RX
Decimals:	9
Token holders:	3129
Transactions count:	11265
Top 100 holders dominance:	79.81 %
Contract deployer address:	0xb8e2a584f5d697640411c100e2750ed6d04327fd
Contract's current owner address:	Zero address
Current donation fee:	2 percent
Current tax fee:	2 percent
Current burn fee:	2 percent
Total fees:	39_937_365_620_341_417
Uniswap V2 pair:	0x10412b6c08a58fd7274e657eb00919a17cdad48d
Uniswap V2 router:	0x05ff2b0db69458a0750badebc4f9e13add608c7f
Total donation BNB:	190_960_249_901_831_099_022
Total burn:	39_937_365_620_341_417

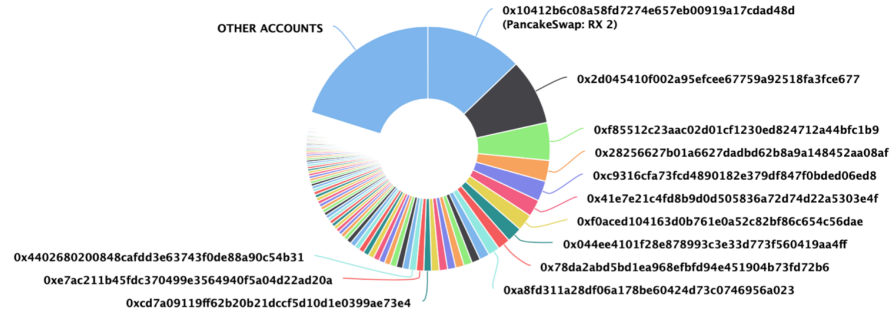
# Raven X token distribution

The top 100 holders collectively own 79.83% (367,283,335.44 Tokens) of Raven X

Token Total Supply: 460,070,320.45 Token | Total Token Holders: 3,129

## Raven X Top 100 Token Holders

Source: BscScan.com

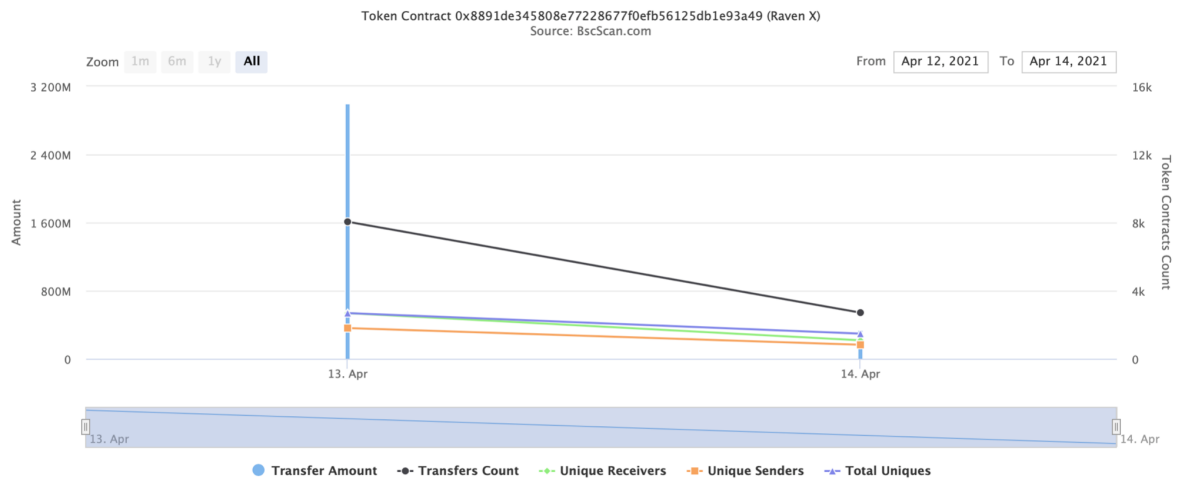


(A total of 367,283,335.44 tokens held by the top 100 accounts from the total supply of 460,070,320.45 token)

# Raven X contract interaction details

Time Series: Token Contract Overview

Tue 13, Apr 2021 - Wed 14, Apr 2021



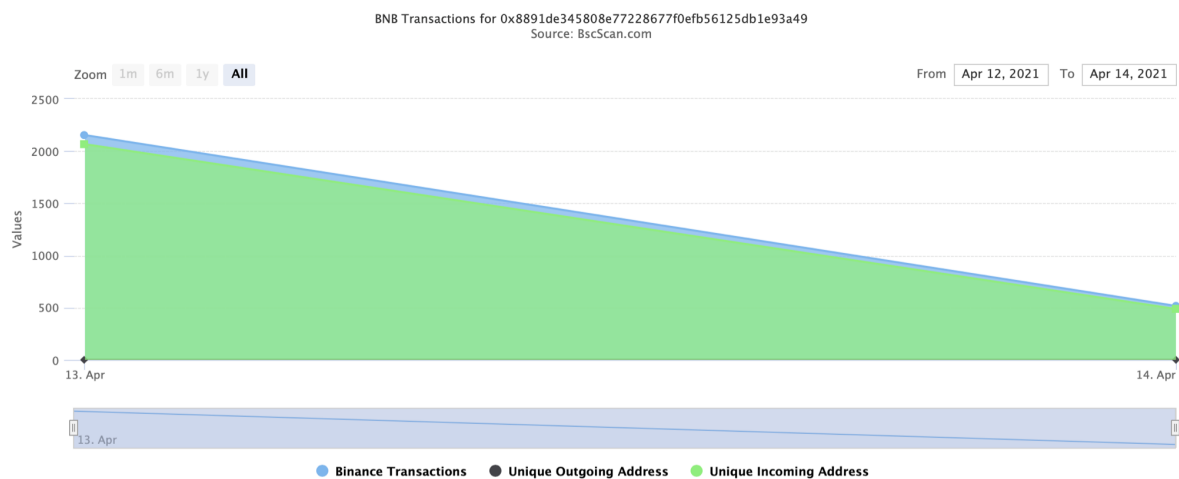
## Raven X top 10 token holders

Rank	Address	Quantity (Token)	Percentage
1	<a href="#">PancakeSwap: RX 2</a>	59,095,350.528565687	12.8449%
2	<a href="#">0x2d045410f002a95efcee67759a92518fa3fce677</a>	40,041,287.916419881	8.7033%
3	<a href="#">0xf85512c23aac02d01cf1230ed824712a44bfc1b9</a>	22,961,045.76875356	4.9908%
4	<a href="#">0x28256627b01a6627dadbd62b8a9a148452aa08af</a>	12,744,070.874296628	2.7700%
5	<a href="#">0xc9316cfa73fcd4890182e379df847f0bded06ed8</a>	12,287,040.267794559	2.6707%
6	<a href="#">0x41e7e21c4fd8b9d0d505836a72d74d22a5303e4f</a>	10,356,093.301711577	2.2510%
7	<a href="#">0xf0aced104163d0b761e0a52c82bf86c654c56dae</a>	10,109,736.462871935	2.1974%
8	<a href="#">0x044ee4101f28e878993c3e33d773f560419aa4ff</a>	9,345,933.064821103	2.0314%
9	<a href="#">0x78da2abd5bd1ea968efbfd94e451904b73fd72b6</a>	7,697,246.635921929	1.6731%
10	<a href="#">0xa8fd311a28df06a178be60424d73c0746956a023</a>	7,007,519.06232887	1.5231%
11	<a href="#">0x000000000000000000000000000000000000dead</a>	6,133,678.155060823	1.3332%

## Raven X transactions

Time Series: Binance Smart Chain Transactions

Tue 13, Apr 2021 - Wed 14, Apr 2021



# 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 #
- + RavenX (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] swapTokensForEth #
  - [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] setMaxTxPercent # - modifiers: onlyOwner
- [Ext] setNumTokensSellToAddToLiquidity # - modifiers: onlyOwner
- [Pub] setSwapAndLiquifyEnabled # - modifiers: onlyOwner
- [Prv] TransferCharityETH #
- [Ext] <Fallback> (\$)

(\$ ) = 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.

## Owner privileges

- ❑ Owner can change the donation, tax and burn fees.
- ❑ Owner can change the max transfer amount.

## Notes

- ❑ 2% from each transaction will be converted to the BNB and sent to the charity address - `0x8b99f3660622e21f2910ecca7fbe51d654a1517d`

## Conclusion

Smart contracts do not contain high severity issues.

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.*