



TechRate
AUDIT COMPANY

Smart Contract Security Audit

TechRate

November, 2021

Audit Details



Audited project

Rajalnu



Deployer address

0xed0f709d7a1119d3d1ab41cbd9ff36efd27a8e6f



Client contacts:

Rajalnu team



Blockchain

Ethereum



Project website:

<https://rajainu.com>

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 Rajalnu to perform an audit of smart contracts:

<https://etherscan.io/address/0x77D64CB9b19228157A7628Ca0D26F5d9656b3d03#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 16.11.2021

Contract name	Rajalnu
Contract address	0x77D64CB9b19228157A7628Ca0D26F5d9656b3d03
Total supply	1,000,000,000,000,000,000
Token ticker	Rajalnu
Decimals	9
Token holders	955
Transactions count	1,957
Top 100 holders dominance	84.53%
Liquidity fee	6
Tax fee	2
Total fees	25554485557018670374215754
Uniswap V2 pair	0x36cbfa3bdf26ddcfcee6efb383775b29e0da95dd
Contract deployer address	0xed0f709d7a1119d3d1ab41cbd9ff36efd27a8e6f
Contract's current owner address	0x00

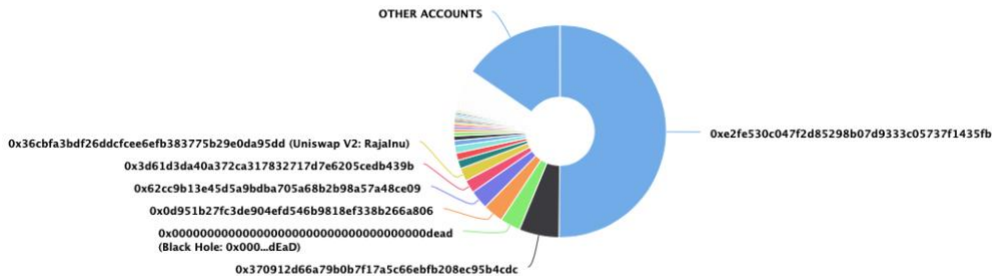
Rajalnu Token Distribution

The top 100 holders collectively own 84.53% (845,303,936,135,313,000.00 Tokens) of Rajalnu

Token Total Supply: 1,000,000,000,000,000.00 Token | Total Token Holders: 955

Rajalnu Top 100 Token Holders

Source: Etherscan.io



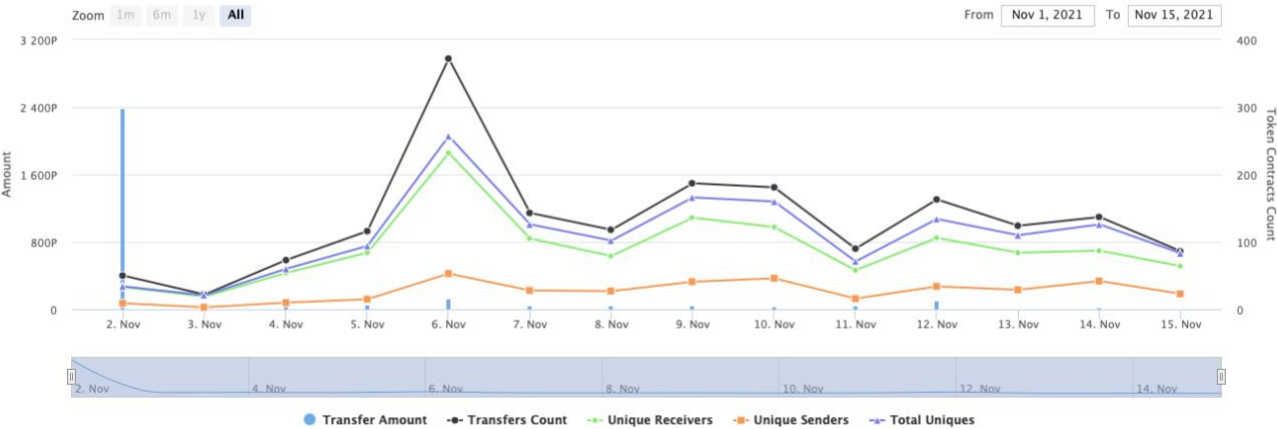
(A total of 845,303,936,135,313,000.00 tokens held by the top 100 accounts from the total supply of 1,000,000,000,000,000.00 token)

Rajalnu Contract Interaction Details



Time Series: Token Contract Overview

Tue 2, Nov 2021 - Mon 15, Nov 2021

Token Contract 0x77D64C89b19228157A7628Ca0D26F5d9656b3d03 (Rajalnu)
Source: Etherscan.io



Rajalnu Top 10 Token Holders

Rank	Address	Quantity (Token)	Percentage
1	 0xe2fe530c047f2d85298b07d9333c05737f1435fb	501,657,154,350,821,000.376607551	50.1657%
2	0x370912d66a79b0b7f17a5c66ebfb208ec95b4cdc	60,859,335,380,838,400.020466574	6.0859%
3	Black Hole: 0x000...dEaD	30,821,575,102,572,700.456256512	3.0822%
4	0x0d951b27fc3de904efd546b9818ef338b266a806	30,756,526,886,889,800.155586268	3.0757%
5	0x62cc9b13e45d5a9bdba705a68b2b98a57a48ce09	29,014,053,846,110,800.923489367	2.9014%
6	0x3d61d3da40a372ca317832717d7e6205cedb439b	20,002,038,669,385,700.018699262	2.0002%
7	 Uniswap V2: Rajalnu	19,847,159,433,418,800.799496206	1.9847%
8	0x7995a3d87239272ce88ec2f4ed917b59ef9b8cab	12,786,899,703,771,300.381537255	1.2787%
9	0x8300c48483adf74c2fba9145cb17eeb8988dc3ca	11,383,902,446,458,800.573879159	1.1384%
10	0xd65f03fb16367a2765a9a64cbe8817c5122e1a27	10,916,612,100,796,400.015471231	1.0917%



Contract functions details

- + [Int] IERC20
 - [Ext] totalSupply
 - [Ext] balanceOf
 - [Ext] transfer #
 - [Ext] allowance
 - [Ext] approve #
 - [Ext] transferFrom #
- + [Lib] SafeMath
 - [Int] tryAdd
 - [Int] trySub
 - [Int] tryMul
 - [Int] tryDiv
 - [Int] tryMod
 - [Int] add
 - [Int] sub
 - [Int] mul
 - [Int] div
 - [Int] mod
 - [Int] sub
 - [Int] div
 - [Int] mod
- + Context
 - [Int] _msgSender
 - [Int] _msgData
- + [Lib] Address
 - [Int] isContract
 - [Int] sendValue #
 - [Int] functionCall #
 - [Int] functionCall #
 - [Int] functionCallWithValue #
 - [Int] functionCallWithValue #
 - [Int] functionStaticCall
 - [Int] functionStaticCall
 - [Int] functionDelegateCall #
 - [Int] functionDelegateCall #
 - [Prv] _verifyCallResult
- + Ownable (Context)
 - [Pub] <Constructor> #
 - [Pub] owner
 - [Pub] renounceOwnership #
 - modifiers: onlyOwner
 - [Pub] transferOwnership #
 - modifiers: onlyOwner
 - [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 #

+ CoinToken (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] setDevFeePercent #
 - modifiers: onlyOwner
- [Ext] setLiquidityFeePercent #
 - modifiers: onlyOwner
- [Pub] setMaxTxPercent #
 - modifiers: onlyOwner
- [Pub] setDevWalletAddress #
 - modifiers: onlyOwner
- [Pub] setSwapAndLiquifyEnabled #
 - modifiers: onlyOwner
- [Ext] <Fallback> (\$)
- [Prv] _reflectFee #
- [Prv] _getValues
- [Prv] _getTValues

- [Prv] _getRValues
- [Prv] _getRate
- [Prv] _getCurrentSupply
- [Prv] _takeLiquidity #
- [Prv] _takeDev #
- [Prv] calculateTaxFee
- [Prv] calculateDevFee
- [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 #
- [Ext] setRouterAddress #
 - modifiers: onlyOwner
- [Ext] setNumTokensSellToAddToLiquidity #
 - modifiers: onlyOwner

(\$) = 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:

Check that the excluded array length is not too big

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

- Owner can change the tax, dev and liquidity fee.

```
ftrace | funcSig
function setTaxFeePercent(uint256 taxFee↑) external onlyOwner() {
    _taxFee = taxFee↑;
}

ftrace | funcSig
function setDevFeePercent(uint256 devFee↑) external onlyOwner() {
    _devFee = devFee↑;
}

ftrace | funcSig
function setLiquidityFeePercent(uint256 liquidityFee↑) external onlyOwner() {
    _liquidityFee = liquidityFee↑;
}
```

- Owner can change the maximum transaction amount.

```
function setMaxTxPercent(uint256 maxTxPercent↑) public onlyOwner {
    _maxTxAmount = maxTxPercent↑ * 10 ** _decimals;
}
```

- Owner can exclude from the fee.

```
function excludeFromFee(address account↑) public onlyOwner {
    _isExcludedFromFee[account↑] = true;
}
```

- Owner can change dev address.

```
function setDevWalletAddress(address _addr↑) public onlyOwner {
    _devWalletAddress = _addr↑;
}
```

- Owner can change router address.

```
function setRouterAddress(address newRouter↑) external onlyOwner {
    IUniswapV2Router02 _uniswapV2Router = IUniswapV2Router02(newRouter↑);
    _uniswapV2Pair = IUniswapV2Factory(_uniswapV2Router.factory()).createPair(address(this), _uniswapV2Router.WETH());
    _uniswapV2Router = _uniswapV2Router;
}
```

- Owner can minimum number of tokens to add to liquidity.

```
function setNumTokensSellToAddToLiquidity(uint256 amountToUpdate↑) external onlyOwner {
    _numTokensSellToAddToLiquidity = amountToUpdate↑;
}
```

- Owner can lock and unlock. By the way, using these functions the owner could retake privileges even after the ownership was renounced.

```
//Locks the contract for owner for the amount of time provided
function lock(uint256 time↑) public virtual onlyOwner {
    _previousOwner = _owner;
    _owner = address(0);
    _lockTime = time↑;
    emit OwnershipTransferred(_owner, address(0));
}

//Unlocks the contract for owner when _lockTime is exceeds
function unlock() public virtual {
    require(_previousOwner == msg.sender, "You don't have permission to unlock.");
    require(block.timestamp > _lockTime, "Contract is locked.");
    emit OwnershipTransferred(_owner, _previousOwner);
    _owner = _previousOwner;
}
```


Conclusion

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

Ownership renounce details are provided by the team:

<https://etherscan.io/tx/0xc5c577d8f6709edf939d04785154823c203dd46b971cb653b5ca05aa02cdb1f5>

Liquidity locking details are provided by the team:

<https://www.team.finance/view-coin/0x77D64CB9b19228157A7628Ca0D26F5d9656b3d03?name=Rajalnu&symbol=Rajalnu>

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.



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