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AUDIT COMPANY

Smart Contract Security Audit

TechRate

December, 2021

Audit Details

Audited project

Exonova

Deployer address

0xb2c4954f80ada033617a4074ce71d65a015bac84

Client contacts:

Exonova team

Blockchain

Binance Smart Chain

Project website:

Not provided

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 Exonova to perform an audit of smart contracts:
https://bscscan.com/address/0xf6ed243538eb71acb278c001fefb5775e100ec3d#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

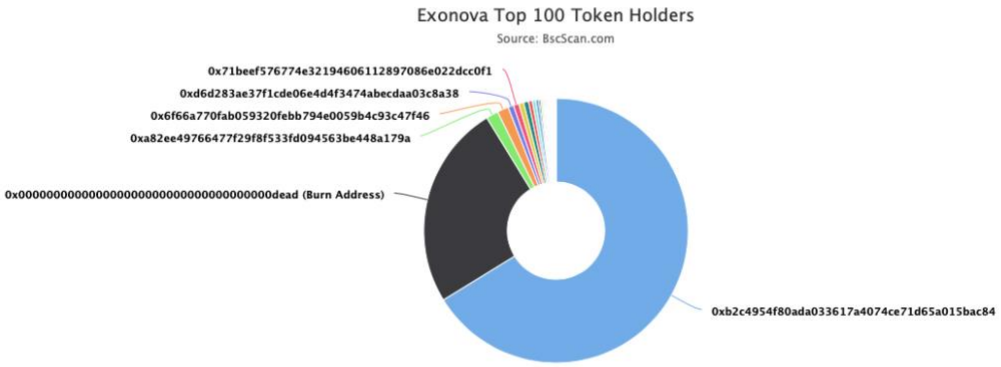
Token contract details for 12.12.2021

Contract name	Exonova
Contract address	0xf6ED243538EB71acb278C001Fefb5775e100ec3D
Total supply	1,000,000,000,000,000
Token ticker	NOVA
Decimals	9
Token holders	40
Transactions count	42
Top 100 holders dominance	100.00%
Multiplied fee	1500
Autoliquidity fee receiver	0xb2c4954f80ada033617a4074ce71d65a015bac84
Marketing fee receiver	0xb2c4954f80ada033617a4074ce71d65a015bac84
Pair	0xce74d1855fddc91b52268033e2268a17172d21cd
Contract deployer address	0xb2c4954f80ada033617a4074ce71d65a015bac84
Contract's current owner address	0xb2c4954f80ada033617a4074ce71d65a015bac84

Exonova Distribution

The top 100 holders collectively own 100.00% (1,000,000,000,000,000.00 Tokens) of Exonova

Token Total Supply: 1,000,000,000,000,000.00 Token | Total Token Holders: 40

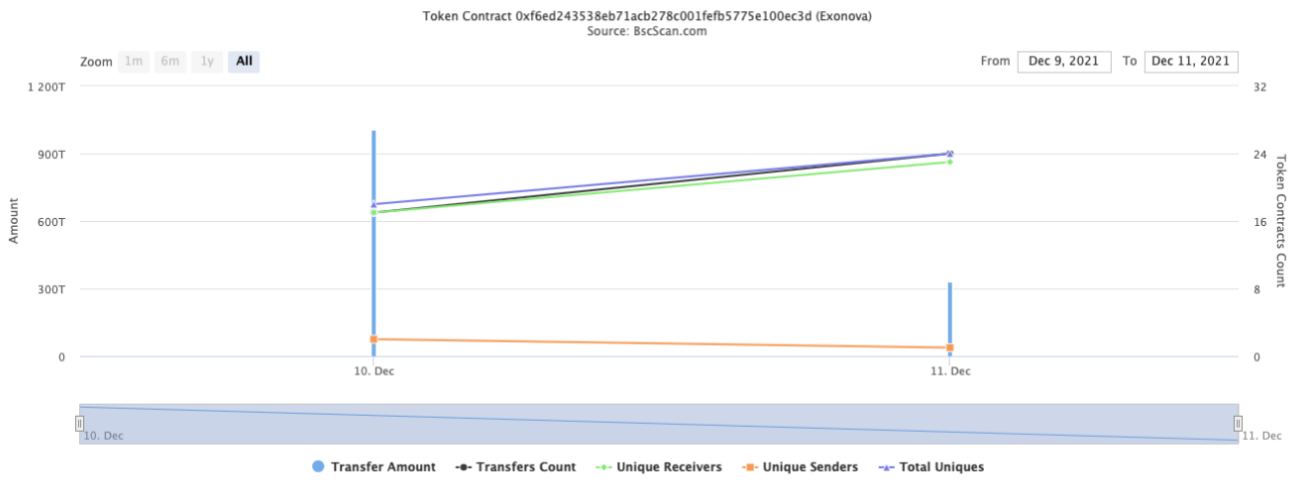


(A total of 1,000,000,000,000,000.00 tokens held by the top 100 accounts from the total supply of 1,000,000,000,000,000.00 token)

Exonova Contract Interaction details

Time Series: Token Contract Overview

Fri 10, Dec 2021 - Sat 11, Dec 2021



Exonova Top 10 Token Holders

Rank	Address	Quantity (Token)	Percentage
1	0xb2c4954f80ada033617a4074ce71d65a015bac84	662,400,000,000,000	66.2400%
2	Burn Address	250,000,000,000,000	25.0000%
3	0xa82ee49766477f29f8f533fd094563be448a179a	15,000,000,000,000	1.5000%
4	0x6f66a770fab059320febb794e0059b4c93c47f46	13,750,000,000,000	1.3750%
5	0xd6d283ae37f1cde06e4d4f3474abecdaa03c8a38	6,750,000,000,000	0.6750%
6	0x71beef576774e32194606112897086e022dcc0f1	6,750,000,000,000	0.6750%
7	0x22c6e00e34c8a454926c6b156fd92a55bd1e2cb6	6,000,000,000,000	0.6000%
8	0xe2b1f90b092534cfca89aed76e76be51cf902d46	6,000,000,000,000	0.6000%
9	0xdc8a3cd307f6531e807658e9a6aeb6aab2f98062	4,630,000,000,000	0.4630%
10	0x5002072b24a06a5224a3c7d2e66f8ad8536d36e2	4,000,000,000,000	0.4000%

Contract functions details

+ [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

+ [Int] IBEP20
  - [Ext] totalSupply
  - [Ext] decimals
  - [Ext] symbol
  - [Ext] name
  - [Ext] getOwner
  - [Ext] balanceOf
  - [Ext] transfer #
  - [Ext] allowance
  - [Ext] approve #
  - [Ext] transferFrom #

+ Auth
  - [Pub] <Constructor> #
  - [Pub] authorize #
    - modifiers: onlyOwner
  - [Pub] unauthorize #
    - modifiers: onlyOwner
  - [Pub] isOwner
  - [Pub] isAuthorized
  - [Pub] transferOwnership #
    - modifiers: onlyOwner

+ [Int] IDEXFactory
  - [Ext] createPair #

+ [Int] IDEXRouter
  - [Ext] factory
  - [Ext] WETH
  - [Ext] addLiquidity #
  - [Ext] addLiquidityETH ($)
  - [Ext] swapExactTokensForTokensSupportingFeeOnTransferTokens #
  - [Ext] swapExactETHForTokensSupportingFeeOnTransferTokens ($)
  - [Ext] swapExactTokensForETHSupportingFeeOnTransferTokens #

+ [Int] IDividendDistributor

- [Ext] setDistributionCriteria #
- [Ext] setShare #
- [Ext] deposit ($)
- [Ext] process #

+ DividendDistributor (IDividendDistributor)
- [Pub] <Constructor> #
- [Ext] setDistributionCriteria #
  - modifiers: onlyToken
- [Ext] setShare #
  - modifiers: onlyToken
- [Ext] deposit ($)
  - modifiers: onlyToken
- [Ext] process #
  - modifiers: onlyToken
- [Int] shouldDistribute
- [Int] distributeDividend #
- [Ext] claimDividend #
- [Pub] getUnpaidEarnings
- [Int] getCumulativeDividends
- [Int] addShareholder #
- [Int] removeShareholder #

+ Exonova (IBEP20, Auth)
- [Pub] <Constructor> #
  - modifiers: Auth
- [Ext] <Fallback> ($)
- [Ext] totalSupply
- [Ext] decimals
- [Ext] symbol
- [Ext] name
- [Ext] getOwner
- [Pub] balanceOf
- [Ext] allowance
- [Pub] approve #
- [Ext] approveMax #
- [Ext] transfer #
- [Ext] transferFrom #
- [Int] _transferFrom #
- [Int] _basicTransfer #
- [Int] checkTxLimit
- [Int] shouldTakeFee
- [Pub] getTotalFee
- [Pub] getMultipliedFee
- [Int] takeFee #
- [Int] shouldSwapBack
- [Int] swapBack #
  - modifiers: swapping
- [Int] shouldAutoBuyback
- [Ext] triggerZeusBuyback #
  - modifiers: authorized
- [Ext] clearBuybackMultiplier #
  - modifiers: authorized
- [Int] triggerAutoBuyback #
- [Int] buyTokens #

  - modifiers: swapping
- [Ext] setAutoBuybackSettings #
  - modifiers: authorized
- [Ext] setBuybackMultiplierSettings #
  - modifiers: authorized
- [Int] launched
- [Pub] launch #
  - modifiers: authorized
- [Ext] setTxLimit #
  - modifiers: authorized
- [Ext] setIsDividendExempt #
  - modifiers: authorized
- [Ext] setIsFeeExempt #
  - modifiers: authorized
- [Ext] setIsTxLimitExempt #
  - modifiers: authorized
- [Ext] setFees #
  - modifiers: authorized
- [Ext] setFeeReceivers #
  - modifiers: authorized
- [Ext] setSwapBackSettings #
  - modifiers: authorized
- [Ext] setTargetLiquidity #
  - modifiers: authorized
- [Ext] setDistributionCriteria #
  - modifiers: authorized
- [Ext] setDistributorSettings #
  - modifiers: authorized
- [Pub] getCirculatingSupply
- [Pub] getLiquidityBacking
- [Pub] isOverLiquified

($) = 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.	Passed
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

No low severity issues found.

Notes

- No transfer event emitted when basic transfer called.

```
function _basicTransfer(address sender, address recipient, uint256 amount) internal returns (bool) {
    _balances[sender] = _balances[sender].sub(amount, "Insufficient Balance");
    _balances[recipient] = _balances[recipient].add(amount);
      emit Transfer(sender, recipient, amount);
    return true;
}
```

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

- Owner can authorize / unauthorize addresses.

```
/**
 * Authorize address. Owner only
 */
function authorize(address adr) public onlyOwner {
    authorizations[adr] = true;
}

/**
 * Remove address' authorization. Owner only
 */
function unauthorize(address adr) public onlyOwner {
    authorizations[adr] = false;
}
```

- Authorized addresses can call triggerZeusBuyback that's initiate buyback.

```
function triggerZeusBuyback(uint256 amount, bool triggerBuybackMultiplier) external authorized {
    buyTokens(amount, DEAD);
    if(triggerBuybackMultiplier){
        buybackMultiplierTriggeredAt = block.timestamp;
        emit BuybackMultiplierActive(buybackMultiplierLength);
    }
}
```

- Authorized addresses can clear buyback multiplier.

```
function clearBuybackMultiplier() external authorized {
    buybackMultiplierTriggeredAt = 0;
}
```

- Authorized addresses can change auto buyback settings.

```
function setAutoBuybackSettings(bool _enabled, uint256 _cap, uint256 _amount, uint256 _period) external authorized {
    autoBuybackEnabled = _enabled;
    autoBuybackCap = _cap;
    autoBuybackAccumulator = 0;
    autoBuybackAmount = _amount;
    autoBuybackBlockPeriod = _period;
    autoBuybackBlockLast = block.number;
}
```

- Authorized addresses can change buyback multiplier settings.

```
function setBuybackMultiplierSettings(uint256 numerator, uint256 denominator, uint256 length) external authorized {
    require(numerator / denominator <= 2 && numerator > denominator);
    buybackMultiplierNumerator = numerator;
    buybackMultiplierDenominator = denominator;
    buybackMultiplierLength = length;
}
```

- Authorized addresses can change the maximum transaction amount.

```
function setTxLimit(uint256 amount) external authorized {
    require(amount >= _totalSupply / 1000);
    _maxTxAmount = amount;
}
```

- Authorized addresses can include in and exclude from dividends.

```
function setIsDividendExempt(address holder, bool exempt) external authorized {
    require(holder != address(this) && holder != pair);
    isDividendExempt[holder] = exempt;
    if(exempt){
        distributor.setShare(holder, 0);
    }else{
        distributor.setShare(holder, _balances[holder]);
    }
}
```

- Authorized addresses can include in and exclude from fee.

```
function setIsFeeExempt(address holder, bool exempt) external authorized {
    isFeeExempt[holder] = exempt;
}
```

- Authorized addresses can include in and exclude from transaction amount limit.

```
function setIsTxLimitExempt(address holder, bool exempt) external authorized {
    isTxLimitExempt[holder] = exempt;
}
```

- Authorized addresses can change fees.

```
function setFees(uint256 _liquidityFee, uint256 _buybackFee, uint256 _reflectionFee, uint256 _marketingFee, uint256 _feeDenominator) external authorized {
    liquidityFee = _liquidityFee;
    buybackFee = _buybackFee;
    reflectionFee = _reflectionFee;
    marketingFee = _marketingFee;
    totalFee = _liquidityFee.add(_buybackFee).add(_reflectionFee).add(_marketingFee);
    feeDenominator = _feeDenominator;
    require(totalFee < feeDenominator/4);
}
```

- Authorized addresses can change fee receivers.

```
function setFeeReceivers(address _autoLiquidityReceiver, address _marketingFeeReceiver) external authorized {
    autoLiquidityReceiver = _autoLiquidityReceiver;
    marketingFeeReceiver = _marketingFeeReceiver;
}
```

- Authorized addresses can change swap threshold and disable/enable swap.

```
function setSwapBackSettings(bool _enabled, uint256 _amount) external authorized {
    swapEnabled = _enabled;
    swapThreshold = _amount;
}
```

- Authorized addresses can change target liquidity values.

```
function setTargetLiquidity(uint256 _target, uint256 _denominator) external authorized {
    targetLiquidity = _target;
    targetLiquidityDenominator = _denominator;
}
```

- Authorized addresses can change distribution criteria.

```
function setDistributionCriteria(uint256 _minPeriod, uint256 _minDistribution) external authorized {
    distributor.setDistributionCriteria(_minPeriod, _minDistribution);
}
```

- Authorized addresses can change distribution GAS.

```
function setDistributorSettings(uint256 gas) external authorized {
    require(gas < 750000);
    distributorGas = gas;
}
```

Conclusion

Smart contracts contain owner privileges! Liquidity pair contract's security is not checked due to out of scope.

Liquidity locking details are NOT provided by the team.

TechRate note:

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