



Cyberscope

# Audit Report

## **Neuron Network**

July 2023

Address      0xfc035fa583abbd21c385ac44e0edfe752cfc8e7f

Network      BSC

Audited by   © cyberscope

# Analysis

● Critical   ● Medium   ● Minor / Informative   ● Pass

| Severity | Code | Description             | Status |
|----------|------|-------------------------|--------|
| ●        | ST   | Stops Transactions      | Passed |
| ●        | OTUT | Transfers User's Tokens | Passed |
| ●        | ELFM | Exceeds Fees Limit      | Passed |
| ●        | MT   | Mints Tokens            | Passed |
| ●        | BT   | Burns Tokens            | Passed |
| ●        | BC   | Blacklists Addresses    | Passed |

# Diagnostics

● Critical ● Medium ● Minor / Informative

| Severity | Code | Description                                | Status     |
|----------|------|--|------------|
| ●        | L04  | Conformance to Solidity Naming Conventions | Unresolved |
| ●        | L07  | Missing Events Arithmetic                  | Unresolved |
| ●        | L12  | Using Variables before Declaration         | Unresolved |
| ●        | L14  | Uninitialized Variables in Local Scope     | Unresolved |
| ●        | L16  | Validate Variable Setters                  | Unresolved |
| ●        | L20  | Succeeded Transfer Check                   | Unresolved |

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## Review

|                  |   |
|------------------|---|
| Contract Name    | NeuronNetwork   |
| Compiler Version | v0.8.19+commit.7dd6d404   |
| Optimization     | 500 runs  |
| Explorer         | <a href="https://bscscan.com/address/0xfc035fa583abbd21c385ac44e0edfe752cfc8e7f">https://bscscan.com/address/0xfc035fa583abbd21c385ac44e0edfe752cfc8e7f</a> |
| Address          | 0xfc035fa583abbd21c385ac44e0edfe752cfc8e7f  |
| Network          | BSC   |
| Symbol           | NEURON  |
| Decimals         | 18  |
| Total Supply     | 1,000,000,000   |

## Audit Updates

|                   |             |
|-------------------|-------------|
| Initial Audit     | 28 Jun 2023 |
| Corrected Phase 2 | 01 Jul 2023 |

## Source Files

|                   |  |
|-------------------|--|
| Filename          | SHA256   |
| NeuronNetwork.sol | edae05896a1114d335918fc31da54fd197df65d2712d634d7a1f3307affb3271 |

## Findings Breakdown



|                       |   |
|-----------------------|---|
| ● Critical            | 0 |
| ● Medium              | 0 |
| ● Minor / Informative | 6 |

| Severity              | Unresolved | Acknowledged | Resolved | Other |
|-----------------------|------------|--------------|----------|-------|
| ● Critical            | 0          | 0            | 0        | 0     |
| ● Medium              | 0          | 0            | 0        | 0     |
| ● Minor / Informative | 6          | 0            | 0        | 0     |

## L04 - Conformance to Solidity Naming Conventions

|                    |  |
|--------------------|--|
| <b>Criticality</b> | Minor / Informative  |
| <b>Location</b>    | contracts/Neuron_Network.sol#L33,110,111,112,113,114,122,128,129,130,131,146 |
| <b>Status</b>      | Unresolved   |

### Description

The Solidity style guide is a set of guidelines for writing clean and consistent Solidity code. Adhering to a style guide can help improve the readability and maintainability of the Solidity code, making it easier for others to understand and work with.

The followings are a few key points from the Solidity style guide:

1. Use camelCase for function and variable names, with the first letter in lowercase (e.g., myVariable, updateCounter).
2. Use PascalCase for contract, struct, and enum names, with the first letter in uppercase (e.g., MyContract, UserStruct, ErrorEnum).
3. Use uppercase for constant variables and enums (e.g., MAX\_VALUE, ERROR\_CODE).
4. Use indentation to improve readability and structure.
5. Use spaces between operators and after commas.
6. Use comments to explain the purpose and behavior of the code.
7. Keep lines short (around 120 characters) to improve readability.

```
function WETH() external pure returns (address);
uint256 constant private startingSupply = 1_000_000_000
string constant private _name = "Neuron Network"
string constant private _symbol = "NEURON"
uint8 constant private _decimals = 9
uint256 constant private _tTotal = startingSupply * 10**_decimals

Fees public _taxRates = Fees({
    buyFee: 1000,
    sellFee: 1000,
    transferFee: 0
})

uint256 constant public maxBuyTaxes = 100
uint256 constant public maxSellTaxes = 1000
uint256 constant public maxTransferTaxes = 1000

...
```

## Recommendation

By following the Solidity naming convention guidelines, the codebase increased the readability, maintainability, and makes it easier to work with.

Find more information on the Solidity documentation

<https://docs.soliditylang.org/en/v0.8.17/style-guide.html#naming-convention>.



## L07 - Missing Events Arithmetic

|                    |                                       |
|--------------------|---------------------------------------|
| <b>Criticality</b> | Minor / Informative                   |
| <b>Location</b>    | contracts/Neuron_Network.sol#L374,384 |
| <b>Status</b>      | Unresolved                            |

### Description

Events are a way to record and log information about changes or actions that occur within a contract. They are often used to notify external parties or clients about events that have occurred within the contract, such as the transfer of tokens or the completion of a task.

It's important to carefully design and implement the events in a contract, and to ensure that all required events are included. It's also a good idea to test the contract to ensure that all events are being properly triggered and logged.

```
swapThreshold = (_tTotal * thresholdPercent) / thresholdDivisor  
piSwapPercent = priceImpactSwapPercent
```

### Recommendation

By including all required events in the contract and thoroughly testing the contract's functionality, the contract ensures that it performs as intended and does not have any missing events that could cause issues with its arithmetic.

## L12 - Using Variables before Declaration

|                    |                                       |
|--------------------|---------------------------------------|
| <b>Criticality</b> | Minor / Informative                   |
| <b>Location</b>    | contracts/Neuron_Network.sol#L313,513 |
| <b>Status</b>      | Unresolved                            |

### Description

The contract is using a variable before the declaration. This is usually happening either if it has not been declared yet or if the variable has been declared in a different scope. It is not a good practice to use a local variable before it has been declared.

```
address router
address constructorLP
uint256 initSwapAmount
uint256 initThreshold
```

### Recommendation

By declaring local variables before using them, contract ensures that it operates correctly. It's important to be aware of this rule when working with local variables, as using a variable before it has been declared can lead to unexpected behavior and can be difficult to debug.

## L14 - Uninitialized Variables in Local Scope

|                    |                                       |
|--------------------|---------------------------------------|
| <b>Criticality</b> | Minor / Informative                   |
| <b>Location</b>    | contracts/Neuron_Network.sol#L313,513 |
| <b>Status</b>      | Unresolved                            |

### Description

Using an uninitialized local variable can lead to unpredictable behavior and potentially cause errors in the contract. It's important to always initialize local variables with appropriate values before using them.

```
address constructorLP
address router
uint256 initSwapAmount
uint256 initThreshold
```

### Recommendation

By initializing local variables before using them, the contract ensures that the functions behave as expected and avoid potential issues.

## L16 - Validate Variable Setters

|                    |                                   |
|--------------------|-----------------------------------|
| <b>Criticality</b> | Minor / Informative               |
| <b>Location</b>    | contracts/Neuron_Network.sol#L220 |
| <b>Status</b>      | Unresolved                        |

### Description

The contract performs operations on variables that have been configured on user-supplied input. These variables are missing of proper check for the case where a value is zero. This can lead to problems when the contract is executed, as certain actions may not be properly handled when the value is zero.

```
operator = newOperator
```

### Recommendation

By adding the proper check, the contract will not allow the variables to be configured with zero value. This will ensure that the contract can handle all possible input values and avoid unexpected behavior or errors. Hence, it can help to prevent the contract from being exploited or operating unexpectedly.

## L20 - Succeeded Transfer Check

|                    |                                   |
|--------------------|-----------------------------------|
| <b>Criticality</b> | Minor / Informative               |
| <b>Location</b>    | contracts/Neuron_Network.sol#L532 |
| <b>Status</b>      | Unresolved                        |

### Description

According to the ERC20 specification, the transfer methods should be checked if the result is successful. Otherwise, the contract may wrongly assume that the transfer has been established.

```
TOKEN.transfer(_owner, TOKEN.balanceOf(address(this)))
```

### Recommendation

The contract should check if the result of the transfer methods is successful. The team is advised to check the SafeERC20 library from the [Openzeppelin library](#).

## Functions Analysis

| Contract          | Type          | Bases      |            |           |
|-------------------|---------------|------------|------------|-----------|
|                   | Function Name | Visibility | Mutability | Modifiers |
|                   |               |            |            |           |
| <b>IERC20</b>     | Interface     |            |            |           |
|                   | totalSupply   | External   |            | -         |
|                   | decimals      | External   |            | -         |
|                   | symbol        | External   |            | -         |
|                   | name          | External   |            | -         |
|                   | getOwner      | External   |            | -         |
|                   | balanceOf     | External   |            | -         |
|                   | transfer      | External   | ✓          | -         |
|                   | allowance     | External   |            | -         |
|                   | approve       | External   | ✓          | -         |
|                   | transferFrom  | External   | ✓          | -         |
|                   |               |            |            |           |
| <b>IFactoryV2</b> | Interface     |            |            |           |
|                   | getPair       | External   |            | -         |
|                   | createPair    | External   | ✓          | -         |
|                   |               |            |            |           |
| <b>IV2Pair</b>    | Interface     |            |            |           |
|                   | factory       | External   |            | -         |

|                    |   |           |         |   |
|--------------------|---|-----------|---------|---|
|                    | getReserves   | External  |         | - |
|                    | sync  | External  | ✓       | - |
|                    |   |           |         |   |
| <b>IRouter01</b>   | Interface   |           |         |   |
|                    | factory   | External  |         | - |
|                    | WETH  | External  |         | - |
|                    | addLiquidityETH                                       | External  | Payable | - |
|                    | addLiquidity  | External  | ✓       | - |
|                    | swapExactETHForTokens                                 | External  | Payable | - |
|                    | getAmountsOut   | External  |         | - |
|                    | getAmountsIn  | External  |         | - |
|                    |   |           |         |   |
| <b>IRouter02</b>   | Interface   | IRouter01 |         |   |
|                    | swapExactTokensForETHSupportingFeeOnTransferTokens    | External  | ✓       | - |
|                    | swapExactETHForTokensSupportingFeeOnTransferTokens    | External  | Payable | - |
|                    | swapExactTokensForTokensSupportingFeeOnTransferTokens | External  | ✓       | - |
|                    | swapExactTokensForTokens                              | External  | ✓       | - |
|                    |   |           |         |   |
| <b>Initializer</b> | Interface   |           |         |   |
|                    | setLaunch   | External  | ✓       | - |
|                    | getConfig   | External  | ✓       | - |
|                    | getInits  | External  | ✓       | - |
|                    | setLpPair   | External  | ✓       | - |

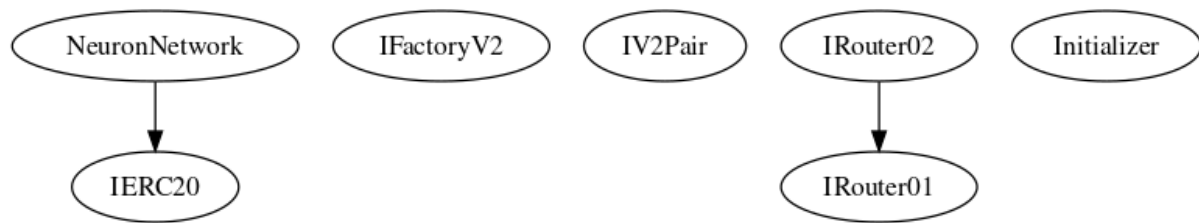
|                      |                            |          |         |           |
|----------------------|----------------------------|----------|---------|-----------|
|                      |                            |          |         |           |
| <b>NeuronNetwork</b> | Implementation             | IERC20   |         |           |
|                      |                            | Public   | Payable | -         |
|                      | transferOwner              | External | ✓       | onlyOwner |
|                      | renounceOwnership          | External | ✓       | onlyOwner |
|                      | setOperator                | Public   | ✓       | -         |
|                      | renounceOriginalDeployer   | External | ✓       | -         |
|                      |                            | External | Payable | -         |
|                      | totalSupply                | External |         | -         |
|                      | decimals                   | External |         | -         |
|                      | symbol                     | External |         | -         |
|                      | name                       | External |         | -         |
|                      | getOwner                   | External |         | -         |
|                      | allowance                  | External |         | -         |
|                      | balanceOf                  | Public   |         | -         |
|                      | transfer                   | Public   | ✓       | -         |
|                      | approve                    | External | ✓       | -         |
|                      | _approve                   | Internal | ✓       |           |
|                      | approveContractContingency | External | ✓       | onlyOwner |
|                      | transferFrom               | External | ✓       | -         |
|                      | setNewRouter               | External | ✓       | onlyOwner |
|                      | setLpPair                  | External | ✓       | onlyOwner |
|                      | setInitializer             | Public   | ✓       | onlyOwner |



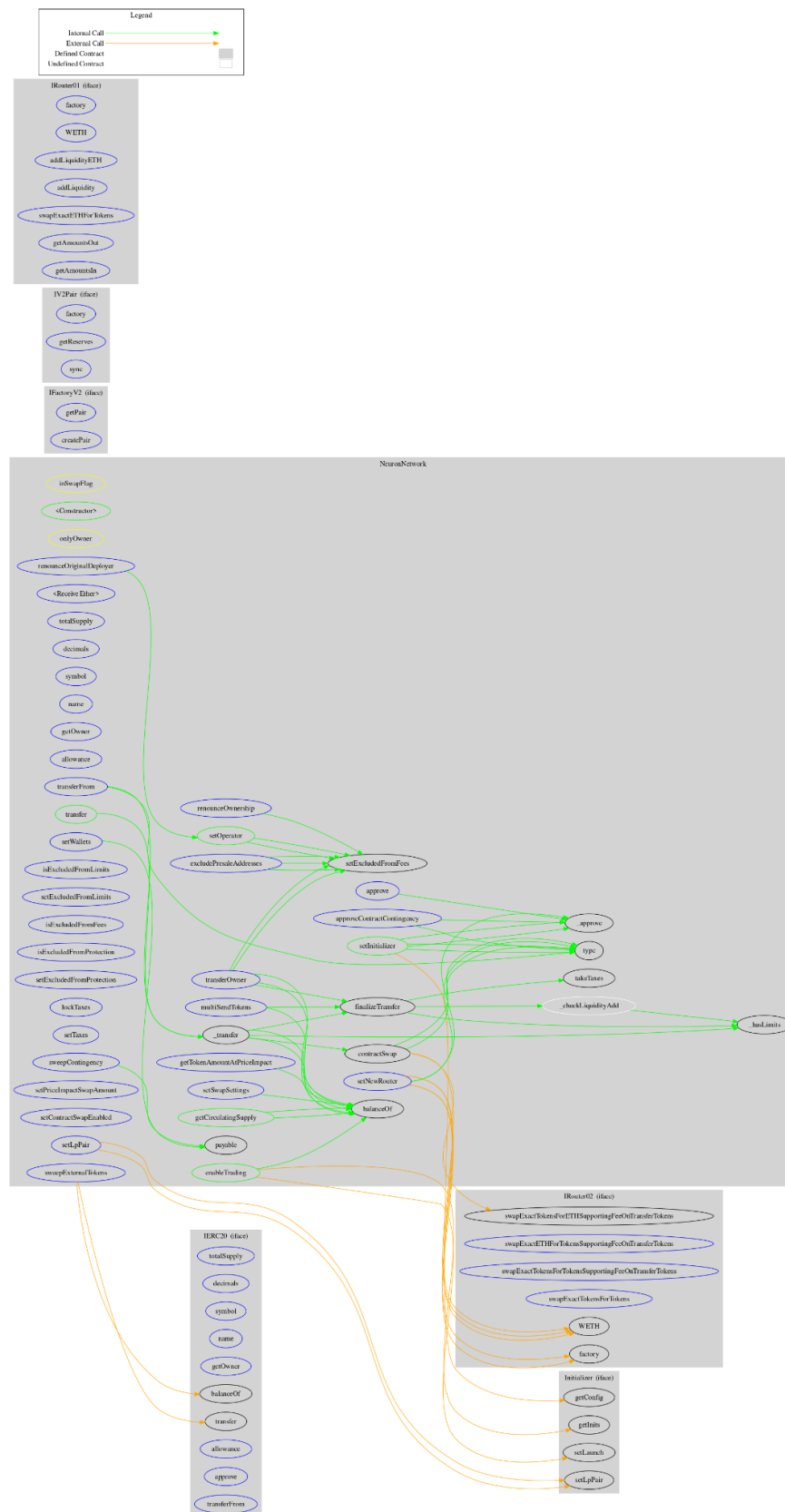
|  |                             |          |   |            |
|--|-----------------------------|----------|---|------------|
|  | isExcludedFromLimits        | External |   | -          |
|  | setExcludedFromLimits       | External | ✓ | onlyOwner  |
|  | isExcludedFromFees          | External |   | -          |
|  | setExcludedFromFees         | Public   | ✓ | onlyOwner  |
|  | isExcludedFromProtection    | External |   | -          |
|  | setExcludedFromProtection   | External | ✓ | onlyOwner  |
|  | getCirculatingSupply        | Public   |   | -          |
|  | lockTaxes                   | External | ✓ | onlyOwner  |
|  | setTaxes                    | External | ✓ | onlyOwner  |
|  | setWallets                  | External | ✓ | onlyOwner  |
|  | getTokenAmountAtPriceImpact | External |   | -          |
|  | setSwapSettings             | External | ✓ | onlyOwner  |
|  | setPriceImpactSwapAmount    | External | ✓ | onlyOwner  |
|  | setContractSwapEnabled      | External | ✓ | onlyOwner  |
|  | excludePresaleAddresses     | External | ✓ | onlyOwner  |
|  | _hasLimits                  | Internal |   |            |
|  | _transfer                   | Internal | ✓ |            |
|  | contractSwap                | Internal | ✓ | inSwapFlag |
|  | _checkLiquidityAdd          | Internal | ✓ |            |
|  | enableTrading               | Public   | ✓ | onlyOwner  |
|  | sweepContingency            | External | ✓ | onlyOwner  |
|  | sweepExternalTokens         | External | ✓ | onlyOwner  |
|  | multiSendTokens             | External | ✓ | onlyOwner  |

|  |                  |          |   |  |
|--|------------------|----------|---|--|
|  | finalizeTransfer | Internal | ✓ |  |
|  | takeTaxes        | Internal | ✓ |  |

## Inheritance Graph



# Flow Graph



## Summary

Neuron Network contract implements a token mechanism. This audit investigates security issues, business logic concerns and potential improvements. Neuron Network is an interesting project that has a friendly and growing community. The Smart Contract analysis reported no compiler error or critical issues. The contract Owner can access some admin functions that can not be used in a malicious way to disturb the users' transactions. There is also a limit of max 1% buy, 10% sell and transfer fees.

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Cyberscope is one of the leading smart contract audit firms in the crypto space and has built a high-profile network of clients and partners.



**The Cyberscope team**

<https://www.cyberscope.io>